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The International Society of Feline Medicine (ISFM) was established in 1996 as the veterinary focus for the work of the charity and, together with the American Society of Feline Practitioners, it publishes the Journal of Feline Medicine and Surgery.
Development of an ultrasound-guided technique for pudendal nerve block in cat cadavers.
Adami, C., G. Angeli, K. Haenssgen, M. H. Stoffel, and C. Spadavecchia
The objective of this prospective experimental cadaveric study was to develop an ultrasound-guided technique to perform an anaesthetic pudendal nerve block in male cats. Fifteen fresh cadavers were used for this trial. A detailed anatomical dissection was performed on one cat in order to scrutinise the pudendal nerve and its ramifications. In a second step, the cadavers of six cats were used to test three different ultrasonographic approaches to the pudendal nerve: the deep dorso-lateral, the superficial dorso-lateral and the median transperineal. Although none of the approaches allowed direct ultrasonographical identification of the pudendal nerve branches, the deep dorso-lateral was found to be the most advantageous one in terms of practicability and ability to identify useful and reliable landmarks. Based on these findings, the deep dorso-lateral approach was selected as technique of choice for tracer injections (0.1 ml 1% methylene blue injected bilaterally) in six cat cadavers other than those used for the ultrasonographical study. Anatomical dissection revealed a homogeneous spread of the tracer around the pudendal nerve sensory branches in all six cadavers. Finally, computed tomography was performed in two additional cadavers after injection of 0.3 ml/kg (0.15 ml/kg per each injection sites, left and right) contrast medium through the deep dorso-lateral approach in order to obtain a model of volume distribution applicable to local anaesthetics. Our findings in cat cadavers indicate that ultrasound-guided pudendal nerve block is feasible and could be proposed to provide peri-operative analgesia in clinical patients undergoing perineal urethropotomy.

Three clinical cases of Anaplasma phagocytophilum infection in cats in Poland.
Adaszek, L., M. Gorna, M. Skrzypczak, K. Buczek, I. Balicki, and S. Winiarczyk
The purpose of this study was to describe Anaplasma phagocytophilum infection of three cats in Poland showing signs of fever, swollen and painful joints, pale mucous membranes and epistaxis. Morulae consistent with A phagocytophilum were present within the neutrophils of two of the cats. A polymerase chain reaction (PCR) was found targeting the 16S rRNA gene amplified DNA consistent with A phagocytophilum in the blood of all three cats. The sequence of the PCR product obtained showed 99.6-100% homology with the sequence of A phagocytophilum, gene number EU 090186 from Genbank. Applied therapy (including administration of tetracyclines for 3 weeks) resulted in a gradual clinical recovery.

Feline small cell lymphosarcoma versus inflammatory bowel disease: diagnostic challenges.
Al-Ghazlat, S., C. E. de Rezende, and J. Ferreri
Inflammatory bowel disease (IBD) and small cell lymphosarcoma (SCLSA) are common causes of chronic gastrointestinal (GI) tract disease in cats. The history, clinical signs, and results of blood work and imaging for these conditions are nonspecific and often overlap. After a thorough diagnostic workup and treatment trials to rule out other conditions, a definitive diagnosis requires histopathologic evaluation of GI tract biopsy specimens. Full-thickness tissue samples appear to be superior to endoscopic biopsy samples in providing an accurate diagnosis. Adding advanced diagnostics such as polymerase chain reaction and immunohistochemistry to traditional histopathology may improve the diagnostic utility of small samples such as the ones obtained via endoscopy. Treatment of and prognosis for IBD and SCLSA are discussed in a companion article.

Anterior segment fluorescein angiography of the normal feline eye using a dSLR camera adaptor.
Alario, A. F., C. G. Pirie, and S. Pizzirani
PURPOSE: To describe anterior segment fluorescein angiography (ASFA) of the normal feline eye using a digital single-lens reflex (dSLR) camera adaptor. ANIMALS: Ten cats free of ocular and systemic disease were evaluated. METHODS: All cats received maropitant citrate (1.0 mg/kg SQ) and diphenhydramine (2.0 mg/kg SQ) 20 min prior to anesthesia using propofol (4 mg/kg IV bolus, 0.2 mg/kg/min CR1). Standard color and red-free images were obtained prior to the administration of 10% sodium fluorescein (20 mg/kg IV). Imaging was performed using a dSLR camera (Canon 7D), dSLR camera adaptor, camera lens (Canon EF-S 60 mm f/2.8 macro), and an accessory flash (Canon 580EXII). Imaging occurred
Pharmacokinetics of imipenem after intravenous, intramuscular and subcutaneous administration to cats.

The study describes the pharmacokinetics and predicted efficacy of imipenem after intravenous (IV), intramuscular (IM) and subcutaneous (SC) administration to five adult cats at a dose of 5 mg/kg. Susceptibility to imipenem [minimum inhibitory concentration (MIC)] was determined for antimicrobial resistant Escherichia coli (n = 13) and staphylococci (n = 3) isolated from domestic cat infections (urinary system, skin and conjunctiva). Maximum plasma concentrations of imipenem were 13.45 microg/ml (IV), 6.47 microg/ml (IM) and 3.83 microg/ml (SC). Bioavailability was 93.18% (IM) and 107.90% (SC). Elimination half-lives for IV, IM and SC administration were 1.17, 1.44 and 1.55 h, respectively. All tested bacteria were susceptible to imipenem; MIC values were 0.03 microg/ml for Staphylococcus species and <0.25-0.5 microg/ml for E. coli. Mean imipenem concentrations remained above a MIC of 0.5 microg/ml for approximately 4 h (IV and IM) and 9 h (SC). Imipenem would be predicted to be effective for the treatment of antimicrobial resistant bacterial infections in cats at a dosage of 5 mg/kg every 6-8 h (IV, IM), or longer for the SC route. However, clinical trials are mandatory to establish its efficacy and proper dosing.

Organohalogenated contaminants (OHCs) in the serum and hair of pet cats and dogs: biosentinels of indoor pollution.

Concentrations of different classes of organohalogenated contaminants (OHCs) viz., polychlorinated diphenyl ethers (PBDEs), novel brominated flame retardants (NBFRs), bromophenols (BPs), polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs), and their metabolites were determined in cat and dog serum and hair samples from Pakistan. The major DDT metabolite, p,p’-DDE, was the major OHC in cat serum (N=20) and ranged between 1 and 2150 ng/g lipid weight (lw). p,p’-DDE was not detected in dog serum (N=16). In contrary to other OHCs, levels of summation operatorHO-PCBs were significantly higher in dog serum (median=6.0 ng/g lw) than cat serum (median=2.2 ng/g lw). Levels of most OHCs were significantly higher (p<0.05) in cat serum than those found in human serum from the same region, in particular for summation operatorPBDEs (ranged 1-1280 ng/g lw). Significantly lower levels of OCPs (p<0.05) were detected in dog serum than in human serum. The concentrations of summation operatorBPs were seven times higher in cat serum (median 112 ng/g lw) than dog serum (median 16 ng/g lw). To the best of our knowledge, this is the first time that NBFRs, e.g., 1,2-bis(2,4,6-tribromophenoxy)ethane (BTBPE), decabromodiphenylethane (DBDPE), and bis(2-ethylhexyl)-3,4,5,6-tetrabromophthalate (TBPH), were detected in cat and dog’s hair. BTBPE had the highest detection frequency (30%) in the serum samples. In cat and dog hair samples, the order of importance of OHCs was summation operatorOCPs>summation operatorNBFRs>summation operatorPBDEs>summation operatorPCB, with the highest concentrations being around 38 ng/g hair. In paired hair-serum cat samples (N=12), summation operatorDDTs (r=0.65, p=0.001) were significantly correlated, while for all other OHCs no significant correlations (p>0.001) were observed in both cats and dogs. Our findings on both hair and serum samples suggested that pet dogs do not bioaccumulate DDTs. Our results are also in agreement with the hypothesis that pets may serve as biosentinels for indoor pollution. This is the first study to document the presence of OHCs in pets from Pakistan and provides baseline information for future monitoring of OHCs in pets.

Correlation of bronchoalveolar eosinophilic percentage with airway responsiveness in cats with chronic bronchial
are necessary to assess whether ketamine could be a useful analgesic minimally affect thermal and mechanical antinociception in cats. Further studies with different nociceptive testing methods are required.

OBJECTIVES: To retrospectively assess the relationship between bronchoalveolar lavage fluid analysis and lung function parameters as assessed by means of barometric whole body plethysmography and airway responsiveness testing in cats with chronic bronchial disease and to evaluate the potential application of barometric whole body plethysmography and airway responsiveness testing to distinguish between eosinophilic and non-eosinophilic bronchitis.

METHODS: Twelve cats presented for chronic bronchial disease with complete bronchoalveolar lavage fluid and barometric whole body plethysmography data were identified. Cats were retrospectively assigned to eosinophilic bronchitis or non-eosinophilic bronchitis groups on the basis of bronchoalveolar lavage fluid eosinophil percentage (threshold 17%). Airway responsiveness was quantified by calculating the concentration of carbachol-inducing bronchoconstriction (C-Penh-300), defined as a 300% increase of basal enhanced pause (Penh). RESULTS: Log Penh was significantly higher and C-Penh-300 significantly lower in eosinophilic bronchitis cats compared to non-eosinophilic bronchitis cats (P=0.031 and P=0.032, respectively). Bronchoalveolar lavage fluid eosinophil percentage was moderately correlated with log Penh (P=0.012, r=0.70) and showed a weak inverse correlation with C-Penh-300 (P=0.047, r=-0.58). CLINICAL SIGNIFICANCE: This study provides supportive evidence of a correlation between airway eosinophil inflammation and plethysmographic measures of bronchoconstriction and airway responsiveness. Further investigation of the use of barometric whole body plethysmography to differentiate between forms of chronic bronchial disease in cats is indicated.

**Diagnosis of rickettsial diseases in dogs and cats.**


**Allison, R. W., and S. E. Little**

Rickettsial agents, including those in the genera Anaplasma, Ehrlichia, Neorickettsia, and Rickettsia, are important and common vector-borne pathogens of dogs and cats. Disease induced by these organisms ranges from clinically inapparent to severe and potentially fatal. However, laboratory confirmation of a rickettsial etiology can be complicated by a number of factors, including the wide spectrum of disease induced by these organisms, an often low and widely fluctuating level of organism present in infected animals, cross-reactions on serologic and molecular assays, and the presence of co-infections. Correct diagnosis is most likely to be reached when multiple diagnostic strategies, including careful microscopic examination of stained blood films or tissues, both specific and broad serologic tests, and a suite of molecular detection assays, are used in concert. Accurate interpretation of diagnostic tests requires awareness of the likelihood for multiple agents, including novel organisms, to be responsible for the results seen in a given patient. This review provides an overview of current strategies used to diagnose rickettsial infections in dogs and cats.

**Effect of low dose rate ketamine infusions on thermal and mechanical thresholds in conscious cats.**

*Vet Anaesth Analg (2013)*

**Ambros, B., and T. Duke**

OBJECTIVE: To determine the thermal and mechanical antinociceptive effects of two different subanesthetic constant rate infusions of racemic ketamine in cats. STUDY DESIGN: Prospective, randomized, blinded, experimental study. ANIMALS: Eight healthy adult domestic shorthair cats (two intact females and six neutered males). METHODS: The thorax and the lower thoracic limbs of each cat were shaved for thermal (TT) and mechanical threshold (MT) testing and a cephalic catheter was placed. Three intravenous treatments of equivalent volume were given as loading dose (LD) followed by an infusion for 2 hours: (K5) 0.5 mg kg-1 ketamine followed by 5 mug kg-1 minute-1 ketamine infusion, (K23) 0.5 mg kg-1 ketamine followed by 23 mug kg-1 minute-1 ketamine infusion or (S) 0.9% saline solution. Effects on behavior, sedation scores, MT and TT were obtained prior to drug treatment and 0.25, 0.5, 0.75, 1, 1.5, 2, 2.25, 2.5 2.75, 3 hours then every 0.5 hours for 7 hours and 10, 12, 14 and 26 hours after loading dose administration. RESULTS: Ketamine induced mild sedation for the period of the infusion, no adverse behavioral effects were observed. Thermal threshold was significantly higher than baseline (K5: 44.5 +/- 0.7 degrees C; K23: 44.5 +/- 0.5 degrees C) at 15 minutes in the K5 group (46.8 +/- 3.5 degrees C) and at 45 minutes in the K23 group (47.1 +/- 4.1 degrees C). In the K23 group TT was significantly increased compared to S and K5 at 45 minutes. In K5 at 15 minutes MT (9.6 +/- 4.0 N) was different to baseline (6.1 +/- 0.8 N) and to the S group (5.9 +/- 2.3 N). CONCLUSION AND CLINICAL RELEVANCE: Low dose rate ketamine infusions minimally affect thermal and mechanical antinociception in cats. Further studies with different nociceptive testing methods are necessary to assess whether ketamine could be a useful analgesic in cats.
Seroprevalence and risk factors associated with ovine toxoplasmosis in Northeast Brazil.
Serum samples of 930 sheep were tested by ELISA to assess the prevalence of anti-Toxoplasma gondii antibodies and to identify risk factors associated with the presence of toxoplasmosis in two regions of Rio Grande do Norte (Northeast Brazil), with different climatic conditions. The overall estimated prevalence was 22.1%, with 26.3% and 17.8% positive sheep in Leste Potiguar and Central Potiguar regions, respectively. Among the positive sheep, 18.1% had low-avidity IgG antibodies, suggesting the occurrence of recent toxoplasmosis. The risk factors for toxoplasmosis in sheep were: presence of cats (odds ratio (OR) = 1.55; confidence interval (CI) 95% = 1.11-2.16), age of the animals, with adults presenting a greater chance of infection (OR = 2.44; CI 95% = 1.58-3.75), and the use of running water (OR = 1.61; CI 95% = 1.25-2.09), characterizing the existence of transmission by sporulated oocysts of T. gondii in the environment.

Spinal dural ossification causing neurological signs in a cat.
Antila, J. M., J. Jeserevics, M. Rakauskas, M. Anttila, and S. Cizinauskas
A six-year-old Ragdoll cat underwent examination due to a six-month history of slowly progressive gait abnormalities. The cat presented with an ambulatory tetraparesis with a neurological examination indicating a C1-T2 myelopathy. Radiographs of the spine showed a radiopaque irregular line ventrally in the vertebral canal dorsal to vertebral bodies C3-C5. In this area, magnetic resonance imaging revealed an intradural extramedullary/extradural lesion compressing the spinal cord. The spinal cord was surgically decompressed. The cause of the spinal cord compression was dural ossification, a diagnosis confirmed by histopathological examination of the surgically dissected sample of dura mater. The cat gradually improved after the procedure and was ambulating better than prior to the surgery. The cat’s locomotion later worsened again due to ossified plaques in the dura causing spinal cord compression on the same cervical area as before. Oral prednisolone treatment provided temporary remission. Ten months after surgery, the cat was euthanized due to severe worsening of gait abnormalities, non-ambulatory tetraparesis. Necropsy confirmed spinal cord compression and secondary degenerative changes in the spinal cord on cervical and lumbar areas caused by dural ossification. To our knowledge, this is the first report of spinal dural ossification in a cat. The reported cat showed neurological signs associated with these dural changes. Dural ossification should be considered in the differential diagnosis of compressive spinal cord disorders in cats.

Multilocus sequence typing of Histoplasma capsulatum in formalin-fixed paraffin-embedded tissues from cats living in non-endemic regions reveals a new phylogenetic clade.
Arunmozhi Balajee, S., S. F. Hurst, L. S. Chang, M. Miles, E. Beeler, C. Hale, T. Kasuga, K. Benedict, T. Chiller, and M. D. Lindsley
Infections caused by Histoplasma capsulatum are found most often in endemic regions of North, Central, and South America. H. capsulatum has been divided into eight geographic clades by multi-locus sequence typing (MLST). Recently, one isolate and five formalin-fixed paraffin-embedded (FFPE) tissue samples were received from six of 15 suspected cases of histoplasmosis in cats residing in areas not known to be endemic for H. capsulatum. Polymerase chain reaction (PCR) amplification and sequence analysis of the rDNA ITS-2 region confirmed the diagnosis of H. capsulatum. Since these cases were not, as noted, from the accepted endemic areas, it was of interest to understand the molecular epidemiology of these isolates. Results of molecular analysis indicated that the H. capsulatum recovered from the cats were most closely related to the North American-1 clade, but clustered separately outside this clade, suggesting that the H. capsulatum infecting the animals may represent a separate clade or phylogenetic species. This study also demonstrated the utility of obtaining valuable molecular subtype data directly from archived FFPE tissue blocks, particularly when a fungus culture was not performed or is otherwise unavailable.
Amyloidosis in association with spontaneous feline immunodeficiency virus infection.
Asproni, P., F. Abramo, F. Millanta, D. Lorenzi, and A. Poli
Tissues from 34 naturally feline immunodeficiency virus (FIV)-infected cats, 13 asymptomatic cats and 21 cats with signs of feline acquired immunodeficiency syndrome (F-AIDS), and 35 FIV-seronegative subjects were examined to determine the presence of amyloid deposits. Twenty experimentally FIV-infected cats and five specific pathogen-free (SPF) control cats were also included in the study. Paraffin-embedded sections from kidney and other organs were submitted to histological and histochemical analysis. Amyloid deposits were identified by a modified Congo red stain and confirmed by electron microscopy to demonstrate the presence of amyloid fibrils in amyloid positive glomeruli. In all positive cases, secondary amyloidosis was identified with potassium permanganate pretreatment and amyloid type was further characterised by immunohistochemistry using primary antibodies against human AA and feline AL amyloids. Amyloid deposits were present in different tissues of 12/34 (35%) naturally FIV-infected cats (seven presenting F-AIDS and five in asymptomatic phase) and in 1/30 FIV-seronegative cats. All the experimentally FIV-infected and SPF subjects showed no amyloid deposits. Amyloidosis has been reported in human lentiviral infections, and the data reported here demonstrate the need, in naturally FIV-infected cats, to consider the presence of amyloidosis in differential diagnosis of hepatic and renal disorders to better assess the prognosis of the disease.

A rare case of feline congenital Toxoplasma gondii infection: fatal outcome of systemic toxoplasmosis for the mother and its kitten.
Atmaca, H. T., G. C. Dinçel, H. C. Macun, O. S. Terzi, T. Uzunalioglu, H. Kalender, and O. Kul
This report describes a case of fatal systemic toxoplasmosis in a 2.5-year-old mixed breed pregnant cat and its kittens. The pregnant cat was presented to the gynecology clinic with symptoms of dystocia. The ultrasonography examination revealed the presence of five fetuses in the uterus, three of which were not alive, and consequently a cesarean section was performed. However, the mother cat and the remaining two live kittens died two and ten days after cesarean section, respectively. Pathologically, severe alveolar edema, tachyzoite-like structures in the alveolar macrophages and multifocal necroses in the lungs of mother cat were observed. An intense Toxoplasma gondii immunopositive reaction was observed in the cytoplasms of alveolar macrophages, bronchial and bronchiolar epithelia, necrotic foci in the lungs, and Kupffer cells of the liver. PCR analyses amplified T. gondii DNA in tissue samples of the mother cat and kittens. The present study provides strong evidence for a transplacental transmission of T. gondii infection with deadly outcome for the mother cat, fetuses and kittens. As to the authors’ knowledge, this report is the first case of fatal congenital toxoplasmosis in domestic cats in Turkey.

Comparison of inferred fractions of n-3 and n-6 polyunsaturated fatty acids in feral domestic cat diets with those in commercial feline extruded diets.
Backus, R. C., D. G. Thomas, and K. L. Fritsche
OBJECTIVE: To compare presumed fatty acid content in natural diets of feral domestic cats (infected from body fat polyunsaturated fatty acids content) with polyunsaturated fatty acid content of commercial feline extruded diets. SAMPLE: Subcutaneous and intra-abdominal adipose tissue samples (approx 1 g) from previously frozen cadavers of 7 adult feral domestic cats trapped in habitats remote from human activity and triplicate samples (200 g each) of 7 commercial extruded diets representing 68% of market share obtained from retail stores. PROCEDURES: Lipid, triacylglycerol, and phospholipid fractions in adipose tissue samples and ether extracts of diet samples were determined by gas chromatography of methyl esters. Triacylglycerol and phospholipid fractions in the adipose tissue were isolated by thin-layer chromatography. Diet samples were also analyzed for proximate contents. RESULTS: For the adipose tissue samples, with few exceptions, fatty acids fractions varied only moderately with lipid fraction and site from which tissue samples were obtained. Linoleic, alpha-linolenic, arachidonic, eicosapentaenoic, and docosahexaenoic acid fractions were 15.0% to 28.2%, 4.5% to 18.7%, 0.9% to 5.0%, < 0.1% to 0.2%, and 0.6% to 1.7%, respectively. As inferred from the adipose findings, dietary fractions of docosahexaenoic and alpha-linolenic acids were significantly greater than those in the commercial feline diets, but those for linoleic and eicosapentaenoic acids were not significantly different. CONCLUSIONS AND CLINICAL RELEVANCE: The fatty acid content of commercial extruded feline diets differed from the inferred content of natural feral cat diets, in which dietary n-3 and possibly n-6 polyunsaturated fatty acids were more abundant. The impact of this difference on the health of pet cats is not known.
Management of urinary tract emergencies in small animals.
Balakrishnan, A., and K. J. Drobatz
This article focuses on some of the most commonly seen urinary tract emergencies in dogs and cats, with emphasis on basic pathophysiology, diagnosis, and emergency management of these cases.

Redescription of Hepatozoon felis (Apicomplexa: Hepatozoidae) based on phylogenetic analysis, tissue and blood form morphology, and possible transplacental transmission.
Baneth, G., A. Sheiner, O. Eyal, S. Hahn, J. P. Beaufils, Y. Anug, and D. Talmi-Frank
BACKGROUND: A Hepatozoon parasite was initially reported from a cat in India in 1908 and named Leucocytozoon felis domestici. Although domestic feline hepatozoonosis has since been recorded from Europe, Africa, Asia and America, its description, classification and pathogenesis have remained vague and the distinction between different species of Hepatozoon infecting domestic and wild carnivores has been unclear. The aim of this study was to carry out a survey on domestic feline hepatozoonosis and characterize it morphologically and genetically. METHODS: Hepatozoon sp. DNA was amplified by PCR from the blood of 55 of 152 (36%) surveyed cats in Israel and from all blood samples of an additional 19 cats detected as parasitemic by microscopy during routine hematologic examinations. Hepatozoon sp. forms were also characterized from tissues of naturally infected cats. RESULTS: DNA sequencing determined that all cats were infected with Hepatozoon felis except for two infected by Hepatozoon canis. A significant association (p = 0.00001) was found between outdoor access and H. felis infection. H. felis meronts containing merozoites were characterized morphologically from skeletal muscles, myocardium and lungs of H. felis PCR-positive cat tissues and development from early to mature meront was described. Distinctly-shaped gamonts were observed and measured from the blood of these H. felis infected cats. Two fetuses from H. felis PCR-positive queens were positive by PCR from fetal tissue including the lung and amniotic fluid, suggesting possible transplacental transmission. Genetic analysis indicated that H. felis DNA sequences from Israeli cats clustered together with the H. felis Spain 1 and Spain 2 sequences. These cat H. felis sequences clustered separately from the feline H. canis sequences, which grouped with Israeli and foreign dog H. canis sequences. H. felis clustered distinctly from Hepatozoon spp. of other mammals. Feline hepatozoonosis caused by H. felis is mostly sub-clinical as a high proportion of the population is infected with no apparent overt clinical manifestations. CONCLUSIONS: This study aimed to integrate new histopathologic, hematologic, clinical, epidemiological and genetic findings on feline hepatozoonosis and promote the understanding of this infection. The results indicate that feline infection is primarily caused by a morphologically and genetically distinct species, H. felis, which has predilection to infecting muscular tissues, and is highly prevalent in the cat population studied. The lack of previous comprehensively integrated data merits the redescription of this parasite elucidating its parasitological characteristics.

Characterization of methicillin-resistant Staphylococcus pseudintermedius isolated from dogs and cats.
Microbiol Immunol (2013)
Bardiau, M., K. Yamazaki, I. Ote, N. Misawa, and J. G. Mainil
The aim of this work was to study methicillin-resistant Staphylococcus (S.) pseudintermedius (MRSP) presence in a collection of S. pseudintermedius strains isolated from dogs and cats suffering from dermatitis in Japan, and to compare their genotypic and phenotypic characteristics. Clonal relationships were determined by Pulse Field Gel Electrophoresis (PFGE), Staphylococcal Chromosomal Cassette mec (SCCmec) typing and MultiLocus Sequence Typing (MLST). Biofilm formation assay was performed using safranin staining in microplates. Three virulence genes coding for S. intermedius exfoliative toxin and Panton-Valentine leukocidin (siet, lukS-PV, lukF-PV) were searched for in a collection of strains. Antimicrobial resistance against 15 antibiotics was studied using disc diffusion method. Twenty-seven MRSP were isolated. Except for few strains, isolates were not closely related according to PFGE results. MLST results revealed that strains belonged to 5 groups, with ST71 and ST26 as the two most prevalent. Three types of SCCmec (II, II-III and V) were found. All isolates were siet-positive but PVL-negative. Most strains (except for two) produced strong biofilm in Tryptic Soy Broth with glucose (TSBglc). Seventy-eight percent (78%) of the isolates were resistant or intermediate to twelve or more
antibiotics. Our study demonstrated that ST71 lineage is spread in Japan and that ST26 could represent an emerging lineage. Moreover, most of our strains are capable to form strong biofilm and possess siet gene, two virulence characteristics that probably help the bacteria to persist and spread. Finally, our MRSP strains show a high profile resistance to commonly used antibiotics in veterinary medicine.

**Phylogenetic analysis of feline coronavirus strains in an epizootic outbreak of feline infectious peritonitis.**


BACKGROUND: Feline coronavirus (FCoV) infection is common. In a small percentage of cats, FCoV infection is associated with the fatal disease feline infectious peritonitis (FIP). Genetically distinct virulent and avirulent strains of FCoV might coexist within a cat population. OBJECTIVES: To determine whether the strains of FCoV in FIP-affected cats are closely related or genetically distinct from the fecally derived strains of FCoV in contemporary-asymptomatic cats during an epizootic outbreak of FIP. ANIMALS: Four cats euthanized because of FIP and 16 asymptomatic cats. METHODS: This prospective outbreak investigation was initiated during an outbreak of FIP in cats within or rehomed from a rescue/rehoming center. Postmortem samples were collected from cats with FIP and contemporaneous fecal samples from asymptomatic cats. RNA was purified from tissue and fecal samples, FCoV gene fragments were reverse transcribed, PCR-amplified using novel primers, and sequenced. Sequences were aligned with ClustalW and compared with published FCoV sequences. RESULTS: FCoV RNA was detected in all 4 FIP cat postmortem samples and in 9 of the 16 fecal samples from contemporary-asymptomatic cats. Novel primers successfully amplified fragments from 4 regions of the genome for all FCoV-positive samples. Phylogenetic analysis showed that the FIP-associated strains of FCoV from the outbreak were very closely related to the fecally derived strains of FCoV from contemporary-asymptomatic cats. CONCLUSIONS AND CLINICAL IMPORTANCE: Sequence analysis provided no evidence that genetically distinct virulent and avirulent strains of FCoV were present during this FIP outbreak.

**Reorganization of the connectivity of cortical field DZ in congenitally deaf cat.**


**Barone, P., L. Lacassagne, and A. Kral**

Psychophysics and brain imaging studies in deaf patients have revealed a functional crossmodal reorganization that affects the remaining sensory modalities. Similarly, the congenital deaf cat (CDC) shows supra-normal visual skills that are supported by specific auditory fields (DZ-dorsal zone and P-posterior auditory cortex) but not the primary auditory cortex (A1). To assess the functional reorganization observed in deafness we analyzed the connectivity pattern of the auditory cortex by means of injections of anatomical tracers in DZ and A1 in both congenital deaf and normally hearing cats. A quantitative analysis of the distribution of the projecting neurons revealed the presence of non-auditory inputs to both A1 and DZ of the CDC which were not observed in the hearing cats. Firstly, some visual (areas 19/20) and somatosensory (SIV) areas were projecting toward DZ of the CDC but not in the control. Secondly, A1 of the deaf cat received a weak projection from the visual lateral posterior nuclei (LP). Most of these abnormal projections to A1 and DZ represent only a small fraction of the normal inputs to these areas. In addition, most of the afferents to DZ and A1 appeared normal in terms of areal specificity and strength of projection, with preserved but smeared nucleotopic gradient of A1 in CDCs. In conclusion, while the abnormal projections revealed in the CDC can participate in the crossmodal compensatory mechanisms, the observation of a limited reorganization of the connectivity pattern of the CDC implies that functional reorganization in congenital deafness is further supported also by normal cortico-cortical connectivity.

**Aspergillus felis sp. nov., an Emerging Agent of Invasive Aspergillosis in Humans, Cats, and Dogs.**


**Barrs, V. R., T. M. van Doorn, J. Houbraken, S. E. Kidd, P. Martin, M. D. Pinheiro, M. Richardson, J. Varga, and R. A. Samson**

We describe a novel heterothallic species in Aspergillus section Fumigati, namely A. felis (neosartorya-morph) isolated from three host species with invasive aspergillosis including a human patient with chronic invasive pulmonary aspergillosis,
domestic cats with invasive fungal rhinosinusitis and a dog with disseminated invasive aspergillosis. Disease in all host species was often refractory to aggressive antifungal therapeutic regimens. Four other human isolates previously reported as A. viridinutans were identified as A. felis on comparative sequence analysis of the partial beta-tubulin and/or calmodulin genes. A. felis is a heterothallic mold with a fully functioning reproductive cycle, as confirmed by mating-type analysis, induction of telemorphs within 7 to 10 days in vitro and ascospore germination. Phenotypic analyses show that A. felis can be distinguished from the related species A. viridinutans by its ability to grow at 45 degrees C and from A. fumigatus by its inability to grow at 50 degrees C. Itraconazole and voriconazole cross-resistance was common in vitro.

Evaluation of maxillary arterial blood flow in anesthetized cats with the mouth closed and open.
The mouth-gag is a common tool used in veterinary medicine during oral and transoral procedures in cats but its use has recently been associated with the development of blindness. The goal of this study was to investigate whether maximal opening of the mouth affects maxillary artery blood flow in six anesthetized cats. To assess blood flow, the electroretinogram (ERG), brainstem auditory evoked response (BAER) and magnetic resonance angiography (MRA) were evaluated qualitatively with the mouth closed and open. During dynamic computer tomography (CT) examinations, detection of contrast medium in the maxillary artery was quantified by measuring the Hounsfield units (HUs). The peak HU, time to peak and mean HU were determined. Changes 10% of these parameters were considered indicative of altered blood flow. ERG and BAER were normal with the mouth closed in all cats, but was abnormal with the mouth opened maximally in two cats and one cat, respectively. During MRA, blood flow was undetected in either maxillary artery in one cat and reduced in the right maxillary artery in two cats, when the mouth was open. During CT, the peak HU decreased 10% in three cats, the time to peak was 10% longer in two cats, and the mean HU was 10% lower in one cat when the mouth was open. No cat developed apparent blindness or deafness. Maximal opening of the mouth caused alterations in several indicators of blood flow in some individual cats.

Age-Dependant Prevalence of Endoparasites in Young Dogs and Cats up to One Year of Age.

Mechanisms, causes, investigation and management of vomiting disorders in cats: a literature review.
Vomiting is a common presenting complaint in feline practice. This article differs from previous reviews in that it is an evidence-based review of the mechanisms, causes, investigation and management of vomiting in the domestic cat. Published evidence was reviewed, and then used to make recommendations for clinical assessment, diagnosis, antiemetic drug treatment, dietary management and monitoring of cats presenting with vomiting. The strength of the evidence on which recommendations are made (and areas where evidence is lacking for cats) has been highlighted throughout.

Anesthesia and pain management for small animals.
Beckman, B.
Anesthesia for oral surgery in dogs and cats requires special consideration and thorough planning to maximize patient safety. Well-trained technical staff capable of providing expedient delivery of quality dental radiographs and precision anesthesia monitoring are essential. Doctors need to be well versed in dental radiographic interpretation and competent and experienced in oral surgical techniques, particularly in surgical extractions. The work flow from patient induction to
recovery involves estimate generation and client communication with multiple staff members. Knowledge of anesthetic and analgesic agents from premedication to postoperative pain management play an equally important role in patient safety.

**Septic implantation syndrome in dogs and cats: a distinct pattern of endophthalmitis with lenticular abscess.**


**Bell, C. M., S. A. Pot, and R. R. Dubielzig**

**OBJECTIVE:** To summarize the clinical and pathologic findings in a group of dogs and cats with progressive clinical ocular disease, which were diagnosed with suppurative endophthalmitis and lens capsule rupture. **ANIMALS STUDIED:** Twenty cats and forty-six dogs that underwent unilateral enucleation or evisceration for intractable uveitis and/or glaucoma. **PROCEDURE:** Biopsy submission requests and microscopic case material were evaluated for clinical and histological features, including history of ocular trauma, duration of ocular disease, pattern of inflammation, and the presence of intralenticular microorganisms. **RESULTS:** The median duration for cats and dogs was 6 and 5 weeks, respectively. A history of trauma was reported for four (20%) cats and 18 (39%) dogs. All confirmed cases of trauma-three in cats and 14 in dogs-were caused by a cat scratch. Microscopically, all cases had suppurative endophthalmitis centered on the lens, lens capsule rupture, cataract, and lenticular abscess. Infectious organisms were identified by Gram stain within the lens of 14 (70%) cats and 30 (65%) dogs. Gram-positive cocci were seen most commonly. Male cats were overrepresented as compared to females. There were no apparent gender, age or breed predilections in dogs. **CONCLUSIONS:** A unique pattern of slowly progressive or delayed-onset endophthalmitis with lens capsule rupture, lenticular abscess, and frequently intralenticular microorganisms is associated with traumatic penetration of the globe and lens capsule. The term Septic Implantation Syndrome (SIS) is favored in lieu of ‘phacoclastic uveitis’ to avoid confusion with phacoalytic uveitis and to clearly implicate the role of intralenticular microorganisms in the pathogenesis.

**Laser and radiosurgery in veterinary dentistry.**


**Bellows, J.**

Lasers and radiosurgery frequently used in human dentistry are rapidly entering veterinary dental use. The carbon dioxide, diode, and low-level therapy lasers have features including hemostasis control, access to difficult to reach areas, and decreased pain, that make them useful for oral surgery. Periodontal pocket surgery, gingivectomy, gingivoplasty, gingival hyperplasia, operculectomy, tongue surgery, oropharyngeal inflammation therapy, oral mass surgery, crown, and frenectomy laser surgeries are described, including images.

**Feline musculoskeletal pain index: responsiveness and testing of criterion validity.**


**Benito, J., B. Hansen, V. Depuy, G. S. Davidson, A. Thomson, W. Simpson, S. Roe, E. Hardie, and B. D. Lascelles**

**BACKGROUND:** Progress in establishing if therapies provide relief to cats with degenerative joint disease (DJD)-associated pain is hampered by a lack of validated owner-administered assessment methods. **HYPOTHESIS:** That an appropriately developed subjective owner-completed instrument (Feline Musculoskeletal Pain Index-FMPI) to assess DJD-associated impairment would have responsiveness and criterion validity. **ANIMALS:** Twenty-five client-owned cats with DJD-associated pain. **METHODS:** FMPI responsiveness (ability to detect the effect of an analgesic treatment) and validity (correlation with an objective measure) were explored through a stratified, randomized, double blinded, placebo-controlled, crossover 10-week clinical study. Meloxicam was administered to effect pain relief. A linear mixed model, backward stepwise regression, and Pearson correlations were used to assess responsiveness and criterion validity with the assumption that the NSAID would increase activity. **RESULTS:** Positive responses of cats to placebo (P =.0001) and meloxicam treatment (P =.0004) were detected; however, the instrument did not detect any difference between placebo and meloxicam (linear mixed model), even for the high impairment cases. Percent meloxicam target dose administered, temperament, and total baseline FMPI score were covariates that most affected FMPI scores. Controlling for significant covariates, most positive effects were seen for placebo treatment. Positive treatment effects on activity were detected, but only for the cases designated as most highly impaired. **CONCLUSIONS AND CLINICAL IMPORTANCE:** Neither responsiveness nor criterion validity were detected by the inclusion criteria for cases in this study. The data suggest that further work is
Reliability and discriminatory testing of a client-based metrology instrument, feline musculoskeletal pain index (FMPI) for the evaluation of degenerative joint disease-associated pain in cats.
The objective of this study was to test the readability, reliability, repeatability and discriminatory ability of an owner-completed instrument to assess feline degenerative joint disease (DJD)-associated pain (feline musculoskeletal pain index, FMPI). Readability was explored using four different formulas (Flesch, Fry, SMOG and FOG) and the final FMPI instrument was produced. To assess the instrument, client-owned cats that were defined as normal (normal group) or as having DJD-associated pain and mobility impairment (pain-DJD group) were recruited. A total of 32 client-owned cats were enrolled in the study (normal, n=13; pain-DJD, n=19). Owners completed the FMPI on two occasions, 14 days apart. Internal consistency (reliability) and repeatability (test-retest) were explored using Cronbach’s alpha and weighted kappa statistic, respectively. Data from the two groups were compared using analysis of covariance (controlling for age) to evaluate discriminatory ability. The FMPI was constructed with 21 questions covering activity, pain intensity and overall quality of life. It had a 6th grade readability score. Reliability of the FMPI was excellent (Cronbach’s alpha > 0.8 for all groupings of questions in normal and pain-DJD cats) and repeatability was good (weighted kappa statistic > 0.74) for normal and pain-DJD cats. All components of the FMPI were able to distinguish between normal cats and cats with DJD (P < 0.001 for all components). This initial evaluation of the FMPI suggests that this instrument is worthy of continued investigation.

In vitro susceptibilities of feline and canine Escherichia coli and Pseudomonas spp. isolates to ticarcillin and ticarcillin-clavulanic acid.
Bennett, A. B., P. A. Martin, S. A. Gottlieb, and M. Govendir
OBJECTIVES: To investigate in vitro susceptibilities of canine and feline Escherichia coli and canine Pseudomonas spp. isolates to ticarcillin and ticarcillin-clavulanic acid (T/C). DESIGN: In vitro susceptibility testing of bacterial isolates collected from infections. METHODS: We tested 148 (83 canine and 65 feline) E. coli and 61 canine Pseudomonas spp. isolates for susceptibility to T/C using both disc diffusion and Epsilometer tests (E-tests). Additionally, susceptibilities of 96 E. coli and 23 canine Pseudomonas spp. isolates were tested via disc diffusion to ticarcillin alone. RESULTS: Of the E. coli isolates obtained from canine and feline urine, 92% by disc diffusion and 91% by E-tests were susceptible to T/C. Of the canine Pseudomonas isolates, 90% by disc diffusion and 82% by E-tests were susceptible to T/C. Of the Pseudomonas spp. isolates from the canine ear canal or tympanic bullae, 12% of isolates tested via disc diffusion and 23% via E-tests were found to be resistant to T/C. The 50% minimum inhibitory concentration of T/C for all feline E. coli isolates was significantly lower than that for all canine E. coli isolates (P = 0.0031). The addition of clavulanic acid significantly increased the efficacy of ticarcillin against E. coli (P < 0.0001), but had negligible effect against canine Pseudomonas spp. isolates. CONCLUSION: Ticarcillin-clavulanic acid has reasonable in vitro efficacy against canine and feline E. coli, and canine Pseudomonas spp. isolates. However, decisions to use this drug therapeutically must be made on prudent considerations to minimise selection for bacterial resistance.

Outcome following gastrointestinal tract decontamination and intravenous fluid diuresis in cats with known lily ingestion: 25 cases (2001-2010).
Bennett, A. J., and E. L. Reineke
OBJECTIVE: To describe the outcome of cats treated with gastrointestinal tract decontamination, IV fluid diuresis, or both after ingestion of plant material from lilies of the Lilium and Hemerocallis genera. Design-Retrospective case series. ANIMALS: 25 cats evaluated after ingestion of lily plants. PROCEDURES: Medical records of cats examined at the Matthew J. Ryan Veterinary Hospital of the University of Pennsylvania with known lily ingestion between July 2001 and April 2010 were reviewed. Inclusion in the study required evidence of lily plant ingestion within the preceding 48 hours. Type of lily ingested, time of ingestion, gastrointestinal tract decontamination procedures performed, and IV fluid diuresis...
were recorded. The presence or absence of acute kidney injury was determined by evaluating BUN concentration, creatinine concentration, and urine specific gravity. Outcome was defined as survival to discharge, death, or euthanasia. RESULTS: The time from ingestion until evaluation at the Matthew J. Ryan Veterinary Hospital of the University of Pennsylvania ranged from < 30 minutes to 48 hours. Nineteen cats received gastrointestinal tract decontamination (18 cats at our hospital and 1 cat by the referring veterinarian). Twenty-three cats were admitted to the hospital for IV fluid diuresis, supportive care, and monitoring. Seventeen of these 23 (74%) cats had normal BUN and creatinine concentrations throughout hospitalization. At the time of discharge from the hospital, 2 of the 23 (9%) hospitalized cats had an increased BUN concentration, creatinine concentration, or both. All 25 (100%) cats survived to discharge from the hospital. CONCLUSIONS AND CLINICAL RELEVANCE: In this series of cats treated with gastrointestinal tract decontamination, IV fluid diuresis, or both within 48 hours after lily ingestion, the outcome was good, with a low incidence of acute kidney injury. Future studies are needed to determine the most effective gastrointestinal tract decontamination procedures and optimal duration of IV fluid therapy.

Seasonal and age effects on energy requirements in domestic short-hair cats (Felis catus) in a temperate environment.

Bermingham, E. N., K. Weidgraaf, M. Hekman, N. C. Roy, M. H. Tavendale, and D. G. Thomas

There is little information known about the energy requirements of cats in temperature climates. Energy requirement of domestic short-haired cats was determined using three groups of mixed gender - old kept outside (approximately 9.9 years of age; 4.8 kg; n = 9), young kept outside (approximately 3.1 years of age; 3.9 kg; n = 8) or young kept inside (approximately 3.1 years of age; 3.9 kg; n = 8). Cats were housed individually for 5 weeks during summer (18.5 +/- 0.5 degrees C) and winter (8.5 +/- 0.4 degrees C) and were fed a commercially available maintenance diet ad libitum. In both periods, energy expenditure was determined from the rates of (2) H and (18) O elimination for blood H2 O over a 12 day period, from a doubly labelled water bolus (2) H2 O (0.7 g/kg BW) and H2 (18) O (0.13 g/kg BW) administered intravenously. During the summer period, macronutrient digestibility was determined. Older cats had a reduction (p < 0.05) in apparent digestibility of dry matter (approximately 9%), energy (approximately 8%) and protein (6%). There was a significant effect of age and season on energy intake and energy expenditure. While lean mass was affected by age and season, there was no effect of age or season on energy expenditure when expressed as a proportion of lean mass. Possible seasonal differences in nutrient digestibility may explain these results.

Outcome of ventriculoperitoneal shunt implantation for treatment of congenital internal hydrocephalus in dogs and cats: 36 cases (2001-2009).

Biel, M., M. Kramer, F. Forterre, K. Jurina, O. Lautersack, K. Failing, and M. J. Schmidt

OBJECTIVE: To examine outcome data for cats and dogs with congenital internal hydrocephalus following treatment via ventriculoperitoneal shunting to determine treatment-associated changes in neurologic signs, the nature and incidence of postoperative complications, and survival time. DESIGN: Retrospective multicenter case series. ANIMALS: 30 dogs and 6 cats with congenital internal hydrocephalus (confirmed via CT or MRI). PROCEDURES: Medical records for dogs and cats with internal hydrocephalus that underwent unilateral ventriculoperitoneal shunt implantation from 2001 through 2009 were evaluated. Data collected included the nature and incidence of postoperative complications, change in clinical signs following surgery, and survival time. To compare pre- and postoperative signs, 2-way frequency tables were analyzed with a 1-sided exact McNemar test. RESULTS: 8 of 36 (22%) animals developed postoperative complications, including shunt malfunction, shunt infection, and seizure events. Three dogs underwent shunt revision surgery. Thirteen (36%) animals died as a result of hydrocephalus-related complications or were euthanized. Following shunt implantation, clinical signs resolved in 7 dogs and 2 cats; overall, 26 (72%) animals had an improvement of clinical signs. After 18 months, 20 animals were alive, and the longest follow-up period was 9.5 years. Most deaths and complications occurred in the first 3 months after shunt placement. CONCLUSIONS AND CLINICAL RELEVANCE: Results indicated that ventriculoperitoneal shunt implantation is a viable option for treatment of dogs or cats with congenital hydrocephalus. Because complications are most likely to develop in the first 3 months after surgery, repeated neurologic and imaging evaluations are warranted during this period.
Cats with cancer: where to start.
Blackwood, L.

PRACTICAL RELEVANCE: Many cats develop cancer and may or may not present with an obvious mass lesion. As our feline patients are living longer and their owners are increasingly seeking veterinary care, the apparent incidence and prevalence of cancer is increasing. CLINICAL CHALLENGES: Neoplasia is a differential for many clinical presentations in cats. Often tumours are relatively advanced at the point of presentation, and this can make management difficult. In addition, many cats find clinic visits stressful and this can influence owners’ decisions about treatment. AUDIENCE: This review provides an overview of the approach to the feline cancer patient, and is aimed at all veterinary practitioners that see cats. It is intended as a starting point for more detailed discussions in accompanying articles in this special issue on feline oncology. EVIDENCE BASE: There is limited data on most feline tumours compared with tumours in canine or human patients, so a robust evidence base is often lacking.

Clinical evaluation of the 3M Littmann Electronic Stethoscope Model 3200 in 150 cats.

Detection of murmurs and gallops may help to identify cats with heart disease. However, auscultatory findings may be subject to clinically relevant observer variation. The objective of this study was to evaluate an electronic stethoscope (ES) in cats. We hypothesized that the ES would perform at least as well as a conventional stethoscope (CS) in the detection of abnormal heart sounds. One hundred and fifty consecutive cats undergoing echocardiography were enrolled prospectively. Cats were ausculted with a CS (WA Tycos Harvey Elite) by two observers, and heart sounds were recorded digitally using an ES (3M Littmann Stethoscope Model 3200) for off-line analysis. Echocardiography was used as the clinical standard method for validation of auscultatory findings. Additionally, digital recordings (DRs) were assessed by eight independent observers with various levels of expertise, and compared using interclass correlation and Cohen’s weighted kappa analyses. Using the CS, a heart murmur (n = 88 cats) or gallop sound (n = 17) was identified in 105 cats, whereas 45 cats lacked abnormal heart sounds. There was good total agreement (83-90%) between the two observers using the CS. In contrast, there was only moderate agreement (P <0.001) between results from the CS and the DRs for murmurs, and poor agreement for gallops. The CS was more sensitive compared with the DRs with regard to murmurs and gallops. Agreement among the eight observers was good-to-excellent for murmur detection (81%). In conclusion, DRs made with the ES are less sensitive but comparably specific to a CS at detecting abnormal heart sounds in cats.

Isolation of Sporothrix schenckii From the Claws of Domestic Cats (Indoor and Outdoor) and in Captivity in Sao Paulo (Brazil).
Mycopathologia (2013)
Borges, T. S., C. N. Rossi, J. D. Fedullo, J. P. Taborda, and C. E. Larsson

Sporotrichosis is a subcutaneous mycosis and is also a zoonosis (sapro- and anthropozoonosis). The objective of the present study was to determine the occurrence of sporotrichosis in domestic cats and in wild or exotic felines in captivity through the isolation of Sporothrix spp. from claw impressions in a culture medium. The samples included 132 felines, of which 120 (91.0 %) were domestic cats, 11 (8.3 %) were wild felines, and one (0.7 %) was an exotic felid. Twenty-one (17.5 %) were outdoor cats. Of the total, 89 (67.4 %) had contact with other animals of the same species. It was possible to isolate Sporothrix schenckii from the claws of one (0.7 %) of the felids probed; this animal exhibited generalised sporotrichosis and had infected a female veterinarian. The potential pathogenic agents Microsporum canis and Malassezia pachydermatis were isolated in 12.1 and 5.3 % of the animals, respectively. The following anemophilous fungi, which were considered to be contaminants, were also isolated: Penicillium sp. (28 or 21.2 %), Aspergillus sp. (13 or 9.8 %), Rhodotorula sp. (5 or 3.8 %), Candida sp. (5 or 3.8 %), Trichoderma sp. (1 or 0.7 %), and Acremonium sp. (1 or 0.7 %). Due to the low magnitude of occurrence (0.7 %) of Sporothrix in feline claws, the potential of the cats evaluated in this study to be sources of infection in the city of Sao Paulo is considerably low.
Babesia lengau associated with cerebral and haemolytic babesiosis in two domestic cats.
BACKGROUND: Although reported sporadically from various countries, feline babesiosis appears to be a significant clinical entity only in South Africa, where Babesia felis is usually incriminated as the causative agent. Babesia lengau, recently described from asymptomatic cheetahs, has now possibly been incriminated as the causative agent in two severe clinical cases in domestic cats. FINDINGS: Both cats were euthanised in extremis. While typical feline babesiosis in South Africa is an afebrile disease with a chronic manifestation, there was acute onset of severe clinical signs in both cats and their body temperatures were above the normal range when they were presented for treatment. Haemolytic anaemia was confirmed in one case. To our knowledge, this is the first report of cerebral babesiosis in cats. On reverse line blot 18S rDNA PCR products obtained from both cats showed positive hybridization profiles with the B. lengau species-specific probe. The two partial parasite 18S rRNA gene sequences obtained, showed high sequence similarity (99.9%) to B. lengau. In a representative tree constructed by the neighbor-joining method using the two-parameter model of Kimura the two obtained partial 18S rDNA sequences and that of B. lengau formed a monophyletic group with B. conradae and sequences previously isolated from humans and wildlife in the western USA. CONCLUSION: All clinical cases of feline babesiosis in South Africa are not necessarily caused by B. felis. Other piroplasms, e.g. B. lengau, may be incriminated in clinical cases, especially those occurring outside the known endemic area.

The Use of Ultrasound for Dogs and Cats in the Emergency Room: AFAST and TFAST.
Boysen, S. R., and G. R. Lisciandro
Internal injuries are common and often life-threatening conditions that can be challenging to detect based on physical examination, radiographs, and centesis. Recently, ultrasound has been introduced and evaluated in human and veterinary emergency medicine as a point-of-care test for a variety of emergent conditions. This article discusses the indications for point-of-care emergency ultrasound of dogs and cats in the emergency and critical care setting. Techniques for performing focused emergency evaluations are described and the current veterinary and human literature is contrasted, with emphasis on abdominal, pleural, pericardial, and pulmonary evaluation.

Evidence for direct transmission of the cat lungworm Troglostrongylus brevior (Strongylida: Crenosomatidae).
Brianti, E., G. Gaglio, E. Napoli, L. Falsone, S. Giannetto, M. S. Latrofa, A. Giannelli, F. Dantas-Torres, and D. Otranto
Metastrongyloids of cats are emerging pathogens that may cause fatal broncho-pulmonary disease. Infestation of definitive hosts occurs after ingestion of intermediate or paratenic hosts. Among metastrongyloids of cats, Troglostrongylus brevior and Troglostrongylus subcrenatus (Strongylida: Crenosomatidae) have recently been described as agents of severe broncho-pulmonary disease. Here, we provide, for the first time, observational evidence suggesting the direct transmission of T. brevior from queen cat to suckling kittens. This new knowledge will have a significant impact on current scientific information of this parasite and shed new light into the biology and epidemiology of metastrongylid nematodes.

Detecting Aelurostrongylus abstrusus-specific IgG antibody using an immunofluorescence assay.
Diagnosis of feline lungworm, Aelurostrongylus abstrusus, is typically achieved by identifying larvae in feces following concentration through flotation or using the Baermann technique. This work presents observations on the usefulness of an indirect immunofluorescence antibody assay for detection of antibodies to this parasite in the sera of infected cats. Using first-stage larvae of A abstrusus and sera from both experimentally and naturally infected cats, it was determined that the test was fairly sensitive and did not cross-react with serum from an Ancylostoma braziliense (hookworm)-infected cat.
Treatment of systemic hypertension associated with kidney disease.
Buoncompagni, S., and M. H. Bowles
Systemic hypertension is an increasingly diagnosed disorder in dogs and cats and frequently occurs secondary to chronic kidney disease. Prevention of damage to organs such as the kidneys, brain, heart, and eyes is one of the primary concerns in the management of veterinary patients with hypertension. This article reviews the guidelines for antihypertensive therapy in patients with, or at risk for, kidney disease, including the initiation of treatment and currently recommended medications.

Evaluation of fecal alpha1-proteinase inhibitor concentrations in cats with idiopathic inflammatory bowel disease and cats with gastrointestinal neoplasia.
Burke, K. F., J. D. Broussard, C. G. Ruaux, J. S. Suchodolski, D. A. Williams, and J. M. Steiner
Idiopathic inflammatory bowel disease (IBD) and gastrointestinal lymphoma are common disorders in cats. The aim of this study was to evaluate fecal alpha1-PI concentrations, a marker of gastrointestinal protein loss, in cats with histopathological evidence of gastrointestinal inflammation or gastrointestinal neoplasia. Fecal and serum samples were obtained from 20 cats with chronic gastrointestinal disease in which endoscopic biopsies were performed. Two groups of cats were assembled based on histopathology: Group A (n=8), mild to moderate IBD; Group B (n=12), severe IBD or gastrointestinal neoplasia. Fecal alpha1-PI concentrations and serum concentrations of total protein, albumin, globulin, cobalamin, folate, pancreatic lipase immunoreactivity, and trypsin-like immunoreactivity were determined. Nineteen of the 20 diseased cats had elevated fecal alpha1-PI concentrations, ranging from 1.9 to 233.6μg/g compared to 20 healthy control cats (normal range: 1.6μg/g). Fecal alpha1-PI concentrations were statistically significantly different between healthy cats and cats of Group A (median: 3.9μg/g, range: 1.3-9.2μg/g, P<0.001) or cats of Group B (median: 20.6μg/g, 4.3-233.6μg/g; P<0.001), and between cats of Groups A and B (P<0.01). Hypoalbuminemia, hypoproteinemia, and hypocobalaminemia were detected in 88%, 83%, and 56% of the diseased cats, respectively. This study suggests that increased fecal alpha1-PI concentrations in association with low serum albumin and total protein concentrations may be a common finding in cats with IBD or gastrointestinal neoplasia. Furthermore, fecal alpha1-PI concentrations appear to be higher in cats with severe IBD or confirmed gastrointestinal neoplasia when compared to cats with mild to moderate IBD.

An online survey to determine owner experiences and opinions on the management of their hyperthyroid cats using oral anti-thyroid medications.
Caney, S. M.
Hyperthyroidism is the most common feline endocrinopathy. Treatment options comprise anti-thyroid medication, iodine-restricted diet, surgical thyroidectomy and radioiodine. One hundred and eleven owners of hyperthyroid cats completed a detailed survey asking about their experiences and views on the management of hyperthyroidism. Male cats were slightly over-represented (60 cats, 54%). Concurrent chronic kidney disease was reported in 27% of the cats. Oral anti-thyroid medication was offered to 92% of owners. The final treatment decision was usually based on the veterinarian’s recommendation or joint decision-making between the owner and the veterinarian. Almost all of the cats (103, 93%) had received oral anti-thyroid medication at some point in the course of their disease. Sixty-nine cats (62%) were receiving oral anti-thyroid medication at the time of survey completion. Management of hyperthyroidism using UK veterinary-licensed oral anti-thyroid medication (Vidalta; MSD Animal Health, Felimazole; Dechra Veterinary Products) was associated with 72-75% success rates in terms of owner-assessed clinical outcome. The most important treatment priorities for owners were the prescription of the most accurate dose of medication and use of the lowest possible dose. None ranked once-daily treatment as most important to them, and 79% of owners said that they were, or would be, happy to dose their cat twice daily to control its hyperthyroidism. For 62% of owners, pilling their cat twice daily was not a problem. These results suggest that most cat owners are not a barrier to prescribing twice-daily anti-thyroid medication, if required.

Prevalence of fleas and gastrointestinal parasites in free-roaming cats in central Mexico.

The prevalence of fleas and gastrointestinal parasites in free-roaming and domestic cats in central Mexico was evaluated. Three hundred and fifty eight cats captured in the street or brought in by owners to the Animal Control Center Unit, a unit of State Government, from June 2010 to May 2011, were included in the study. All cats were examined for the presence of fleas and gastrointestinal worms. One-hundred and ninety (53%) cats were infested with at least one flea species. Single infestations were observed in 106 (30%) cats and mixed infestations in 84 (23%) cats. Four species of fleas were recovered: Ctenocephalides felis in 53% of the cats, C. canis in 18%, Echidnophaga gallinacea in 7% and Pulex irritans in 1%. One-hundred and sixty three (45%) cats were infected with one or more species of gastrointestinal parasites: 48 (13%) with nematodes, 145 (40%) with cestodes, and one animal presented Moniliformis moniliformis. Prevalences and mean intensity of infection were: Physaloptera praepetialis 7 and 18; T. cati 3 and 2; Ancylostoma tubaeforme 2.5 and 2; Toxascaris leonina 0.5 and 2; Dipylidium caninum 36 and 32; Taenia taeniformis 4 and 3 and Moniliformis moniliformis 0.3 and 106, respectively. There was significant association (P<0.01), between season and ectoparasites load, more fleas were obtained in the summer and autumn than in the winter and spring; however, no statistical difference was observed for endoparasites load (P>0.05). The correlation between the total number of ectoparasites and endoparasites was not significant (r = 0.089, P = 0.094).

Phylogeny and prevalence of kobuviruses in dogs and cats in the UK.

The kobuviruses represent an emerging genus in the Picornaviridae. Here we have used next generation sequencing and conventional approaches to identify the first canine kobuvirus (CaKoV) from outside the USA. Phylogenetic analysis suggests that a single lineage genotype of CaKoV now exists in Europe and the USA with 94% nucleotide similarity in the coding region. CaKoV was only identified in a single case from a case-control study of canine diarrhoea, suggesting this virus was not a frequent cause of disease in this population. Attempts to grow CaKoV in cell culture failed. Sequence analysis suggested CaKoV was distinct from human Aichi virus (AiV), and unlikely to pose a significant zoonotic risk. Serosurveys by ELISA, immunofluorescence and neutralisation tests, using AiV as antigen, suggested kobuvirus infection is prevalent in dogs. In addition, IgG antibody to AiV was also detected in cat sera, indicating for the first time that cats may also be susceptible to kobuvirus infection.

Single Incision Laparoscopic-Assisted Intestinal Surgery (SILAIS) in 7 Dogs and 1 Cat.
Case, J. B., and G. Ellison

OBJECTIVES: To describe the clinical findings and short-term outcome in 7 dogs and 1 cat undergoing single-incision laparoscopic-assisted intestinal surgery (SILAIS) using an SILS or EndoCone port. STUDY DESIGN: Prospective case series. ANIMALS: Dogs (n = 7) and cat (n = 1). METHODS: An SILS port using three 5-mm instrument cannulas or EndoCone port was used to perform an initial limited laparoscopic abdominal exploration. The stomach and descending duodenum were explored intracorporeally and the jejunum through orad descending colon was explored extracorporeally. All intestinal procedures (enterotomy, biopsy, resection, and anastomosis) were performed extracorporeally. Omentalization of affected bowel was accomplished either intracorporeally or extracorporeally. Short-term outcome was determined.
RESULTS: SILAIS was completed successfully in all but 1 dog and all animals had a good short-term outcome. Most (n = 5) animals were discharged the day after surgery. SILAIS was performed in a median of 120 minutes (interquartile range; 82-148 minutes) and was associated with a moderate level of difficulty. No major complications occurred but conversion to celiotomy (n = 1) and enlargement of the incision (n = 3) was required because of inability to exteriorize the affected bowel. CONCLUSIONS: SILAIS using an SILS or EndoCone port in dogs and cats is feasible and appears effective in selected cases. Single portal laparoscopic-assisted intestinal surgery might be an effective method of minimizing morbidity in dogs and cats with uncomplicated intestinal disease.

Preliminary results in the redox balance in healthy cats: influence of age and gender.
Oxidative stress (OS) impairs organic function and is considered causally related to cellular senescence and death. This study aims to evaluate if the redox balance varies in relation to age and gender in healthy cats. To quantify the oxidative status of this species we determined the oxidative damage as serum reactive oxygen metabolites (ROM) and the total serum antioxidant capacity (SAC). In addition, we used the ratio of ROM to SAC as a measure of the oxidative balance, with higher values meaning higher oxidative stress (oxidative stress index). Our results suggest that the male population is at oxidative risk when compared with females, especially between the age of 2 and 7 years. Nutritional strategies in this population looking for additional antioxidant support would probably avoid the oxidative stress status that predisposes to chronic processes in senior male cats. Further clinical trials in this field are recommended.

**InPouch TF-Feline medium is not specific for Tritrichomonas foetus.**

*Vet Parasitol* (2013)

**Ceplecha, V., M. Svoboda, I. Cepicka, R. Husnik, K. Horackova, and V. Svobodova**

Trichomonads are a group of anaerobic flagellates. Two species of intestinal trichomonads have been described in cats - pathogenic *Tritrichomonas foetus* and probably harmless *Pentatrichomonas hominis*. InPouch TF-Feline medium (Bio-Med Diagnostics, White City, Oregon, USA) is considered the gold standard for diagnosis of *T. foetus* infection in cats. It is commercially available, relatively cheap and easy-to-use. The medium is intended to be highly specific to *T. foetus* as morphologically similar *Pentatrichomonas hominis* and *Giardia* sp. do not survive here longer than 24h. In this study we successfully cultivated *P. hominis* in InPouch TF-Feline medium for 3 days after inoculation with cat faeces. The identity of the organism was assessed by sequencing of SSU rDNA and ITS region. Possible coinfection with *T. foetus* was ruled out using Tritrichomonas-specific PCR. Our results suggest possible misdiagnosis of tritrichomonosis in cats using InPouch TF-Feline medium. PCR-based verification of culture-positive samples prior the potentially neurotoxic ronidazole treatment is recommended.

**A door-to-door prevalence study of feline immunodeficiency virus in an Australian suburb.**


**Chang-Fung-Martel, J., B. Gummow, G. Burgess, E. Fenton, and R. Squires**

A door-to-door survey was conducted within the limits of the suburb of Douglas in northern Queensland, Australia, to determine the prevalence of feline immunodeficiency virus (FIV) infection in the overall population of domestic cats. Previous FIV prevalence studies have relied on convenience sampling strategies, leaving out an important group of pet cats that do not receive regular veterinary attention. Saliva was selected for testing because collection was non-invasive and was likely to achieve a high rate of participation. Ninety-six cats were surveyed and tested for salivary antibodies against FIV and with real-time polymerase chain reaction (PCR). PCR was considered to be the gold standard and a cat was considered to be FIV-positive if sequencing results on a PCR product of appropriate size matched previously published FIV genome sequences available in GenBank. Results showed 10/96 cats to be infected with FIV subtype A, indicating a prevalence of 10.4% (95% confidence interval: 4.4-16.4) in the area studied. High risk associations were established with the roaming lifestyle of the cat (P <0.002), presence of abscesses (P <0.03) and occurrence of bite wounds (P <0.10). This is the first known cross-sectional study of a population of urban northern Australian cats living in an affluent suburb and presenting saliva as a potential non-invasive sample for large-scale epidemiological surveys on FIV.

**MICRONODULAR ULTRASOUND LESIONS IN THE COLONIC SUBMUCOSA OF 42 DOGS AND 14 CATS.**

*Vet Radiol Ultrasound* (2013)

**Citi, S., T. Chimenti, V. Marchetti, F. Millanta, and T. Mannucci**

Micronodular ultrasound lesions have been detected in the colonic submucosa of dogs and cats at our hospital. The lesions had rounded/oval shapes, measured 1-3 mm in size, and exhibited a hypo/anechoic ultrasonographic pattern. To our knowledge, these lesions have not been previously reported in human or veterinary patients. The purpose of this retrospective study was to determine whether micronodular lesions were associated with other abdominal ultrasound abnormalities or clinical findings. Medical records of dogs and cats with sonographic reports describing micronodular
lesions within the colonic submucosa were reviewed. Concurrent ultrasonographic abnormalities were recorded and compared with clinical signs and follow-up data. A total of 42 dogs and 14 cats met inclusion criteria. Concurrent sonographic abnormalities included the following: increased colon wall thickness (12.5%); small bowel wall thickening, altered layering, and/or hyperechoic mucosa (45%); abdominal effusion (29%); caudal mesenteric lymphadenopathy (46%); mesenteric lymphadenopathy (27%); and pericolic peritoneal fat reactivity (9%). Fifty of 56 animals presented with diarrhea. Twenty-seven cases had clinical signs of colitis and ultrasonographic lesions were limited to the colonic submucosa. In nine cases, follow-up examination at 6–8 weeks showed resolution of clinical and ultrasonographic signs. Ultrasonographic and clinical examinations in 17 patients at 12–18 months and in 20 patients at 18–30 months from initial diagnosis showed resolution of submucosal lesions and clinical signs of enteropathy. The authors propose that micronodular submucosal ultrasound lesions may represent reactive intraparietal lymphoid follicles and may be indicators of colonic inflammatory diseases in dogs and cats.

Ticks and associated pathogens collected from dogs and cats in Belgium.
Claerebout, E., B. Losson, C. Cochez, S. Casaert, A. C. Dalemans, A. De Cat, M. Madder, C. Saegerman, P. Heyman, and L. Lempereur
BACKGROUND: Although Ixodes spp. are the most common ticks in North-Western Europe, recent reports indicated an expanding geographical distribution of Dermacentor reticulatus in Western Europe. Recently, the establishment of a D. reticulatus population in Belgium was described. D. reticulatus is an important vector of canine and equine babesiosis and can transmit several Rickettsia species, Coxiella burnetii and tick-borne encephalitis virus (TBEV), whilst Ixodes spp. are vectors of pathogens causing babesiosis, borreliosis, anaplasmosis, rickettsiosis and TBEV. METHODS: A survey was conducted in 2008–2009 to investigate the presence of different tick species and associated pathogens on dogs and cats in Belgium. Ticks were collected from dogs and cats in 75 veterinary practices, selected by stratified randomization. All collected ticks were morphologically determined and analysed for the presence of Babesia spp., Borrelia spp., Anaplasma phagocytophilum and Rickettsia DNA. RESULTS: In total 2373 ticks were collected from 647 dogs and 506 cats. Ixodes ricinus (76.4%) and I. hexagonus (22.6%) were the predominant species. Rhipicephalus sanguineus (0.3%) and D. reticulatus (0.8%) were found in low numbers on dogs only. All dogs infested with R. sanguineus had a recent travel history, but D. reticulatus were collected from a dog without a history of travelling abroad. Of the collected Ixodes ticks, 19.5% were positive for A. phagocytophilum and 10.1% for Borrelia spp. (B. afzelii, B. garinii, B. burgdorferi s.s., B. lusitaniae, B. valaisiana and B. spielmanii). Rickettsia helvetica was found in 14.1% of Ixodes ticks. All Dermacentor ticks were negative for all the investigated pathogens, but one R. sanguineus tick was positive for Rickettsia massiliae. CONCLUSION: D. reticulatus was confirmed to be present as an indigenous parasite in Belgium. B. lusitaniae and R. helvetica were detected in ticks in Belgium for the first time.

Investigation of H MRS for quantification of hepatic triglyceride in lean and obese cats.
Clark, M. H., R. Larsen, W. Lu, and M. Hoenig
1H magnetic resonance spectroscopy (1H MRS) is the preferred technique for noninvasive quantification of hepatic triglyceride in humans. Domestic cats are subject to liver lipid accumulation, but MRS has not been investigated for quantification of liver fat in cats. The purpose of this project was to explore a technique for 1H MRS measurement of hepatic triglyceride in lean and obese cats. Hepatic 1H MRS was performed, using a 3T imaging unit and a single-voxel spin-echo spectroscopy sequence, on 6 lean (3.3–4.6kg) and 12 obese cats (5.2–9.8kg). Median liver fat percentages in lean and obese cats were 1.3% and 6.8%, respectively. Results are biologically plausible, based on chemical assay in a separate group of cats; however, full validation of the method is necessary before other conclusions can be drawn. This report should provide a foundation for the further development of spectroscopic techniques for studying hepatic lipid accumulation in cats.

Oral and dental imaging equipment and techniques for small animals.
Fat mass, and not diet, has a large effect on postprandial leptin but not on adiponectin concentrations in cats.


In the diagnosis and treatment of oral and dental diseases in dogs and cats, digital intraoral radiography offers many advantages over the use of standard dental radiographic film, including rapid image generation, easier exposure correction, enhancement, and paperless storage. Digital image receptors can be divided into 2 main types, direct digital systems using charged coupled devices and complementary metal oxide semiconductor sensors, and indirect digital systems using phosphor plates with a computerized scanner. Each system is paired with a computer software system to allow handling, visualization, enhancement, sharing, and archiving of the images.

Feline immunodeficiency virus (FIV) vaccine efficacy and FIV neutralizing antibodies.

Vaccine (2013)


A HIV-1 tier system has been developed to categorize the various subtype viruses based on their sensitivity to vaccine-induced neutralizing antibodies (NAbs): tier 1 with greatest sensitivity, tier 2 being moderately sensitive, and tier 3 being the least sensitive to NAbs (Mascola et al., J Virol 2005; 79:10103-7). Here, we define an FIV tier system using two related FIV dual-subtype (A+D) vaccines: the commercially available inactivated infected-cell vaccine (Fel-O-Vax(R) FIV) and its prototype vaccine solely composed of inactivated whole viruses. Both vaccines afforded combined protection rates of 100% against subtype-A tier-1 FIVPet, 89% against subtype-B tier-3 FIVFC1, 61% against recombinant subtype-A/B tier-2 FIVBang, 62% against recombinant subtype-F'/C tier-3 FIVNZ1, and 40% against subtype-A tier-2 FIVUK8 in short-duration (37-41 weeks) studies. In long-duration (76-80 weeks) studies, the commercial vaccine afforded a combined protection rate of at least 46% against the tier-2 and tier-3 viruses. Notably, protection rates observed here are far better than recently reported HIV-1 vaccine trials (Sanou et al., The Open AIDS J 2012; 6:246-60). Prototype vaccine protection against two tier-3 and one tier-2 viruses was more effective than commercial vaccine. Such protection did not correlate with the presence of vaccine-induced NAbs to challenge viruses. This is the first large-scale (228 laboratory cats) study characterizing short- and long-duration efficacies of dual-subtype FIV vaccines against heterologous subtype and recombinant viruses, as well as FIV tiers based on in vitro NAb analysis and in vivo passive-transfer studies. These studies demonstrate that not all vaccine protection is mediated by vaccine-induced NAbs.

Ultrasonographic appearance of adrenal glands in healthy and sick cats.


The first part of the study aimed to describe prospectively the ultrasonographic features of the adrenal glands in 94 healthy cats and 51 chronically sick cats. It confirmed the feasibility of ultrasonography of adrenal glands in healthy and chronically sick cats, which were not statistically different. The typical hyperechoic appearance of the gland surrounded by hyperechoic fat made it recognisable. A sagittal plane of the gland, not in line with the aorta, may be necessary to obtain the largest adrenal measurements. The reference intervals of adrenal measurements were inferred from the values obtained in the healthy and chronically sick cats (mean +/- 0.96 SD): adrenal length was 8.9-12.5 mm; cranial height was 3.0-4.8 mm; caudal height was 3.0-4.5 mm. The second part of the study consisted of a retrospective analysis of the ultrasonographic examination of the adrenal glands in cats with adrenal diseases (six had hyperaldosteronism and four had pituitary-dependent hyperadrenocorticism) and a descriptive comparison with the reference features obtained in the control groups from the prospective study. Cats with hyperaldosteronism presented with unilateral severely enlarged adrenal glands. However, a normal contralateral gland did not preclude a contralateral infiltration in benign or malignant adrenal neoplasms. The ultrasonographic appearance of the adrenal glands could not differentiate benign and malignant lesions. The ultrasonographic appearance of pituitary-dependent hyperadrenocorticism was mainly a symmetrical adrenal enlargement; however, a substantial number of cases were within the reference intervals of adrenal size.

Fat mass, and not diet, has a large effect on postprandial leptin but not on adiponectin concentrations in cats.

Domest Anim Endocrinol (2013)

Leptin and adiponectin play important roles in carbohydrate and lipid metabolism in different species. Information is limited on the effects of diet, weight gain, and fat mass on their concentrations in cats. This study compared fasting and postprandial blood leptin and total adiponectin concentrations before and after 8 wk of ad libitum feeding to promote weight gain in adult cats (n = 32) fed either a low-carbohydrate, high-protein (23% and 47% ME) or a high-carbohydrate, low-protein (51% and 21% ME) diet. There were significant effects of total, abdominal, and nonabdominal fat mass, but not diet or body weight, on mean 24-h and peak leptin (P < 0.01); observed increases in mean and peak leptin were greatest for abdominal fat mass (50% and 56% increase for every extra 100 g, respectively). After weight gain, postprandial leptin concentration increased markedly relative to when cats were lean, and the duration of the increase was longer after a mean weight gain of 37% with the low-carbohydrate, high-protein diet group compared with 17% with the high-carbohydrate, low-protein group (P <= 0.01). Adiponectin was lower than fasting at some time points during the postprandial period in both groups (P <= 0.05). For both fasting and mean 24-h adiponectin, there was no significant diet effect (P >/= 0.19) or changes in weight gain relative to when cats were lean (P >/= 0.29). In conclusion, fat mass, and not diet, has a large effect on postprandial leptin but not adiponectin concentrations in cats.

Skin fragility syndrome in a cat with multicentric follicular lymphoma.
Crosaz, O., F. Vilaplana-Grosso, C. Alleaume, N. Cordonnier, A. S. Bedu-Leperlier, G. Marignac, B. Hubert, and D. Rosenberg
An 11-year-old, spayed female domestic shorthair cat was presented for a right flank wound. On clinical examination, a single non-painful skin tear lesion with irregular edges was detected. During the examination, star-shaped cigarette paper-like skin lesions appeared spontaneously. An abdominal mass was also palpated. Feline skin fragility syndrome (FSFS) was suspected and a multicentric lymphoma was diagnosed by fine needle aspiration. The cat’s condition declined and it died spontaneously. Post-mortem examination confirmed the diagnosis of lymphoma. Neoplastic lymphocytes were not observed in the skin. Histological analysis of the skin was consistent with the morphological aspects of FSFS. A possible direct link between the two conditions remains a matter of speculation, but this case report provides the first description of FSFS associated with multicentric follicular lymphoma. Thus, multicentric follicular lymphoma should be considered as a differential diagnosis in cats presenting with FSFS.

An observational clinical study in cats and rabbits of an anatomically designed supraglottic airway device for use in companion animal veterinary anaesthesia.
Crotaz, I. R.

Genetic variability in Microsporum canis isolated from cats, dogs and humans in Brazil.
Mycoses (2013)
Dermatophytosis caused by Microsporum canis is a heterogeneous disease with variable clinical manifestations. M. canis is a zoophilic dermatophyte and the most frequent fungi isolated from dogs, cats and children in Brazil. The aim of this study was to investigate the genetic variability of M. canis isolates from different animal species using two microsatellite markers, namely, McGT(13) and McGT(17), and to correlate the results with the clinical and epidemiological patient data in Brazil. The study included a global set of 102 M. canis strains, including 37 symptomatic cats, 35 asymptomatic cats, 19 human patients with tinea, 9 asymptomatic dogs and 2 symptomatic dogs. A total of 14 genotypes were identified, and 6 large populations were distinguished. There was no correlation between these multilocus genotypes and the clinical and epidemiological data, including the source, symptomatology, clinical picture, breed, age, sex, living conditions and geographic location. These results demonstrate that the use of microsatellite polymorphisms is a reliable method for the differentiation of M. canis strains. However, we were unable to demonstrate a shared clinical and epidemiological pattern among the same genotype samples.
2013 AAHA/AAFP fluid therapy guidelines for dogs and cats.
Fluid therapy is important for many medical conditions in veterinary patients. The assessment of patient history, chief complaint, physical exam findings, and indicated additional testing will determine the need for fluid therapy. Fluid selection is dictated by the patient’s needs, including volume, rate, fluid composition required, and location the fluid is needed (e.g., interstitial versus intravascular). Therapy must be individualized, tailored to each patient, and constantly re-evaluated and reformulated according to changes in status. Needs may vary according to the existence of either acute or chronic conditions, patient pathology (e.g., acid-base, oncotic, electrolyte abnormalities), and comorbid conditions. All patients should be assessed for three types of fluid disturbances: changes in volume, changes in content, and/or changes in distribution. The goals of these guidelines are to assist the clinician in prioritizing goals, selecting appropriate fluids and rates of administration, and assessing patient response to therapy. These guidelines provide recommendations for fluid administration for anesthetized patients and patients with fluid disturbances.

Enzyme-linked immunosorbent assay using a crude antigen extract to measure Cuterebra-specific immunoglobulin G in sera of cats with systemic infections.
In cats, larvae of the dipteran fly, Cuterebra, sometimes cause severe disease by their migration through the tissues of the larynx, pharynx, nasal sinuses, brain, and spinal cord; such infected cats may die without the maggots ever reaching the subcutaneous tissues where they would typically mature. The current study examines the ability of an indirect enzyme-linked immunosorbent assay (ELISA) using crude Cuterebra antigen from maggots to detect parasite-specific immunoglobulin (Ig)G in cats with known (n = 42), suspected (n = 25), or no known exposure to the infection (n = 68). The probability of a given optical density (OD) predicting the infection status of a given animal was determined using logistic regression, and both 1:20 and 1:80 serum dilutions were highly predictive of the potential of a cat being infected with a larval Cuterebra. In 5 cases where 2 samples were collected 1-2 weeks apart, there was a mean OD increase in the second sample for both the 1:20 and 1:80 dilutions, but it was significant (P = 0.044) only at the 1:20 dilution. Sex of the sampled cat was not a significant contributor to the ability of the OD to predict the presence of a larva, but the age of the cat added significantly to the predictive value of the generated curves, with the only exception being with the 1:20 serum dilution with the curve being generated only using the cats known to be positive for larval presence. This ELISA should aid in ruling cuterebrasis in or out in suspect systemic and, specifically, neurologic cases and provide information on kinetics of antibody presence postexposure.

COMPANION ANIMALS SYMPOSIUM: Nutrigenomics: Using gene expression and molecular biology data to understand pet obesity.
de Godoy, M. R., and K. S. Swanson
Approximately 55% of dogs and 53% of cats in the United States are considered overweight or obese. The domestication of dogs and cats and, more recently, their anthropomorphism, have drastically changed their environment and social behavior. A greater manifestation of chronic diseases is observed with pet obesity (e.g., insulin resistance, type-2 diabetes, musculoskeletal disorders). The advances in “omics” technology may provide new tools to investigate the complexity of obesity and its comorbidities. The field of nutrigenomics focuses specifically on the mechanisms by which nutrients and dietary bioactive molecules affect gene expression. The main objective of this review is to discuss factors involved in the etiology of pet obesity and demonstrate how the field of nutrigenomics has been used to better understand and characterize this disease. Currently, most of the genomics literature available on companion animal obesity has focused on adipose tissue, with fewer studies focused on other tissues (e.g., skeletal muscle, liver). Initial studies focused on the sequence and functionality of a few specific genes, such as leptin and adiponectin, and identified their association with obesity. Subsequent studies focused on gene expression levels across tissues and how they were impacted by BW status or if animals...
were intact, spayed, or neutered. Dietary interventions to induce obesity, promote BW loss, or alter dietary nutrient profile have also been investigated. Diets including prebiotics, green tea extract, or increased concentrations of protein have been shown to modify the expression of several genes related to glucose and lipid metabolism in adipose [e.g., uncoupling protein-2, carnitine palmitoyltransferase-1, PPARalpha, lipoprotein lipase (LPL), and glucose transporter 4] and skeletal muscle (e.g., PPARalpha and LPL) tissues. In general, the outcomes derived from these studies demonstrated that dogs and cats share similar adipokines and hormones to other species, and they are affected in a similar fashion during obesity. They also indicate that gene transcription modifications may preclude clinical signs, which may become a useful tool in the management and prevention of obesity.

Assessing the rabies control and surveillance systems in Brazil: An experience of measures toward bats after the halt of massive vaccination of dogs and cats in Campinas, Sao Paulo. 
Bats are less vulnerable to forest fragmentation than any other mammal, and for that reason, some species can disperse to peri-urban or urban areas. Insectivorous bats are abundant in urban areas due to the density of artificial roosts and insects attracted by city lights. Inter-species transmission of the rabies virus between bats can occur, and this is the most probable mechanism of virus circulation in bat populations. Bats can also transmit the rabies virus to other mammal species, like dogs and cats. With the halt of dog and cat vaccination campaigns in 2010, the importance of rabies surveillance in bats has increased in Brazil. A cross-sectional study performed in Campinas, Sao Paulo State, using data from the passive surveillance system for bats showed that rabies-positive bats from the families Molossidae, Phyllostomidae and Vespertilionidae were found in a peri-urban area. In these areas, dog and cat emergency vaccination (vaccination blockage) was recommended after the halt of the massive vaccination campaign in 2010. This control strategy was able to increase the proportion of vaccinated animals around a critical value of 50% and even with a higher probability of infectious contact between bats and dogs or cats in the vaccination blockage areas, no dog or cat rabies case was observed, evidencing the importance of the implementation of strategic rabies control measures in this new epidemiological scenario.

Detection of Leishmania infantum in animals and their ectoparasites by conventional PCR and real time PCR.
tVisceral leishmaniosis (VL) is a parasitic disease caused by Leishmania infantum, which is primarily transmitted by phlebotomine sandflies. However, there has been much speculation on the role of other arthropods in the transmission of VL. Thus, the aim of this study was to assess the presence of L. infantum in cats, dogs and their ectoparasites in a VL-endemic area in northeastern Brazil. DNA was extracted from blood samples and ectoparasites, tested by conventional PCR (cPCR) and quantitative real time PCR (qPCR) targeting the L. infantum kinetoplast DNA. A total of 280 blood samples (from five cats and 275 dogs) and 117 ectoparasites from dogs were collected. Animals were apparently healthy and not previously tested by serological or molecular diagnostic methods. Overall, 213 (76.1 %) animals and 51 (43.6 %) ectoparasites were positive to L. infantum, with mean parasite loads of 795.2, 31.9 and 9.1 fg in dogs, cats and ectoparasites, respectively. Concerning the positivity between dogs and their ectoparasites, 32 (15.3 %) positive dogs were parasitized by positive ectoparasites. The overall concordance between the PCR protocols used was 59.2 %, with qPCR being more efficient than cPCR; 34.1 % of all positive samples were exclusively positive by qPCR. The high number of positive animals and ectoparasites also indicates that they could serve as sentinels or indicators of the circulation of L. infantum in risk areas.

Comparison of renal ultrasonographic measurements between healthy cats of three cat breeds: Ragdoll, British Shorthair and Sphynx.

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Healthy cats of three cat breeds -- Sphynx (n = 11), British Shorthair (n = 15) and Ragdoll (n = 15) -- were included in this study. All cats underwent an ultrasonographic examination to assess renal length, cortical thickness, medullary thickness and corticomedullary ratio. Of all ultrasonographic measurements, renal length showed the highest variation. For all ultrasonographic dimensions, individual and kidney side (left vs right) variation were much more pronounced than interbreed variation. Sphynx cats tended to have larger kidneys (4.09 +/- 0.33 cm) than British Shorthair (3.77 +/- 0.43 cm) and Ragdoll cats (3.87 +/- 0.41 cm). British Shorthair cats, however, tended to have a thinner cortex (0.67 +/- 0.13 cm) and medulla (0.76 +/- 0.18 cm) than Sphynx (0.76 +/- 0.14 cm and 0.90 +/- 0.25 cm, respectively) and Ragdoll cats (0.75 +/- 0.13 cm and 0.91 +/- 0.22 cm, respectively). However, statistical tests did not reveal significant differences between these cat breeds. The corticomedullary ratio was similar for the three cat breeds (Sphynx: 0.93 +/- 0.43; British Shorthair: 0.91 +/- 0.26; Ragdoll: 0.88 +/- 0.31). The left kidney (3.83 +/- 0.42 cm) was significantly smaller than the right kidney (3.99 +/- 0.40 cm) and showed a thicker medulla (left: 0.93 +/- 0.21 cm, right: 0.79 +/- 0.22 cm), and thus a lower corticomedullary ratio (left: 0.80 +/- 0.23, right: 1.01 +/- 0.32). For the cortical thickness, no significant difference was observed between the left (0.71 +/- 0.14 cm) and right kidney (0.74 +/- 0.14 cm).

Renal dimensions at ultrasonography in healthy Ragdoll cats with normal kidney morphology: correlation with age, gender and bodyweight.
Fifty-six healthy Ragdoll cats underwent an ultrasonographical examination of the urinary tract to evaluate if gender, age, bodyweight and presence of a medullary rim sign had a significant influence on renal length and corticomedullary ratio (CM). Individual variation percentage was much more pronounced for renal length in comparison with CM ratio. Mean renal length measured 3.83 +/- 0.45 cm (range 2.98-5.09 cm), mean cortical thickness 0.73 +/- 0.15 cm (range 0.36-1.18 cm), mean medullary thickness 0.87 +/- 0.19 cm (range 0.46-1.39 cm) and mean CM ratio 0.88 +/- 0.29 (range 0.29-1.78). Renal length showed a significant positive correlation with bodyweight (P <0.0001), age (P = 0.0073) and male gender (P <0.0001). Therefore, these parameters have to be kept in mind when evaluating renal length on ultrasound. The CM ratio was solely influenced by the presence of a medullary rim sign (P <0.0001). Further research, however, is needed to investigate the usefulness of the CM ratio for the detection of kidney disease by ultrasonography.

Automated and visual analysis of commercial urinary dipsticks in dogs, cats and cattle.
Defontis, M., N. Bauer, K. Failing, and A. Moritz
Two dipsticks developed for human use were evaluated for routine urinalysis and for detection of proteinuria in dogs (n=101), cats (n=50) and cattle (n=100). The aims were to determine their diagnostic usefulness in dogs, cats and cattle and to compare automated versus visual methods of reading. Results obtained with automated reading correlated better with reference methods than visual reading. Correlation with the reference methods was good to excellent for automated estimation of creatinine (dog: r(s)=0.86, cat: r(s)=0.83, cattle: r(s)=0.87) and pH (dog: r(s)=0.96, cat: r(s)=0.91, cattle: r(s)=0.94). The correlation was good for protein (dog: r(s)=0.88, cat: r(s)=0.91), glucose (cat: r(s)=0.83) and urine protein:creatinine (UPC) ratio (dog: r(s)=0.75, cat: r(s)=0.89). Estimation of proteinuria in cattle and pyuria in cats lacked specificity and detection of isosthenuria lacked sensitivity in all species. Semiquantitative estimation of UPC ratio was specific (100% and 91.2% at a cut-off of 0.2 in cats and 0.4 in dogs, respectively).

THORACIC COMPUTED TOMOGRAPHY, ANGIOGRAPHIC COMPUTED TOMOGRAPHY, AND PATHOLOGY FINDINGS IN SIX CATS EXPERIMENTALLY INFECTED WITH AELUROSTRONGYLUS ABSTRUSUS.
Vet Radiol Ultrasound (2013)
Aelurostrongylus abstrusus infection is common in endemic areas and may cause severe respiratory clinical signs. Computed tomography (CT) is an important tool to diagnose pulmonary disease, because it allows detection of small lesions
and discrimination of superimposed structures. The purpose of this study was to characterize by CT and angiographic CT the pulmonary lesions in six cats before, and 48 and 81 days after inoculation with 100 or 800 A. abstrusus infective larvae. Histological examination of the accessory lung lobe was performed to determine the microscopic, pathomorphologic correlate of the CT findings. The predominant CT lesion consisted of multiple nodules of varying size distributed throughout the lungs, severity depending on infectious dose. The histological correlate of the nodular lesions was multifocal dense granulomatous to mixed inflammatory cell infiltrates, including eosinophils distributed in the parenchyma and obliterating the alveoli. Marked, multifocal, dose-dependent thickening of the bronchi and adjacent interstitial changes blurred the margins of the outer serosal surface of the bronchi and vessels. Histologically, this was due to peribronchial mixed cell inflammation. During the course of infection some of the nodular and peribronchial changes were replaced by areas of ground-glass opacity. In addition to providing detailed depiction of pulmonary lesions resulting from an infectious cause and clearly defining lesions with respect to time and severity of infection, CT allowed quantitative assessment of bronchial thickness and lymph node size during the course of disease. Findings indicated that CT characteristics of this disease are consistent with pathologic findings.

**Lung histopathology, radiography, high-resolution computed tomography, and bronchio-alveolar lavage cytology are altered by Toxocara cati infection in cats and is independent of development of adult intestinal parasites.**


This study presents clinical findings after oral ingestion of Toxocara cati eggs which resulted in rapid pulmonary lung migration and parenchymal disease, noted on clinically relevant diagnostic methods. Further, the study investigated the efficacy of pre-infection applications of preventative medication on larval migration through the lungs. A third aim of the study was to determine if adult cats infected with T. cati developed lung disease. Cats in infected groups were administered five oral doses of L3 T. cati larvae. Four-month-old specific pathogen free (SPF) kittens were divided into three groups (six per group): an infected untreated group, an uninfected untreated control group, and an infected treated group (topical moxidectin and imidacloprid, Advantage Multi for Cats, Bayer Healthcare LLC). Six 2- to 3-year-old adult multiparous female SPF cats were an infected untreated adult group. The cats were evaluated by serial CBCs, bronchial-alveolar lavage (BAL), fecal examinations, thoracic radiographs, and thoracic computed tomography (CT) scans and were euthanized 65 days after the initial infection. Adult T. cati were recovered in infected untreated kittens (5/6) and infected untreated adults (5/6) in numbers consistent with natural infections. Eggs were identified in the feces of most but not all cats with adult worm infections. No adult worms were identified in the uninfected controls or the infected treated group. All cats in the infected groups, including treated cats and untreated cats without adult worms, had lung pathology based on evaluation of radiography, CT scans, and histopathology. The infected cats demonstrated a transient peripheral eosinophilia and marked eosinophilic BAL cytology, but normal bronchial reactivity based on in vivo CT and in vitro ring studies. Lung lesions initially identified by CT on day 11 were progressive. Thoracic radiographs in infected cats had a diffuse bronchial-interstitial pattern and enlarged pulmonary arteries. Pulmonary arterial, bronchial, and interstitial disease were prominent histological findings. Infected treated cats had a subtle attenuation but not prevention of lung disease compared to infected cats. Significant lung disease in kittens and adult cats is associated with the early arrival of T. cati larvae in the lungs and is independent of the development of adult worms in the intestine. These data suggest that while the medical prevention of the development of adult parasites after oral exposure to T. cati is obviously beneficial, this practice even with good client compliance will not prevent the development of lung disease which can alter clinical diagnostic methods.

**Organohalogenated contaminants in domestic cats’ plasma in relation to spontaneous acromegaly and type 2 diabetes mellitus: A clue for endocrine disruption in humans?**


**Diru, A. C., S. J. Niessen, P. G. Jorens, and A. Covaci**

It was recently hypothesized that pets may serve as sentinels to explore human exposure to organohalogenated chemicals (OHCs) via indoor environments and adverse health effects. The current study investigates OHCs contamination in domestic cats suffering from diabetes mellitus (DM), particularly DM induced by acromegaly and a form of DM akin to human type 2 DM (T2DM). Plasma from three groups of domestic cats was analyzed: acromegaly induced DM, T2DM and age matched control cats without DM. Analytes targeted included organochlorine pesticides, polychlorinated biphenyls (PCBs), and polybrominated diphenyl ethers (PBDEs), together with their hydroxylated (HO-) metabolites. Similar PCB
profiles were measured in cat plasma compared to humans, while the PBDE profile (dominated by BDE-99 (48%-55%) and BDE-47 (19%-25%)), the PCB and PBDE metabolite profiles were different in cat plasma than found in humans. Significantly higher OHC concentrations were recorded in plasma of acromegalic cats compared to the other two groups. Group differences in the PCBs/HO-PCBs ratios suggest that acromegalic cats have a lower capacity to metabolize persistent OHCs, like PCBs, than diabetic cats or cats without an endocrinopathy. As pituitary tumorigenesis in animals can be induced by estrogens, and PCBs may act as xenoestrogens, further investigation into whether there could be a causative link with the induction of feline acromegaly is warranted. Interestingly, BDE-47/BDE-99 ratios in cats were similar to the ratios in house dust. The results of this study suggest that domestic cats may represent a good model to assess human exposure to chemicals present in indoor dust.

**Molecular survey of Tritrichomonas suis (=T. foetus) ‘cat’ and ‘cattle’ genotypes in pigs in Japan.**


Doi, J., N. Abe, and Y. Oku

Tritrichomonas suis (=T. foetus) is a protozoan parasite of pigs, cattle and cats. Based on host range and genetic differences, T. suis has been divided into a ‘cat genotype’ and a ‘cattle genotype’, with the latter genotype capable of infecting both cattle and pigs. Since no information is currently available on the genetic characteristics of T. suis from pigs in Japan, we conducted a molecular survey of T. suis using fecal DNA from pigs in Japan. Of the 64 pigs examined, nested PCR revealed that 36 (56.3%) were positive for T. suis. Sequence analysis of 8 positive samples showed that 7 of the pig isolates belonged to the ‘cattle genotype’ and the remaining isolate belonged to the ‘cat genotype’. The findings revealed that T. suis infection is common in pigs in Japan and that pigs can be infected by both genotypes.

**Novel bacterial phylotypes associated with the healthy feline oral cavity and feline chronic gingivostomatitis.**


Dolieslager, S. M., D. Bennett, N. Johnston, and M. P. Riggio

Feline chronic gingivostomatitis (FCGS) is a painful inflammatory disease of the oral cavity. Treatment options for FCGS are very limited and little is known regarding its aetiology. The aim of this study was to investigate the presence of putative novel species in the oral cavity of cats with and without FCGS. Bacterial DNA was extracted from oral swabs and identified by 16S rRNA gene sequencing. The 16S rRNA genes of 54 clones representing distinct potentially novel species were sequenced (1202-1325 base pairs). Obtained sequences were compared to the BLAST database, aligned using the ClustalW2 alignment tool and a phylogenetic tree created. Twenty-two clones (18 from control and four from FCGS samples) had a similarity of less than 97% and were considered novel. The proportion of novel phylotypes in each group was 19.6% (control) and 2.3% (FCGS). In the derived phylogenetic tree, 15 novel phylotypes clustered together and branched away from known species and phyla. This suggests the presence of a group of novel, previously unidentified bacteria that are associated with the feline oral cavity in both health and disease.

**Methods used to estimate the size of the owned cat and dog population: a systematic review.**


Downes, M. J., R. S. Dean, J. H. Stavisky, V. J. Adams, D. J. Grindlay, and M. L. Brennan

BACKGROUND: There are a number of different methods that can be used when estimating the size of the owned cat and dog population in a region, leading to varying population estimates. The aim of this study was to conduct a systematic review to evaluate the methods that have been used for estimating the sizes of owned cat and dog populations and to assess the biases associated with those methods. A comprehensive, systematic search of seven electronic bibliographic databases and the Google search engine was carried out using a range of different search terms for cats, dogs and population. The inclusion criteria were that the studies had involved owned or pet domestic dogs and/or cats, provided an estimate of the size of the owned dog or cat population, collected raw data on dog and cat ownership, and analysed primary data. Data relating to study methodology were extracted and assessed for biases. RESULTS: Seven papers were included in the final analysis. Collection methods used to select participants in the included studies were: mailed surveys using a commercial list of contacts, door to door surveys, random digit dialled telephone surveys, and randomised telephone surveys using a commercial list of numbers. Analytical and statistical methods used to estimate the pet population size were: mean number
of dogs/cats per household multiplied by the number of households in an area, human density multiplied by number of dogs per human, and calculations using predictors of pet ownership. CONCLUSION: The main biases of the studies included selection bias, non-response bias, measurement bias and biases associated with length of sampling time. Careful design and planning of studies is a necessity before executing a study to estimate pet populations.

**Efficacy of indoxacarb applied to cats against the adult cat flea, Ctenocephalides felis, flea eggs and adult flea emergence.**
Dryden, M. W., P. A. Payne, V. Smith, K. Heaney, and F. Sun

BACKGROUND: A study was conducted to evaluate the effect of indoxacarb applied to cats on adult cat fleas, Ctenocephalides felis, flea egg production and adult flea emergence. METHODS: Sixteen cats were selected for the study and allocated to two treatment groups. Eight cats were treated with a 19.5% w/v topical spot-on solution of indoxacarb on day 0 and eight cats served as untreated controls. Each cat was infested with 50 fleas on Days -2, 7, 14, 21, 28, 35 and 42. On Days 1, 2, and 3, and at 2 and 3 days after each post treatment reinestation flea eggs were collected from the pan under each cat cage. Eggs were counted and viability assessed by evaluating adult flea emergence 28 days after egg collection. Three days after treatment or infestation, each cat was combed to remove and count live fleas. RESULTS: Treatment with indoxacarb provided 100% efficacy following infestations on day -2, 7, 14, 21 and 28 and efficacy was 99.6% following infestations on days 35 and 42. Egg production from indoxacarb treated cats was reduced by 99.9% within 72 hours of treatment. For subsequent infestations no eggs were produced from treated cats from day 8 through day 30. Egg production was still reduced by >/=95.8% through day 45. Indoxacarb treatment also reduced adult flea emergence from eggs for 5 weeks after treatment. The combination of reduction in egg numbers and egg viability from indoxacarb treated cats reduced predicted flea emergence by 100% from days 2 - 31 and 99.9%, 100%, 96.4% and 99.0% on days 37, 38, 44 and 45, respectively. CONCLUSIONS: A topical spot-on formulation of indoxacarb provided >/=99.6% efficacy against flea infestations on cats for 6 weeks following a single treatment. Indoxacarb also eliminated or markedly reduced egg production for the entire evaluation period and reduced the viability of the few eggs that were produced from Day 1 through Day 38. Given indoxacarb’s effect on adult fleas, egg production and egg viability; this formulation can interrupt flea reproduction on treated cats for at least 6 weeks after treatment.

**Comparative accuracy of several published formulae for the estimation of serum osmolality in cats.**
Dugger, D. T., M. S. Mellema, K. Hopper, and S. E. Epstein

OBJECTIVE: To determine the osmole gap utilizing 18 previously published formulae for the estimation of serum osmolality in cats. PROCEDURES: Serum samples were frozen at -80 degrees C after routine biochemical analysis. An Advanced Micro Osmometer 3300 was used to measure serum osmolality. Eighteen previously reported formulae were used to calculate osmolality from biochemical analysis results. The calculated osmolality was subtracted from the measured osmolality to determine the osmole gap. Osmole gaps for azotaemic and hyperglycaemic cats were compared to those from cats without azotaemia or hyperglycaemia using each formula. RESULTS: The osmole gaps varied dependent on the formula used and the presence or absence of hyperglycaemia or azotaemia. Eleven formulae led to calculated osmolality and osmole gaps that were not statistically different when hyperglycaemia, azotaemia or both were present. Four of these 11 formulæ resulted in osmole gaps near zero. For each formula used, the osmole gap increased with increasing osmolality. CLINICAL SIGNIFICANCE: Multiple formulæ to calculate serum osmolality can be used, but they result in significantly different osmole gaps. Clinicians should be aware of the specific reference interval for the formula being used. The formula [2(Na(+)) + glucose + BUN] is recommended as it is easy to use and reliable even in the presence of hyperglycaemia and/or azotaemia.

**Use of bovine pericardium (Tutopatch) graft for surgical repair of deep melting corneal ulcers in dogs and corneal sequestra in cats.**
Vet Ophthalmol (2013)
Dulaurent, T., T. Azoulay, F. Goulle, A. Dulaurent, M. Mentek, R. L. Peiffer, and P. F. Isard
OBJECTIVE: To evaluate the efficacy of bovine pericardium (BP) graft in the treatment of deep melting corneal ulcers in three dogs and corneal sequestra in three cats. PROCEDURE: Three dogs with keratomalacia affecting the deep third of the stroma and three cats with corneal sequestrum were evaluated and underwent surgery. Following keratectomy, BP material was placed into the keratectomy bed and sutured to the recipient cornea with 9/0 polyglactin suture material. Postoperative treatment with topical and systemic antibiotics, systemic nonsteroidal anti-inflammatory agents, and topical atropine was prescribed. Follow-up examinations were carried out 1, 2 weeks, 1 and 2 months after the surgery and consisted of a complete ophthalmic examination. Optical coherence tomography (OCT) was performed 1 and 2 months after the surgery in one dog and in one cat. RESULTS: At 1 week, corneal neovascularization was present around the BP graft in all cases. Four weeks after the BP graft, in two dogs and in all cats, the vascularization was regressing and the graft was integrated into the cornea, which was regaining transparency. Topical treatment with anti-inflammatory agents was then prescribed for 2 weeks. Two months after the surgery, 5 of 6 corneas in two dogs and three cats had healed with focal corneal scarring. The remaining dog had progression of the keratomalacia involving the deep BP graft that required additional surgery, but became blind. CONCLUSION: Bovine pericardium graft offers a promising option for surgical reconstruction of the cornea following keratectomy for the management of corneal ulcers and sequestra.

In vitro glucuronidation of the angiotensin II receptor antagonist telmisartan in the cat: a comparison with other species.


Ebner, T., G. Schanzle, W. Weber, U. Sent, and J. Elliott

Glucuronidation of telmisartan comprises nearly its entire metabolic clearance in several mammalian species including human. However, data were lacking for the cat, a species noted for its inability to glucuronidate some drugs. Therefore, the glucuronidation of telmisartan was investigated using feline liver microsomes and compared to liver microsomes of rats, dogs, and human, intestinal human microsomes and cell lines expressing human UDP-glucuronosyltransferases (UGT). Incubation of telmisartan with cat liver microsomes readily yielded telmisartan glucuronide, and pooled (N = 3 for each gender) cat liver microsomes even showed the highest glucuronidation rate (cat > dog >> human > rat). Michaelis Menten kinetics were observed with Km of 7.5 and 10 mum and Vmax of 3.9 and 3.3 nmol/min/mg for male and female cats, respectively. Confirming the in vitro data, telmisartan glucuronide was detected as the major circulating metabolite in cat plasma. To elucidate which UGT enzymes are involved, telmisartan was incubated with cell lines expressing human UGTs. The highest glucuronidation activity was observed for UGT1A8, UGT1A7, and UGT1A9. In conclusion, telmisartan was effectively glucuronidated in cats. Defects of the UGT1A6 gene in cats do not affect the glucuronidation of telmisartan as it is not a substrate of human UGT1A6.

Nematode-associated intramural alimentary nodules in pumas are histologically similar to gastrointestinal eosinophilic sclerosing fibroplasia of domestic cats.


Intramural alimentary nodules in the gastric pylorus and proximal duodenum are a common finding in free-ranging pumas (Puma concolor) in North America, and are often associated with the presence of an indwelling nematode (most commonly Cyclicospirura spp.). This study compares the histological, histochemical and immunohistochemical appearance of three proximal gastrointestinal nodules in pumas with four cases of eosinophilic sclerosing fibroplasia in domestic cats. Histologically, the pattern of inflammation and repair was strikingly similar, consisting of lamillated anastomosing trabeculae of dense sclerotic collagen with interspersed inflammatory cells and reactive fibroblasts. The stromal trabeculae were histologically reminiscent of osteoid and were uniformly positive for collagenous protein by Masson’s trichrome stain and negative for mineralized osteoid deposits with Von Kossa’s stain. Trabecular cells expressed osteonectin, but not osteocalcin immunohistochemically. Collectively, these findings are most consistent with a stroma comprised of dense collagenous trabeculae that resembles, but is distinct, from osteoid. Both the puma and domestic cat lesions demonstrated an eosinophilic inflammatory component; however, eosinophils were present in small numbers in the puma nodules relative to the nodules in domestic cats. These entities likely represent a unique and stereotypic gastrointestinal repair response of felids, given their similar histological, histochemical and immunohistochemical profiles.
Eiler, K. C., D. S. Bruyette, E. N. Behrend, R. J. Kemppainen, and P. H. Kass
BACKGROUND: Because of the lack of a current validated assay for feline endogenous adrenocorticotropic hormone (ACTH) in response to administration of currently available ovine corticotropin-releasing hormone (oCRH) preparations, a complete evaluation of the hypothalamic-pituitary-adrenal axis in cats has not been possible. OBJECTIVE: This study was undertaken to (1) determine the pituitary (ACTH) and adrenal (cortisol) response to both IV and IM administration of a currently available oCRH product in healthy cats, and (2) validate an endogenous ACTH assay for use in cats. ANIMALS: Seventeen healthy cats receiving oCRH (n = 11) or placebo (n = 6). METHODS: Prospective, randomized, placebo-controlled study. oCRH at 1 mug/kg or placebo was given either IM or IV. Endogenous cortisol and ACTH concentrations were evaluated after the injection. A comparison of IM versus IV and placebo versus treatment was made. RESULTS: The DiaSorin immunoradiometric assay (IRMA) assay for ACTH performed well, showing both parallelism and acceptable intra- and interassay coefficients of variation. There was a significant difference between groups (P =.025) and a significant difference between times (P =.025) when endogenous ACTH concentrations were compared after oCRH IV or IM. No significant differences were observed in cortisol concentrations comparing IV to IM oCRH. CONCLUSIONS: IM administration of oCRH results in significantly greater ACTH concentrations but not cortisol concentrations when compared with IV administration. Samples should be drawn before and at 60 minutes after the injection. The Diasorin IRMA is valid for feline endogenous ACTH measurements.

Eisner, E. R.
Veterinary standard of care is peer-regulated, measured as the level of care provided and acceptable among most veterinarians in a given geographic area. This article proposes that today it should be the responsibility of the guiding organization of each medical discipline, such as the American Veterinary Dental College for the veterinary dental profession, to provide guidance to ruling Medical Boards regarding a recommended standard of care, rather than being defined by geographic boundaries. Within each medical discipline, specialists should be held to a higher standard than generalists, with both operating to a standard of care commensurate with their training.

Domestic dogs and cats are major domestic reservoir hosts of Trypanosoma cruzi and a risk factor for parasite transmission. In this study we assessed the relative performance of a polymerase chain reaction assay targeted to minicircle DNA (kDNA-PCR) in reference to conventional serological tests, a rapid dipstick test and xenodiagnosis to detect T. cruzi infection in dogs and cats from an endemic rural area in northeastern Argentina. A total of 43 dogs and 13 cats seropositive for T. cruzi by an immunosorbent assay (ELISA) and an indirect hemagglutination assay (IHA), which had been examined by xenodiagnosis, were also tested by kDNA-PCR. kDNA-PCR was nearly as sensitive as xenodiagnosis for detecting T. cruzi-infectious dogs and cats. kDNA-PCR was slightly more sensitive than xenodiagnosis in seropositive dogs (91% versus 86%, respectively) and cats (77% against 54%, respectively), but failed to detect all of the seropositive individuals. ELISA and IHA detected all xenodiagnosis-positive dogs and both outcomes largely agreed (kappa coefficient, kappa=0.92), whereas both assays failed to detect all of the xenodiagnosis-positive cats and their agreement was moderate (kappa=0.68). In dogs, the sensitivity of the dipstick test was 95% and agreed closely with the outcome of conventional serological tests (kappa=0.82). The high sensitivity of kDNA-PCR to detect T. cruzi infections in naturally infected dogs and cats supports its application as a diagnostic tool complementary to serology and may replace the use of xenodiagnosis or hemoculture.

Distribution, seasonality and risk factors for tick paralysis in Australian dogs and cats.
Tick paralysis is a serious and potentially fatal condition of Australian companion animals induced by the paralysis ticks, *Ixodes holocyclus* and *Ixodes cornuatus*. Limited published information is available on the distribution, seasonality and risk factors for tick paralysis mortality in dogs and cats. This study describes 3479 cases of canine and feline tick paralysis in Australia using data extracted from a real-time disease surveillance program. Risk factors for mortality were identified, and maps of the distribution of cases were generated. Cluster analysis was performed using a space-time permutation scan statistic. Tick paralysis was found to be distinctly seasonal, with most cases reported during spring. Most cases were located on the eastern coast of Australia with New South Wales and Queensland accounting for the majority of reported cases. A cluster of cases was identified on the south coast of New South Wales. Dogs were found to be at significantly higher risk (P<0.05) of death if less than 6 months of age or if a toy breed. No significant risk factors for mortality were identified for cats. Some animals receiving chemoprophylactic treatment for tick infestation experienced tick paralysis during the products’ period of effectiveness. There is a high risk of tick paralysis in dogs and cats on the eastern coast of Australia during the spring months. The risk factors for mortality identified can be used by veterinarians to determine prognosis in cases of canine tick paralysis and potentially to improve the treatment of cases. Daily tick searches of pets - particularly in high risk areas and during high risk periods - are recommended since the prevention of tick paralysis via chemoprophylaxis is not 100% guaranteed across the whole population.

ULTRASONOGRAPHIC CHARACTERISTICS OF THE CISTERNA CHYLI IN EIGHT DOGS AND FOUR CATS.
Vet Radiol Ultrasound (2013)
Etienne, A. L., R. Cavrenne, K. Gommeren, G. Bolen, and V. Busoni
Ultrasonography of the cisterna chyli has been used in humans to diagnose increased lymphatic flow or lymph flow obstruction and to guide percutaneous embolization of the thoracic duct via the cisterna chyli. The aim of this study was to describe the ultrasonographic characteristics of the dorsal portion of cisterna chyli in dogs and cats with chylous ascites or chylothorax and in a group of healthy dogs and cats. The aorta and the cranial mesenteric artery were used as anatomic landmarks. Ultrasonography was performed before and 2 h after a fatty meal in healthy dogs and cats. The visualized structure was confirmed to be a dilated cisterna chyli at necropsy in a dog with chylous ascites. The confirmed or presumed cisterna chyli was consistently detected using ultrasonography in nonfasted healthy animals and clinically affected animals and appeared as an anechoic tubular structure, without detectable flow, at the right dorsolateral aspect of the aorta. It had a similar ultrasonographic appearance in patients with chyloabdomen and in nonfasted healthy dogs and cats. There was considerable overlap in diameters of the cisterna chyli for affected and healthy animals. The shape and size of the cisterna chyli in an individual animal were variable during the same ultrasound examination and between different examinations. This study demonstrated the appearance of the presumed dorsal portion of the cisterna chyli by ultrasonography and might provide useful preliminary data for further studies into the feasibility of ultrasound-guided injections or aspirations of the cisterna chyli in dogs and cats.

Jugular vascular access port implantation for frequent, long-term blood sampling in cats: Methodology, assessment, and comparison with jugular catheters.
Long-term, frequent venous access for diagnostic, therapeutic, or research purposes in cats is problematic. Frequent blood sampling over extended periods is necessary for some therapeutic regimes and often required for clinical research in veterinary science. In this paper, we describe the implantation of vascular access ports (VAPs) and assess their use for repeated blood sampling over 16 weeks and 38 weeks, as well as the use of jugular catheters for one week. The VAP placement procedure was well-tolerated with few minor complications (minor swelling, contusion, or superficial dermatitis from self-trauma), which were not observed when neck bandages were applied immediately after surgery. Thromboembolism occurred in two cats, but did not occur after switching to a smaller catheter with a rounded tip and taurodilide-citrate locking solution. Although duration of access was much longer with VAPs compared to jugular catheters, patency rates were similar (89% (n=28) to 92% (n=12) after 16 weeks and 75% (n=12) after 38 weeks for VAPs; 88% (n=49) after one week for jugular catheters). Behavioural reactions to blood collection from 30 cats-assessed over 16 weeks and comprising 378 collections-were absent or minor in 99% of collections. These findings indicate that VAPs offer a viable
alternative to jugular catheters for studies requiring frequent blood sampling and lasting more than 2 weeks.

Epidural dirofilariosis in a paraparetic cat: case report of Dirofilaria immitis infection.
Favole, P., A. Cauduro, M. Opreni, S. Zanzani, F. Albonico, M. Manfredi, C. Cantile, and V. Lorenzo
A 6-year-old neutered female cat was examined for chronic and progressive pelvic limb ataxia that progressed to non-ambulatory paraparesis over 1 month. Haematological and serum analyses were mainly within normal ranges. Thoracic and abdominal radiographs did not reveal any morphological abnormalities. Magnetic resonance imaging investigation of the thoraco-lumbar spine demonstrated a well-defined, extradural mass that extended into the epidural space from the L2 to L3 vertebral bodies and expanded in the L2 to L3 left intervertebral foramen. During surgery, a long, narrow, white parasite that was weakly adherent to the phlogistic epidural fat tissue was gently removed from the spinal canal. Histological examination of the pathological tissue supported a diagnosis of epidural steatitis surrounding a female adult Dirofilaria immitis. This is a novel case of natural D. immitis infection with spinal localization in a cat, well documented with magnetic resonance investigation, and cytological and histological examinations, introducing a novel differential diagnosis for extradural spinal masses in cats.

Fecal estradiol-17beta and testosterone in prepubertal domestic cats.
Theriogenology (2013)
Faya, M., A. Carranza, R. Miotti, T. Ponchon, P. Furlan, and C. Gobello
The aim of this article was to describe the time course of prepubertal sexual steroids in domestic cats. Fourteen newborn kittens were followed up until puberty (physical, behavioral, and hormonal changes). Fecal testosterone [T; males] and E17-beta and testosterone in prepubertal domestic cats. 

ULTRASOUND CRITERIA AND GUIDED FINE-NEEDLE ASPIRATION DIAGNOSTIC YIELDS IN SMALL ANIMAL PERITONEAL, MESENTERIC AND OMENTAL DISEASE.
Vet Radiol Ultrasound (2013)
Feeney, D. A., C. P. Ober, L. A. Snyder, S. A. Hill, and C. R. Jessen
Peritoneal, mesenteric, and omental diseases are important causes of morbidity and mortality in humans and animals, although information in the veterinary literature is limited. The purposes of this retrospective study were to determine whether objectively applied ultrasound interpretive criteria are statistically useful in differentiating among cytotically defined normal, inflammatory, and neoplastic peritoneal conditions in dogs and cats. A second goal was to determine the cytotically interpretable yield on ultrasound-guided, fine-needle sampling of peritoneal, mesenteric, or omental structures. Sonographic criteria agreed upon by the authors were retrospectively and independently applied by two radiologists to the available ultrasound images without knowledge of the cytologic diagnosis and statistically compared to the ultrasound-guided, fine-needle aspiration cytologic interpretations. A total of 72 dogs and 49 cats with abdominal peritoneal, mesenteric, or omental (peritoneal) surface or effusive disease and 17 dogs and 3 cats with no cytologic evidence of inflammation or neoplasia were included. The optimized, ultrasound criteria-based statistical model created independently for each radiologist yielded an equation-based diagnostic category placement accuracy of 63.2-69.9% across the two involved radiologists. Regional organ-associated masses or nodules as well as aggregated bowel and peritoneal thickening were more associated with peritoneal neoplasia whereas localized, severely complex fluid collections were more associated with inflammatory peritoneal disease. The cytotically interpretable yield for ultrasound-guided fine-needle sampling was 72.3% with no difference between species, making this a worthwhile clinical procedure.
A Single Sample Method for Estimating Glomerular Filtration Rate in Cats.
Finch, N. C., R. Heiene, J. Elliott, H. M. Syme, and A. M. Peters
BACKGROUND: Validated methods of estimating glomerular filtration rate (GFR) in cats requiring only a limited number of samples are desirable. HYPOTHESIS/OBJECTIVES: To test a single sample method of determining GFR in cats. ANIMALS: The validation population (group 1) consisted of 89 client-owned cats (73 nonazotemic and 16 azotemic). A separate population of 18 healthy nonazotemic cats (group 2) was used to test the methods. METHODS: Glomerular filtration rate was determined in group 1 using corrected slope-intercept iohexol clearance. Single sample clearance was determined using the Jacobsson and modified Jacobsson methods and validated against slope-intercept clearance. Extracellular fluid volume (ECFV) was determined from slope-intercept clearance with correction for the 1 compartment assumption and by deriving a prediction formula for ECFV (ECFVPredicted) based on the body weight. The optimal single sample method was tested in group 2. RESULTS: A blood sample at 180 minutes and ECFVPredicted were optimal for single sample clearance. Mean +/- SD GFR in group 1 determined using the Jacobsson and modified Jacobsson formulae was 1.78 +/- 0.70 and 1.65 +/- 0.60 mL/min/kg, respectively. When tested in group 2, the Jacobsson method overestimated multisample clearance. The modified Jacobsson method (mean +/- SD 2.22 +/- 0.34 mL/min/kg) was in agreement with multisample clearance (mean +/- SD 2.19 +/- 0.34 mL/min/kg). CONCLUSIONS AND CLINICAL IMPORTANCE: The modified Jacobsson method provides accurate estimation of iohexol clearance in cats, from a single sample collected at 180 minutes postinjection and using a formula based on the body weight to predict ECFV. Further validation of the formula in patients with very high or very low GFR is required.

Feline pantarsal arthrodesis using pre-contoured dorsal plates applied according to the principles of percutaneous plate arthrodesis.
Vet Comp Orthop Traumatol (2013) 26
Fitzpatrick, N., D. Sajik, and M. Farrell
Objective: To describe the surgical technique for pantarsal arthrodesis (PTA) in cats according to the principles of percutaneous plate arthrodesis with application of a new pre-contoured dorsal plate, without external coaptation and to report the long-term clinical outcome. Materials and methods: Retrospective review was performed of all cats treated by percutaneous plate application using a new pre-contoured dorsal plate for PTA between 2008 and 2011. Inclusion criteria were clinical and radiographic records plus clinical follow-up to at least six weeks. Data recorded included signalment, indication for surgery, postoperative care, and complications encountered. Radiographs were assessed for arthrodesis progression and complications. Outcome was assessed using an owner questionnaire. Results: Eleven cats were treated for tarsal injuries and met the inclusion criteria. Mean age was 86 +/- 45 months, weight 4.50 +/- 0.92 kg. The only major short-term complication encountered was wound dehiscence requiring sedation and re-suturing. In the medium-term (23.3 months +/- 11.6 months) eight out of nine cats returned to normal activity and one cat showed intermittent lameness. Long-term (34.3 months +/-17.5 months) radiographic evaluation was performed in seven out of nine cats; six manifested complete arthrodesis and one sustained plate breakage. Based on owner questionnaire, all nine cats returned to normal activity in the long-term, even the case with plate breakage. Conclusion: Based on our results, PTA using a custom pre-contoured dorsal plate is a suitable salvage surgery for treatment of severe tarsal injuries in cats.

Differential expression of circulating microRNAs in diabetic and healthy lean cats.
Vet J (2013)
Fleischhacker, S. N., S. Bauersachs, A. Wehner, K. Hartmann, and K. Weber
MicroRNAs (miRNAs) regulate gene expression and play a role in the pathogenesis of human type 2 diabetes mellitus. This study investigated whether miRNA expression profiles differ between healthy and diabetic cats. Total RNA was extracted from sera of healthy lean cats, newly diagnosed diabetic cats and cats in diabetic remission. Microarrays representing 1079 mouse miRNA targets were used to measure miRNA expression in serum samples from eight healthy lean and seven newly diagnosed diabetic cats; 227 distinct miRNAs could be detected. Nineteen miRNAs were differentially expressed in newly diagnosed diabetic cats compared to healthy lean cats, with a false discovery rate of 10%. Hierarchical cluster analysis of
these 19 miRNAs grouped healthy lean and newly diagnosed diabetic cats into separate clusters. After correction for multiple testing, only miR-122 and miR-193b reached statistical significance (P<0.05), with a false discovery rate of 1%. Specific quantitative real-time PCR assays for three target miRNAs (miR-122, miR-193b and miR-483*) were applied to four samples from each of the three groups. miR-122 expression was >40-fold higher in newly diagnosed diabetic cats compared to healthy lean cats and cats in diabetic remission, whereas miR-193b showed >14-fold higher expression. MiR-483* was expressed sixfold higher in newly diagnosed diabetic cats compared to both other groups.

**Updates in small animal cardiopulmonary resuscitation.**
Fletcher, D. J., and M. Boller

For dogs and cats that experience cardiopulmonary arrest, rates of survival to discharge are 6% to 7%, as compared with survival rates of 20% for people. The introduction of standardized cardiopulmonary resuscitation guidelines and training in human medicine has led to substantial improvements in outcome. The Reassessment Campaign on Veterinary Resuscitation initiative recently completed an exhaustive literature review and generated a set of evidence-based, consensus cardiopulmonary resuscitation guidelines in 5 domains: preparedness and prevention, basic life support, advanced life support, monitoring, and postcardiac arrest care. This article reviews some of the most important of these new guidelines.

**A toxicological review of the propylene glycols.**
Fowles, J. R., M. I. Banton, and L. H. Pottenger

The toxicological profiles of monopropylene glycol (MPG), dipropylene glycol (DPG), tripropylene glycol (TPG) and polypropylene glycols (PPG; including tetra-rich oligomers) are collectively reviewed, and assessed considering regulatory toxicology endpoints. The review confirms a rich data set for these compounds, covering all of the major toxicological endpoints of interest. The metabolism of these compounds share common pathways, and a consistent profile of toxicity is observed. The common metabolism provides scientific justification for adopting a read-across approach to describing expected hazard potential from data gaps that may exist for specific oligomers. None of the glycols reviewed presented evidence of carcinogenic, mutagenic or reproductive/developmental toxicity potential to humans. The pathologies reported in some animal studies either occurred at doses that exceeded experimental guidelines, or involved mechanisms that are likely irrelevant to human physiology and therefore are not pertinent to the exposures experienced by consumers or workers. At very high chronic doses, MPG causes a transient, slight decrease in hemoglobin in dogs and at somewhat lower doses causes Heinz bodies to form in cats in the absence of any clinical signs of anemia. Some evidence for rare, idiosyncratic skin reactions exists for MPG. However, the larger data set indicates that these compounds have low sensitization potential in animal studies, and therefore are unlikely to represent human allergens. The existing safety evaluations of the FDA, USEPA, NTP and ATSDR for these compounds are consistent and point to the conclusion that the propylene glycols present a very low risk to human health.

**A molecular technique for the detection and differentiation of Demodex mites on cats.**

BACKGROUND: Demodex gatoi causes a pruritic dermatitis in cats. Diagnosis requires the demonstration of mites using superficial skin scrapings or faecal flotation, which can be insensitive. HYPOTHESIS/OBJECTIVES: The goal of this study was to develop a molecular method to diagnose D. gatoi infection in cats and distinguish these mites from Demodex cati. ANIMALS: Fifty-three shelter cats, 11 cats from a closed research colony and 12 privately owned cats were used. METHODS: Demodex gatoi and D. cati were obtained from scrapings of cat skin. The 16S RNA DNA was amplified by PCR, sequenced and compared with available Demodex sequences. Hair and skin samples were also collected for microscopic examination and DNA isolation. RESULTS: DNA sequences were obtained from D. gatoi and D. cati. qPCR with D. gatoi specific primers and probe amplified DNA isolated from D. gatoi and not D. cati. Conversely, D. cati qPCR primers and probe amplified D. cati DNA and not D. gatoi. Five of the shelter cats were positive for D. gatoi. Two of these cats were pruritic, and the other three were in contact with these cats. Only one cat was positive for D. gatoi on skin.
scraping but was negative for D. gatoi or D. cati DNA. CONCLUSION: Results from this study show D. gatoi and D. cati to be distinct species. A novel qPCR test for the identification and differentiation of D. gatoi and D. cati was developed. Once optimized, this test could provide a valuable technique for the diagnosis of D. gatoi infection.

Molecular analysis of Baylisascaris columnaris revealed mitochondrial and nuclear polymorphisms.
Franssen, F., K. Xie, H. Sprong, and J. van der Giessen
BACKGROUND: Baylisascaris species are intestinal nematodes of skunks, raccoons, badgers, and bears belonging to the genus Ascarididae. Oral uptake of embryonated Baylisascaris sp. eggs by a wide variety of mammals and birds can lead to visceral, ocular and neurological larva migrans. B. procyonis, the raccoon roundworm, is known to cause severe illness in intermediate hosts and in humans, whereas the skunk roundworm B. columnaris is probably less pathogenic. Skunks and raccoons are kept as pets in Europe, sometimes together with cats and dogs, living in close contact with humans. B. procyonis and B. columnaris are difficult to differentiate based on morphological criteria and molecular and phylogenetic information concerning B. columnaris is missing. This is the first study on the genetic characterisation of B. columnaris, based on mitochondrial and nuclear molecular markers. METHODS: B. columnaris worms were isolated from pet skunks, and used for molecular analysis. PCR primers targeted at mitochondrial cytochrome c oxidase 1 and 2 (CO1 and CO2), ribosomal ITS1-5.8S-ITS2 and ribosomal 28S genes were used. DNA sequences from B. columnaris, B. procyonis and B. transfuga from bears were analysed by cluster analysis. RESULTS: Four different multi-locus genotypes were found in B. columnaris, based on 14 single nucleotide polymorphisms (SNPs) and two insertions / deletions in CO1, CO2, ITS1-5.8S-ITS2 and 28S. CONCLUSIONS: The genetic characteristics of B. columnaris show close resemblance to those of B. procyonis, but in contrast to B. procyonis, show several polymorphisms in both mitochondrial and nuclear markers. These polymorphisms could be used as a tool to differentiate B. columnaris from B. procyonis in molecular diagnostic assays, and to identify B. columnaris by PCR, in addition to or replacing morphometric analysis. This might lead to more insight into the zoonotic relevance of B. columnaris in humans.

Systemic immune responses in Cytauxzoon felis-infected domestic cats.
Objective-To characterize systemic immune responses in Cytauxzoon felis-infected cats. Sample-Blood and lung samples obtained from 27 cats. Procedures-Cats were allocated into 4 groups: cats that died of cytauxzoonosis, acutely ill C felis-infected cats, healthy survivors of C felis infection, and healthy uninfected cats. Serum concentrations of tumor necrosis factor-alpha and interleukin-1 beta were measured and serum proteins characterized. Blood smears were stained immunocytochemically and used to assess immunoglobulin deposition. Immunohistochemical expression of CD18 and tumor necrosis factor-alpha were compared in lung tissues obtained from cats that died and healthy uninfected cats. A real-time reverse-transcription PCR assay for CD18 expression was performed on selected blood samples from all groups. Results-Concentrations of both cytokines were greater and serum albumin concentrations were significantly lower in cats that died of cytauxzoonosis, compared with results for all other groups. Erythrocytes from acutely ill cats and survivors of C felis infection had staining for plasmalemmal IgM, whereas erythrocytes from the other groups did not. Increased staining of C felis-infected monocytes and interstitial neutrophils for CD18 was detected. The real-time reverse-transcription PCR assay confirmed a relative increase in CD18 expression in cats that died of cytauxzoonosis and acutely ill cats, compared with expression in other groups. Immunostaining for TNF-alpha in lung samples confirmed a local proinflammatory response. Conclusions and Clinical Relevance-Results indicated immunopathologic responses were greater in cats that died of C felis infection than in cats that survived C felis infection.

Comparative Study of Radioresistance between Feline Cells and Human Cells.
Radioresistance of cats has been seen in animal radiotherapy. Feline radioresistance and its underlying mechanism(s) were
investigated in fibroblast cells and lymphocytes. We hypothesized that radioresistance was attributable to an increase in the cells ability to repair DNA damage. To investigate this hypothesis, fibroblast cells were exposed to various doses of X rays and then colony formation assays were performed. Survival curves showed that potential lethal damage repair (PLDR) for feline cells were greater than that for human cells. gamma-H2AX foci assays were performed to evaluate DNA double-strand breaks (DSBs) formation and repair kinetics. After PLDR, feline cells displayed a decreased residual amount of gamma-H2AX foci. Formation of chromosome aberrations (dicentrics) after PLDR as an indicator of radiation-induced DNA damage and repair; human, feline and canine lymphocytes were evaluated. Human and canine lymphocytes showed two to three times the number of dicentrics compared to feline lymphocytes. Finally, micronuclei assays were performed to further confirm the radioresistant nature of feline lymphocytes. In concordance with the results of the chromosome aberration assay, the number of micronuclei in feline lymphocytes was less than observed in human and canine lymphocytes. Taken together, these results show that DNA and chromosome damage induced by X irradiation is more effectively repaired in feline cells, resulting in less residual damage. Our results suggest that both feline fibroblasts and lymphocytes are more radioresistant compared to human cells of similar tissues, and this resistance can be contributed, at least in part, to greater ability for PLDR.

To the Root of the Curl: A Signature of a Recent Selective Sweep Identifies a Mutation That Defines the Cornish Rex Cat Breed.


The cat (Felis silvestris catus) shows significant variation in pelage, morphological, and behavioral phenotypes amongst its over 40 domesticated breeds. The majority of the breed specific phenotypic presentations originated through artificial selection, especially on desired novel phenotypic characteristics that arose only a few hundred years ago. Variations in coat texture and color of hair often delineate breeds amongst domestic animals. Although the genetic basis of several feline coat colors and hair lengths are characterized, less is known about the genes influencing variation in coat growth and texture, especially rexoid - curly coated types. Cornish Rex is a cat breed defined by a fixed recessive curly coat trait. Genome-wide analyses for selection (di, Tajima’s D and nucleotide diversity) were performed in the Cornish Rex breed and in 11 phenotypically diverse breeds and two random bred populations. Approximately 63K SNPs were used in the analysis that aimed to localize the locus controlling the rexoid hair texture. A region with a strong signature of recent selective sweep was identified in the Cornish Rex breed on chromosome A1, as well as a consensus block of homozygosity that spans approximately 3 Mb. Inspection of the region for candidate genes led to the identification of the lysophosphatidic acid receptor 6 (LPAR6). A 4 bp deletion in exon 5, c.250_253_delTTTG, which induces a premature stop codon in the receptor, was identified via Sanger sequencing. The mutation is fixed in Cornish Rex, absent in all straight haired cats analyzed, and is also segregating in the German Rex breed. LPAR6 encodes a G protein-coupled receptor essential for maintaining the structural integrity of the hair shaft; and has mutations resulting in a wooly hair phenotype in humans.

Prevalence and risk factors for carriage of multi-drug resistant staphylococci in healthy cats and dogs.


Gandolfi-Decristophoris, P., G. Regula, O. Petrini, J. Zinsstag, and E. Schelling

We investigated the distribution of commensal staphylococcal species and determined the prevalence of multi-drug resistance in healthy cats and dogs. Risk factors associated to the carriage of multi-drug resistant strains were explored. Isolates from 256 dogs and 277 cats were identified at the species level using MALDI-TOF mass spectrometry. Diversity of coagulase-negative staphylococci (CNS) was high, with 22 species in dogs and 24 in cats. Multi-drug resistance was frequent (17%) and not always associated with the presence of the meca gene. A stay in a veterinary clinic in the last year was associated with an increased risk of colonisation by multi-drug resistant staphylococci (OR = 2.4, 95% CI: 1.1-5.2, p-value LRT = 0.04). In finding new efficient control strategies against antibiotic resistance, the presence of mechanisms other than meticillin resistance, and the possible role of CNS in the spread of resistance determinants should be considered.

Feline degenerative joint disease: a genomic and proteomic approach.
The underlying disease mechanisms for feline degenerative joint disease (DJD) are mostly unidentified. Today, most of what is published on mammalian arthritis is based on human clinical findings or on mammalian models of human arthritis. However, DJD is a common occurrence in the millions of domestic felines worldwide. To get a better understanding of the changes in biological pathways that are associated with feline DJD, this study employed a custom-designed feline GeneChip, and the institution’s unique access to large sample populations to investigate genes and proteins from whole blood and serum that may be up- or down-regulated in DJD cats. The GeneChip results centered around three main pathways that were affected in DJD cats: immune function, apoptosis and oxidative phosphorylation. By identifying these key disease-associated pathways it will then be possible to better understand disease pathogenesis and diagnose it more easily, and to better target it with pharmaceutical and nutritional intervention.

Extemporaneous compounding in veterinary practice: A New Zealand perspective.
N Z Vet J (2013)
AIMS: The aims of this study were to explore the extent of extemporaneous compounding in veterinary centres throughout New Zealand and to determine whether pharmacists could collaborate with veterinarians to improve this service in New Zealand. METHODS: Questionnaires were sent to 200 randomly selected veterinarians in New Zealand. Semi-structured interviews were also conducted with selected participants from four animal facilities (zoos, research facilities and animal shelters) and two compounding pharmacies. RESULTS: Of the 200 veterinarian questionnaire recipients, 99 responded. Ten replies were withdrawn from the study giving a response rate of 44.5%. Of these 89, 33 (37%) compounded in their practice. Of the 33 compounding professionals, 3 (9%) compounded daily for animals under their care; 11 (34%) weekly, 18 (54%) monthly and 1 (3%) compounded yearly. Compounding was done by 29/33 (88%) veterinarians, 16/33 (48%) veterinary nurses or 6/33 (18%) others. It was carried out due to the unavailability of commercial products, or the need for dose adjustment to ease administration or improve compliance. The animals most commonly requiring veterinary compounding were dogs (21/33; 64%), cats (19/33; 58%) or cattle (15/33; 46%). Products which were commonly compounded included cyclosporin eye drops, methimazole gels and potassium bromide solutions. Issues commonly faced when compounding included unavailability of dosage forms (18/33; 55%) or appropriate ingredients (14/33; 42%), stability (12/33; 36%), time constraints (10/33; 30%) or unavailability of equipment (9/33; 27%). Reasons given for not compounding included medicines being commercially available (38/56; 68%), pharmacy compounding for those particular practices (24/56; 43%), lack of training (21/56; 38%), ingredients (16/56; 29%) or equipment (15/56; 11%). All participants who worked with a pharmacist (11/33; 33%) described this relationship as beneficial and indicated they would continue to do so in the future. CONCLUSIONS: Veterinary extemporaneous compounding exists in New Zealand. As pharmacists have extensive knowledge in formulating medications and compounding they could be of greater value to veterinarians and their patients. Educating both professions on the opportunities available to them from this collaboration could be an important step forward. CLINICAL RELEVANCE: This study provides new information regarding extemporaneous compounding for veterinary patients in New Zealand.

Maine Coon renal screening: ultrasonographical characterisation and preliminary genetic analysis for common genes in cats with renal cysts.
Gendron, K., M. Owczarek-Lipska, J. Lang, and T. Leeb
The objective of this study was to assess the prevalence of renal cysts and other renal abnormalities in purebred Maine Coon cats, and to characterise these through genetic typing. Voluntary pre-breeding screening programmes for polycystic kidney disease (PKD) are offered for this breed throughout Switzerland, Germany and other northern European countries. We performed a retrospective evaluation of Maine Coon screening for renal disease at one institution over an 8-year period. Renal ultrasonography was performed in 187 healthy Maine Coon cats. Renal changes were observed in 27 of these cats. Renal cysts were found in seven cats, and were mostly single and unilateral (6/7, 85.7%), small (mean 3.6 mm) and located at the corticomedullary junction (4/6, 66.7%). Sonographical changes indicating chronic kidney disease (CKD) were observed in 10/187 (5.3%) cats and changes of unknown significance were documented in 11/187 (5.9%) cats. All six cats genetically tested for PKD1 were negative for the mutation, and gene sequencing of these cats did not demonstrate any common genetic sequences. Cystic renal disease occurs with a low prevalence in Maine Coons and is unrelated to the PKD
observed in Persians and related breeds. Ultrasonographical findings compatible with CKD are not uncommon in juvenile Maine Coons.

**Exodontics: extraction of teeth in the dog and cat.**
**Gengler, B.**
Dental disease can have a profound effect on the comfort and well-being of pets. Oral disease can be difficult to detect. Patients often hide their discomfort. The identification and treatment or removal of diseased teeth are the responsibility of the veterinarian. When diseased teeth cannot be saved by specialized care, extraction of teeth is necessary. Proper extraction of teeth in dogs and cats can be challenging and frustrating, but with review of the oral anatomy, proper instrumentation, and gentle tissue-handling techniques, this can be a rewarding part of clinical practice.

**Neuraxial morphine induced pruritus in two cats and treatment with sub anaesthetic doses of propofol.**
Vet Anaesth Analg (2013)
**Gent, T., I. Iff, R. Bettschart-Wolfensberger, and M. Mosing**
**HISTORY:** Two cats were presented for orthopaedic surgery. **PHYSICAL EXAMINATION:** With the exception of the orthopaedic injuries found, clinical examination showed no abnormality. **MANAGEMENT:** As part of anaesthetic management, one cat received intrathecal morphine, the other epidural morphine. Following recovery, intense grooming was observed. After ensuring adequate analgesia this behaviour was interpreted as pruritus. In the first cat, pruritus was initially managed with medetomidine constant rate infusion (CRI) at 1 and 1.5 mg kg⁻¹ hour⁻¹. The lower dose produced sedation and no relief from pruritus, the higher dose ablated pruritus but induced sedation. Two propofol (lipid emulsion formulation) boli of 0.1 mg kg⁻¹ ablated pruritus without causing sedation. The second cat was successfully treated with four boli of 0.1 mg kg⁻¹ propofol over 20 minutes. **FOLLOW-UP:** Following treatment with propofol, pruritus did not recur in either cat and both were discharged from the hospital. **CONCLUSIONS:** This is the first clinical report of morphine-induced pruritus in cats and management with low-dose propofol. These cases suggest an antipruritic mechanism for lipid-formulation propofol.

**Common two-dimensional echocardiographic estimates of aortic linear dimensions are interchangeable.**
**Georgiev, R., M. Rishniw, I. Ljungwall, and N. Summerfield**
**OBJECTIVE:** To compare two echocardiographic methods of measuring aortic diameter in short-axis projections. **METHODS:** Right-parasternal short-axis 2-dimensional projections of the left atrium and aorta were obtained from dogs and cats undergoing routine cardiac evaluation. Two investigators measured the aortic valve linear dimension using 2 methods: along the commissure between the non-coronary and right-coronary cusps and along the commissure between the non-coronary and left-coronary cusps. Inter-observer and intra-observer variability and agreement were assessed by comparing blinded measurements with each method by 4 trained observers on a standardized set of images. Measurements were compared for agreement using the limits of agreement analysis. Variability between observers was compared by examining residuals and intraclass correlation. **RESULTS:** 274 canine and 100 feline aortic valve images were measured in the first part of the study. One observer demonstrated slight proportional bias, while the other observer showed more variability (less agreement). When results were pooled for both investigators, no bias was identified, and 95% limits of agreement were +/-10% of the mean measurement for both species. In the second part of the study, 106 images were measured. Intraobserver variability was <4% for all observers. Inter-observer agreement was very high. Individual bias was identified in some observers, but was considered clinically inconsequential. Normalized differences between the 2 methods of measurement were below +/-15% of the measured value for all observers. **CONCLUSIONS:** Our results show sufficient agreement between two common methods used to measure aortic linear dimensions to suggest that these methods are interchangeable.
Zoonotic diseases associated with free-roaming cats.
Gerhold, R. W., and D. A. Jessup
Free-roaming cat populations have been identified as a significant public health threat and are a source for several zoonotic diseases including rabies, toxoplasmosis, cutaneous larval migrans because of various nematode parasites, plague, tularemia and murine typhus. Several of these diseases are reported to cause mortality in humans and can cause other important health issues including abortion, blindness, pruritic skin rashes and other various symptoms. A recent case of rabies in a young girl from California that likely was transmitted by a free-roaming cat underscores that free-roaming cats can be a source of zoonotic diseases. Increased attention has been placed on trap-neuter-release (TNR) programmes as a viable tool to manage cat populations. However, some studies have shown that TNR leads to increased immigration of unneutered cats into neutered populations as well as increased kitten survival in neutered groups. These compensatory mechanisms in neutered groups leading to increased kitten survival and immigration would confound rabies vaccination campaigns and produce naive populations of cats that can serve as source of zoonotic disease agents owing to lack of immunity. This manuscript is a review of the various diseases of free-roaming cats and the public health implications associated with the cat populations.

RADIOGRAPHIC CHARACTERIZATION OF PRESUMED PLATE-LIKE ATELECTASIS IN 75 NONANESTHETIZED DOGS AND 15 CATS.
Vet Radiol Ultrasound (2013)
Discrete discoid or linear areas of increased soft opacity have been observed within the pulmonary parenchyma in thoracic radiographs of dogs and cats. Similar radiographic findings have been described in humans and termed plate-like atelectasis. The purpose of this retrospective study was to describe locations and characteristics of presumed plate-like atelectasis, presence of concurrent thoracic disease(s), and presence of persistent pulmonary changes on recheck thoracic radiographic studies in a cohort of dogs and cats. Hospital records between 2004 and 2011 were searched and a total of 90 cases were included (75 dogs and 15 cats, 2-17 years of age). Plate-like atelectasis was most commonly found in left lateral radiographs. Plate-like atelectasis was observed in the cranial thorax and was oriented in a dorso cranial to ventrocaudal direction in 68 (75%) patients. Plate-like atelectasis averaged 29.6 +/- 14.4 mm in length and 2.6 +/- 1.3 mm in width. In 57 of the 90 patients (63%), plate-like atelectasis was the only abnormality found. Plate-like atelectasis was present in 7 of 22 cases where follow-up radiographs were available. Findings from the current study indicated that, while the etiology of plate-like atelectasis remains unknown, anatomic variations in sublobar pulmonary anatomy might account for pleural areas of atelectasis. The authors propose that the presence of plate-like atelectasis may represent areas of atelectasis that track along sublobar lung lobe separations, an area of hypoventilation or decreased collateral ventilation, and/or area of decreased localized surfactant deficiency.

Relevance of feline interferon omega for clinical improvement and reduction of concurrent viral excretion in retrovirus infected cats from a rescue shelter.
Feline Immunodeficiency (FIV) and Feline Leukemia (FeLV) viruses are common infectious agents in stray cats and shelter environments. Recombinant feline interferon-omega (rFeIFNomega) has shown an antiviral action not only against FIV and FeLV but also against herpesvirus (FHV-1) and calicivirus (FCV). Sixteen naturally infected FIV/FeLV cats were followed during rFeIFNomega therapy in order to monitor clinical signs and to correlate with excretion of concomitant viruses (FCV, FHV-1, feline coronavirus (FCoV) and parvovirus (FPV)). Cats were submitted to clinical evaluations and concomitant virus excretion assessment. Comparing D0-D65, 10/16 cats improved clinical scores. Of the 10 cats positive for FHV-1 on D0, 4 were negative and 6 reduced viral loads. Of the 11 FCoV positive cats, 9 reduced viral loads. The 13 FCV positive cats and the FPV positive cat were negative on D65. In conclusion, rFeIFNomega improves clinical signs and reduces concurrent viral excretion in naturally infected retroviral cats.

Distribution of K and L cells in the feline intestinal tract.
Glucose-dependent insulinotropic peptide (GIP), glucagon-like peptide (GLP)-1 and GLP-2 are hormones secreted from specialized K cells (GIP) and L cells (GLP-1, GLP-2) in the intestinal mucosa. These hormones play major roles in health and disease by modulating insulin secretion, satiety, and multiple intestinal functions. The aim of this study was to describe the distribution of K cells and L cells in the intestines of healthy cats. Samples of duodenum, mid-jejunum, ileum, cecum, and colon were collected from 5 cats that were euthanized for reasons unrelated to this study and had no gross or histologic evidence of gastrointestinal disease. Samples stained with rabbit-anti-porcine GIP, mouse-anti-(all mammals) GLP-1, or rabbit-anti-(all mammals) GLP-2 antibodies were used to determine the number of cells in 15 randomly selected 400x microscopic fields. In contrast to other mammals (eg, dogs) in which K cells are not present in the ileum and aborally, GIP-expressing cells are abundant throughout the intestines in cats (>6/high-power field in the ileum). Cells expressing GLP-1 or GLP-2 were most abundant in the ileum (>9/high-power field) as in other mammals, but, although GLP-1-expressing cells were abundant throughout the intestines, GLP-2-expressing cells were rarely found in the duodenum. In conclusion, the distribution of GIP-secreting K cells in cats is different from the distribution of K cells that is described in other mammals. The difference in distribution of GLP-2- and GLP-1-expressing cells suggests that more than 1 distinct population of L cells is present in cats.

**Basal testosterone concentrations after the application of a slow-release GnRH agonist implant are associated with a loss of response to buserelin, a short-term GnRH agonist, in the tom cat.**


**Goericke-Pesch, S., P. Georgiev, I. Fasulkov, A. Vodenicharov, and A. Wehrend**

Slow-release GnRH agonist implants are considered an effective, reversible alternative to surgical castration in male tom cats. Individual differences exist regarding the onset of efficacy and might be delayed in some animals. Single measurements of testosterone (T) might result in basal concentrations also in intact male cats. Consequently, GnRH stimulation tests are performed to measure T increase in intact animals and to differentiate castrated from intact male cats. In this study, five tom cats were treated with a 4.7-mg deslorelin implant and GnRH stimulation tests using buserelin were performed before treatment and at 4-week intervals afterward until Week 20. After the last test in Week 20 all animals were castrated. Four of five animals had basal T after 4 weeks and in contrast to pretreatment-application of buserelin did not result in any further T increase. In one animal, T was low after implant insertion, but not basal; however, a GnRH stimulation test induced a slight increase of T in Week 8 and 16 only and no response in Weeks 4, 12, and 20. Testicular volume was significantly decreased and penile spines disappeared in all cats. Testicular histology showed mixed atrophy, but also fully elongated spermatids in three of five male cats making infertility questionable. Because of the loss of the stimulatory effect of short-term GnRH application (buserelin), it can be assumed that long-term GnRH agonists also act by some mechanisms of downregulation of pituitary GnRH receptors in the tom cat.

**Treatment with Suprelorin in a pregnant cat.**


**Goericke-Pesch, S., P. Georgiev, A. Atanasov, and A. Wehrend**

Suppression of oestrus is of major interest in feral cat populations, but also in breeding queens temporarily not intended for breeding. Slow release gonadotropin-releasing hormone (GnRH) agonist implants are a new off-label approach for reproduction control in cats. However, initially, oestrus induction may occur and no data exist regarding what happens if previously mated queens are treated. This case report presents a queen mismated 9 and 8 days before treatment with a 4.7 mg deslorelin implant. The queen delivered four healthy kittens 66 days after mismating, but showed no interest in the kittens and lactation was not adequate. Progesterone and oestradiol concentrations were monitored and the queen was followed until the return of oestrus and subsequent breeding. The next oestrus was observed 498 days after treatment and the queen was mated in the second oestrus afterwards, became pregnant and delivered two healthy kittens, both of which were raised successfully by the queen. This case report clearly shows that pregnancy following a GnRH-agonist implant may go to term, but maternal care might be influenced owing to hormonal changes induced by treatment. In addition, this is the first report demonstrating reversibility of effects induced by long-term treatment with a deslorelin implant (return to oestrus, fertility and normal maternal care).
Genetic susceptibility to feline infectious peritonitis in Birman cats.
Golovko, L., L. A. Lyons, H. Liu, A. Sorensen, S. Wehnert, and N. C. Pedersen
Genetic factors are presumed to influence the incidence of feline infectious peritonitis (FIP), especially among pedigreed cats. However, proof for the existence of such factors has been limited and mainly anecdotal. Therefore, we sought evidence for genetic susceptibility to FIP using feline high density single nucleotide polymorphism (SNP) arrays in a genome-wide association study (GWAS). Birman cats were chosen for GWAS because they are highly inbred and suffer a high incidence of FIP. DNA from 38 Birman cats that died of FIP and 161 healthy cats from breeders in Denmark and USA were selected for genotyping using 63K SNPs distributed across the feline genome. Danish and American Birman cats were closely related and the populations were therefore combined and analyzed in two manners: (1) all cases (FIP) vs. all controls (healthy) regardless of age, and (2) cases 1(1/2) years of age and younger (most susceptible) vs. controls 2 years of age and older (most resistant). GWAS of the second cohort was most productive in identifying significant genome-wide associations between case and control cats. Four peaks of association with FIP susceptibility were identified, with two being identified on both analyses. Five candidate genes ELMO1, RRAGA, TNFSF10, ERAP1 and ERAP2, all relevant to what is known about FIP virus pathogenesis, were identified but no single association was fully concordant with the disease phenotype. Difficulties in doing GWAS in cats and interrogating complex genetic traits were discussed.

Survey of flea infestation in cats in Spain.
Gracia, M. J., C. Calvete, R. Estrada, J. A. Castillo, M. A. Peribanez, and J. Lucientes
Fleas are a common cause of feline skin disorders as well as vectors of zoonotic diseases. This study evaluated the flea species infesting domestic cats in Spain and assessed factors influencing their distribution. Fleas from 217 cats from 57 localities in Spain were identified and associations between abundance, and host-dependent, host habitat and environmental factors were examined. Variations in infracommunity and component community structure were also explored. Three species were present, of which Ctenocephalides felis (Bouche) (Siphonaptera: Pulicidae) was the most abundant (98.4%), followed by Ctenocephalides canis (Curtis) (1.1%) and Pulex irritans (L.) (Siphonaptera: Pulicidae) (0.5%). Overall abundance and abundances of both C. felis and C. canis were higher on farms than in apartments, but overall flea abundance and abundances of both C. felis and C. canis were lower in rural than urban environments. Overall abundance and C. felis abundance were lower during the warmest months, and mean annual rainfall was positively correlated with overall, C. felis and C. canis abundances. No relationship between the number of species per cat and any host, habitat or physiographical variable was found. Species richness was not correlated with mean annual temperature or rainfall. Flea abundance was mainly associated with host habitat and environmental factors.

Low-dose megestrol acetate revisited: A viable adjunct to surgical sterilization in free roaming cats?
Greenberg, M., D. Lawler, S. Zawistowski, and W. Jochle
Approximately 2-3 million cats are euthanased in animal shelters across the United States annually. Preventing pregnancy in cats is a key step to reducing this number. While surgery is generally a safe and effective tool for curbing reproduction in cats, it is not a practical method to achieve the reduction in numbers required for an appreciable impact on the cat population as a whole. Low-dose megestrol acetate (MA) is a synthetic progestin that has been used for the management of reproduction in free roaming cat populations; however, there has been no regulatory oversight regarding the use of this product for this purpose. Additionally, there is a paucity of data regarding the safety and efficacy of the product for the management of reproduction in free roaming cats. The purpose of this review is: (1) to outline the need for a non-surgical contraceptive in cats; (2) to discuss the uses of MA in domestic cats; (3) to consider potential adverse effects of the drug, and (4) to discuss regulatory challenges associated with the use of MA in free roaming cat populations. In order to answer the questions posed in this review, more data will need to be collected in laboratory and field studies.

Litter box preference in domestic cats: covered versus uncovered.

Grigg, E. K., L. Pick, and B. Nibblett

Feline inappropriate elimination (periuria and/or periczezia) remains a very common behavioral complaint of cat owners. Treatment recommendations often include improving the attractiveness of the litter boxes available to the cat. One frequent recommendation is to avoid covered litter boxes, although this has not previously been tested experimentally. The goal of this study was to assess whether, all else being equal, cats preferentially used uncovered litter boxes over covered litter boxes. Twenty-eight cats were enrolled in the study and offered the choice of a covered or uncovered box. Waste was scooped daily from each box, and the weight of waste in the different box styles was compared and evaluated using paired t-tests and chi(2) analyses. Overall, there was no significant difference between use of the two box styles. Eight individual cats did exhibit a preference (four for covered, four for uncovered), but individual preference results are not evenly distributed, with more cats than expected showing no preference between litter box types. We postulate that, if boxes are kept sufficiently clean (ie, once daily minimum cleaning), most cats will not show a preference for either box type. The observation that a minority of cats in the study exhibited a preference supports the recommendation of providing individual cats with a ‘cafeteria’ of litter box styles, including a covered box, to determine whether such a preference exists. These findings add to existing literature on the topic of feline inappropriate elimination and provide additional information for clinicians recommending treatment options for cats exhibiting this behavior.

Characterization of osteoarthritis in cats and meloxicam efficacy using objective chronic pain evaluation tools.


Guillot, M., M. Moreau, M. Heit, J. Martel-Pelletier, J. P. Pelletier, and E. Troncy

This study aimed to characterize osteoarthritis (OA)-related chronic pain and disability in experimental cats with naturally occurring OA. Peak vertical ground reaction force (PVF), accelerometer-based motor activity (MA) and the von Frey anesthesiometer-induced paw withdrawal threshold were used to define OA and to test the efficacy of meloxicam. A diagnosis of OA was based on radiographic and orthopedic examinations. Cats with OA (n=39) and classified as non-OA (n=6) were used to assess the reliability and sensitivity of the parameters to assess OA over 3 weeks while being administered placebo medication. A randomised parallel design study was then used to investigate the effects on OA of daily oral meloxicam treatment for 4 weeks at different dose rates (0.025mg/kg, n=10mg/kg; 0.04mg/kg, n=10; 0.05mg/kg, n=9), compared to cats administered a placebo (n=10). The test-retest repeatability for each tool was good (intra-class correlation coefficient 0.6). The PVF and the von Frey anesthesiometer-induced paw withdrawal threshold discriminated OA (P<0.05). Meloxicam did not add to the PVF improvement observed in placebo-treated cats during the treatment period (adj-P<0.01). The 0.025 and the 0.05mg/kg meloxicam-treated cats experienced a higher night-time (17:00-06:58h) MA intensity during the treatment period compared to the placebo period (adj-P=0.04, and 0.02, respectively) and this effect was not observed in the placebo group. The high allodynia rate observed in the 0.04mg/kg meloxicam-treated group may explain the lower responsiveness to the drug. The von Frey anesthesiometer-induced paw withdrawal threshold demonstrated no responsiveness to meloxicam. The results from this study indicated that daily oral meloxicam administration for 4 weeks provided pain relief according to night-time MA.


Ha, Y. S., K. Hopper, and S. E. Epstein

BACKGROUND: The incidence and causes of metabolic alkalosis in dogs and cats have not been fully investigated. OBJECTIVES: To describe the incidence, nature, and etiology of metabolic alkalosis in dogs and cats undergoing blood gas analysis at a veterinary teaching hospital. ANIMALS: Dogs and cats at a veterinary medical teaching hospital. METHODS: Acid-base and electrolyte results for dogs and cats measured during a 13-month period were retrospectively collected from a computer database. Only the first measured (venous or arterial) blood gas analyzed in a single hospitalization period was included. Animals with a base excess above the reference range for the species were included. RESULTS: A total of 1,805 dogs and cats were included. Of these, 349 (19%) were identified as having an increased standardized base excess, 319 dogs and 30 cats. The mixed acid-base disorder of metabolic alkalosis with respiratory acidosis was the most common abnormality identified in both dogs and cats. Hypokalemia and hypochloremia were more common in animals with metabolic alkalosis compared to animals without metabolic alkalosis. The 4 most commonly identified underlying diseases were respiratory disease, gastrointestinal tract obstruction, furosemide administration, and renal disease. CONCLUSIONS AND CLINICAL IMPORTANCE: Metabolic alkalosis was less common than metabolic acidoses in the same population of
animals. Evidence of contraction alkalosis was present in many patients in this study. Hypokalemia and hypochloremia were more frequent in patients with metabolic alkalosis and suggest the importance of evaluation of acid-base status in conjunction with serum electrolyte concentrations.

The neurobiology of abnormal manifestations of aggression—a review of hypothalamic mechanisms in cats, rodents, and humans.


Haller, J.

Aggression research was for long dominated by the assumption that aggression-related psychopathologies result from the excessive activation of aggression-promoting brain mechanisms. This assumption was recently challenged by findings with models of aggression that mimic etiological factors of aggression-related psychopathologies. Subjects submitted to such procedures show abnormal attack features (mismatch between provocation and response, disregard of species-specific rules, and insensitivity toward the social signals of opponents). We review here 12 such laboratory models and the available human findings on the neural background of abnormal aggression. We focus on the hypothalamus, a region tightly involved in the execution of attacks. Data show that the hypothalamic mechanisms controlling attacks (general activation levels, local serotonin, vasopressin, substance P, glutamate, GABA, and dopamine neurotransmission) undergo etiological factor-dependent changes. Findings suggest that the emotional component of attacks differentiates two basic types of hypothalamic mechanisms. Aggression associated with increased arousal (emotional/reactive aggression) is paralleled by increased mediobasal hypothalamic activation, increased hypothalamic vasopressinergic, but diminished hypothalamic serotonergic neurotransmission. In aggression models associated with low arousal (unemotional/proactive aggression), the lateral but not the mediobasal hypothalamus is over-activated. In addition, the anti-aggressive effect of serotonergic neurotransmission is lost and paradoxical changes were noticed in vasopressinergic neurotransmission. We conclude that there is no single ‘neurobiological road’ to abnormal aggression: the neural background shows qualitative, etiological factor-dependent differences. Findings obtained with different models should be viewed as alternative mechanisms rather than conflicting data. The relevance of these findings for understanding and treating of aggression-related psychopathologies is discussed. This article is part of a Special Issue entitled ‘Extrasynaptic ionotropic receptors’.

Lumbosacral osteochondrosis in cats.


Hanna, F. Y.

Primary brachial plexus neoplasia in cats.


Hanna, F. Y.

Conditions affecting the brachial plexus and its branches can cause lameness and/or neurological deficits. There are few reports of schwannomas in cats. In reported cases, the tumours arose from the dermis or subcutis of the limbs, head and neck and thorax, but there are no reports of primary tumours that arose from the brachial plexus itself. The purpose of this study is to present the clinical, radiological, ultrasonographical and pathological findings of primary brachial plexus tumour in three cats.

Differential association between circulating testosterone and infection risk by several viruses in natural cat populations: a behavioural-mediated effect?


Hellard, E., D. Fouchet, B. Rey, A. Mouchet, H. Poulet, and D. Pontier

Testosterone is involved in the development and expression of physiological, morphological and behavioural traits. High levels are often associated with high infection risk and/or intensity, suggesting a trade-off between sexual traits and
immunity. Classically invoked mechanisms are immunological or behavioural, i.e., testosterone increases susceptibility or resistance to parasites via an impact on immunity or modulates behaviours involved in parasite transmission. However, studies report contrasted patterns. Given its modes of action and the diversity of host-parasite interactions, testosterone should not act similarly on all interactions. To reduce host and context diversity, we studied 3 viruses in the same cat population: the aggressively transmitted Feline Immunodeficiency virus (FIV), and the Feline Calicivirus (FCV) and Herpesvirus (FHV) both transmitted during friendly contacts. Testosterone had a strong effect on the probability of being positive to FIV whereas its effect was significantly weaker on FCV and FHV. These findings demonstrate that testosterone can be differentially associated with parasites of the same type (viruses). The difference we observed was consistent with a behavioural-mediated effect (increased aggressiveness), supporting the idea that the testosterone effect on infection risk is at least partially driven by behavioural mechanisms in our system. Further investigations (e.g., individual immunity measures) are required to confirm this hypothesis.

Treatment of Naturally Notoeoedres cati-infested Cats with a Combination of Imidacloprid 10 % / Moxidectin 1 % Spot-on (Advocate / Advantage Multi, Bayer).
Parasitol Res (2013)
Hellmann, K., G. Petry, B. Capari, D. Cvejic, and F. Kramer

Eye position of cats anaesthetised with alfaxalone or propofol.
Herbert, G. L., and P. J. Murison

Consistent proportional macronutrient intake selected by adult domestic cats (Felis catus) despite variations in macronutrient and moisture content of foods offered.
We investigated the ability of domestic cats to regulate the macronutrient composition of their diet when provided with foods that differed not only in macronutrient content but also in texture and moisture content, as typically found in the main forms of commercially manufactured cat foods. Cats were provided with foods in different combinations (1 wet + 3 dry; 1 dry + 3 wet; 3 wet + 3 dry) in three separate experiments. Within each experiment cats were offered the wet and dry food combinations in two (naïve and experienced) diet selection phases where all the foods were offered simultaneously, separated by a phase in which the foods were offered sequentially in 3-day cycles in pairs (1 wet with 1 dry). Using nutritional geometry we demonstrate convergence upon the same dietary macronutrient composition in the naïve and experienced self-selection phases of each experiment as well as over the course of the 3-day cycles in the pair-wise choice phase of each experiment. Furthermore, even though the dietary options were very different in each of these experiments the macronutrient composition of the diets achieved across all experiments were remarkably similar. These results indicate that a mammalian obligate carnivore, the domestic cat, is able to regulate food selection and intake to balance macronutrient intake despite differences in moisture content and textural properties of the foods provided.

Klebsiella pneumoniae ST11 from companion animals bearing ArmA methyltransferase, DHA-1 beta-lactamase and QnrB4.
Seven Klebsiella pneumoniae isolated from dogs and cats in Spain were found to be highly resistant to aminoglycosides, and ArmA methyltransferase was responsible for this phenotype. All isolates were typed by MLST as ST11, a human
Polymorphisms and tissue expression of the feline leukocyte antigen class I loci FLAI-E, FLAI-H, and FLAI-K.

Holmes, J. C., S. G. Holmer, P. Ross, A. S. Buntzman, J. A. Frelinger, and P. R. Hess

Cytotoxic CD8+ T-cell immunosurveillance for intracellular pathogens, such as viruses, is controlled by classical major histocompatibility complex (MHC) class Ia molecules, and ideally, these antiviral T-cell populations are defined by the specific peptide and restricting MHC allele. Surprisingly, despite the utility of the cat in modeling human viral immunity, little is known about the feline leukocyte antigen class I complex (FLAI). Only a few coding sequences with uncertain locus origin and expression patterns have been reported. Of 19 class I genes, three loci-FLAI-E, FLAI-H, and FLAI-K—are predicted to encode classical molecules, and our objective was to evaluate their status by analyzing polymorphisms and tissue expression. Using locus-specific, PCR-based genotyping, we amplified 33 FLAI-E, FLAI-H, and FLAI-K alleles from 12 cats of various breeds, identifying, for the first time, alleles across three distinct loci in a feline species. Alleles shared the expected polymorphic and invariant sites in the alpha1/alpha2 domains, and full-length cDNA clones possessed all characteristic class Ia exons. Alleles could be assigned to a specific locus with reasonable confidence, although there was evidence of potentially confounding interlocus recombination between FLAI-E and FLAI-K. Only FLAI-E, FLAI-H, and FLAI-K origin alleles were amplified from cDNAs of multiple tissue types. We also defined hypervariable regions across these genes, which permitted the assignment of names to both novel and established alleles. As predicted, FLAI-E, FLAI-H, and FLAI-K fulfill the major criteria of class Ia genes. These data represent a necessary prerequisite for studying epitope-specific antiviral CD8+ T-cell responses in cats.

Clinical veterinary dentistry.


Holmstrom, S. E.

The gut microbiome of kittens is affected by dietary protein:carbohydrate ratio and associated with blood metabolite and hormone concentrations.

Hooda, S., B. M. Vester Boler, K. R. Kerr, S. E. Dowd, and K. S. Swanson

High-protein, low-carbohydrate (HPLC) diets are common in cats, but their effect on the gut microbiome has been ignored. The present study was conducted to test the effects of dietary protein:carbohydrate ratio on the gut microbiota of growing kittens. Male domestic shorthair kittens were raised by mothers fed moderate-protein, moderate-carbohydrate (MPMC; n 7) or HPLC (n 7) diets, and then weaned at 8 weeks onto the same diet. Fresh faeces were collected at 8, 12 and 16 weeks; DNA was extracted, followed by amplification of the V4-V6 region of the 16S rRNA gene using 454 pyrosequencing. A total of 384 588 sequences (average of 9374 per sample) were generated. Dual hierarchical clustering indicated distinct clustering based on the protein:carbohydrate ratio regardless of age. The protein:carbohydrate ratio affected faecal bacteria. Faecal Actinobacteria were greater (P< 0.05) and Fusobacteria were lower (P< 0.05) in MPMC-fed kittens. Faecal Clostridium, Faecalibacterium, Ruminococcus, Blautia and Eubacterium were greater (P< 0.05) in HPLC-fed kittens, while Dialister, Acidaminococcus, Bifidobacterium, Megasphaera and Mitsuokella were greater (P< 0.05) in MPMC-fed kittens. Principal component analysis of faecal bacteria and blood metabolites and hormones resulted in distinct clusters. Of particular interest was the clustering of blood TAG with faecal Clostridiaceae, Eubacteriaceae, Ruminococcaceae, Fusobacteriaceae and Lachnospiraceae; blood ghrelin with faecal Coriobacteriaceae, Bifidobacteriaceae and Veillonellaceae; and blood glucose, cholesterol and leptin with faecal Lactobacillaceae. The present results demonstrate that the protein:carbohydrate ratio affects the faecal microbiome, and highlight the associations between faecal microbes and circulating hormones and metabolites that may be important in terms of satiety and host metabolism.
Retrospective analysis of clinical findings and outcome of cats with suspected rattlesnake envenomation in Southern California: 18 cases (2007-2010).

Hoose, J. A., and A. Carr

OBJECTIVE: To evaluate treatment and survival rates of cats with suspected rattlesnake envenomation. DESIGN: Retrospective study. SETTING: Veterinary emergency referral hospital in Southern California. ANIMALS: Client-owned animals. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Eighteen cats were treated for suspected rattlesnake envenomation between January 2007 and August 2010. There were 3 fatalities and 15 cats survived (16% mortality rate). Two cases developed pelvic limb paresis 3-4 days post envenomation. There were no apparent adverse reactions to treatment with antivenom. CONCLUSIONS: Cats are presented infrequently for treatment of envenomation compared to dogs. Envenomation in cats should be treated according to guidelines established for people and dogs and administration of antivenom does not appear to be associated with adverse events. The mortality rate in this study was found to be 16%, which is higher than the mortality rate reported for dogs suspected of rattlesnake envenomation in a similar region (4.1%). Pelvic limb paresis may develop 3-4 days post envenomation but can resolve within 24 hours.
Standing balance is often threatened in everyday life. These threats typically involve scenarios where either the likelihood or the consequence of falling is higher than normal. When cats are placed in these scenarios they respond by increasing the sensitivity of muscle spindles imbedded in the leg muscles, presumably to increase balance-relevant afferent information available to the nervous system. At present, it is unknown if humans also respond to such postural threats by altering muscle spindle sensitivity. Here we present two studies that probed the effects of postural threat on spinal stretch reflexes. In Study 1 we manipulated the threat associated with an increased consequence of a fall by having subjects stand at the edge of an elevated surface (3.2 m). In Study 2 we manipulated threat by increasing the likelihood of a fall by occasionally tilting the support surface on which subjects stood. In both scenarios we used Hoffmann (H-) and tendon stretch (T-) reflexes to probe the spinal stretch reflex circuit of the soleus muscle. We observed increased T-reflex and unchanged H-reflex amplitudes in both threat scenarios. These results suggest that the synaptic state of the spinal stretch reflex is unaffected by postural threat, and that therefore the muscle spindles activated in the T-reflexes must be more sensitive in the threatening conditions. We propose that this increase in sensitivity may function to satisfy the conflicting needs to restrict movement with threat, while maintaining a certain amount of sensory information related to postural control.

Feline sarcoptic mange in Taiwan: a case series of five cats.
Vet Dermatol (2013)
Huang, H. P., and Y. H. Lien
BACKGROUND: Sarcoptes scabiei infestation is rare in cats. OBJECTIVE: To report the clinical presentations and treatments of cats infested with S. scabiei. ANIMALS: Five cats that presented with progressive and nonresponsive crusting lesions on the concave and convex aspects of the pinnae are included in this series. Other dermatological manifestations recorded were crusts on the bridge of the nose (five of five), crusty pododermatitis (three of five), crusty lesions on the tail (one of five) and pruritic erythematous papules on the arms and/or thighs of the owners (five of five). None of the cats was living in a household with a dog. METHODS: Sarcoptic (S. scabiei) mange was diagnosed based on the identification of S. scabiei in deep skin scrapings. A spot-on application of 1.0% moxidectin and 10% imidacloprid (0.1 mL/kg) was administered every 2 weeks for three applications. All cats were re-evaluated at the time of treatment. RESULTS: All five cats and their owners improved after the first application and reached clinical remission after the third application. Deep skin scrapings from all cats were negative for S. scabiei after the first application. No clinical adverse effects or abnormalities on routine blood tests were noted during the study period. No reinfestation was reported during the follow-up period of 6 months after treatment. CONCLUSION: Although sarcoptic mange is rare in cats, it should be considered as a differential diagnosis for cats presenting with crusting lesions on the pinnae and nose and crusty pododermatitis. A spot-on preparation of moxidectin and imidacloprid was used successfully to treat cats with S. scabiei infestation.

Complications of Stamey percutaneous loop cystostomy catheters in three cats.
Hunt, G. B., W. T. Culp, S. Epstein, K. Jandrey, M. Ivanov, and J. L. Westropp
Complications associated with the Stamey percutaneous loop cystostomy catheter (Cook Medical), including exposure of the most proximal side-hole and leakage of urine from the bladder, were encountered following percutaneous placement in three cats. In all cats, surgical exploration for removal of the catheter was performed.

Sedative and analgesic effects of buprenorphine, combined with either acepromazine or dexmedetomidine, for premedication prior to elective surgery in cats and dogs.
Hunt, J. R., N. J. Grint, P. M. Taylor, and J. C. Murrell
OBJECTIVE: To evaluate the sedative and analgesic effects of intramuscular buprenorphine with either dexmedetomidine or acepromazine, administered as premedication to cats and dogs undergoing elective surgery. STUDY DESIGN: Prospective, randomized, blinded clinical study. ANIMALS: Forty dogs and 48 cats. METHODS: Animals were assigned to one of four groups, according to anaesthetic premedication and induction agent: buprenorphine 20 mug kg(-1) with either
dexmedetomidine (dex) 250 mg kg(-2) or acepromazine (acp) 0.03 mg kg(-1), followed by alfaxalone (ALF) or propofol (PRO). Meloxicam was administered preoperatively to all animals and anaesthesia was always maintained using isoflurane. Physiological measures and assessments of pain, sedation and mechanical nociceptive threshold (MNT) were made before and after premedication, intraoperatively, and for up to 24 hours after premedication. Data were analyzed with one-way, two-way and mixed between-within subjects anova, Kruskall-Wallis analyses and Chi squared tests. Results were deemed significant if p <= 0.05, except where multiple comparisons were performed (p <= 0.005). RESULTS: Cats premedicated with dex were more sedated than cats premedicated with acp (p < 0.001) and ALF doses were lower in dex cats (1.2 +/- 1.0 mg kg(-1)) than acp cats (2.5 +/- 1.9 mg kg(-1)) (p = 0.041). There were no differences in sedation in dogs however PRO doses were lower in dex dogs (1.5 +/- 0.8 mg kg(-1)) compared to acp dogs (3.3 +/- 1.1 mg kg(-1)) (p < 0.001). There were no differences between groups with respect to pain scores or MNT for cats or dogs. CONCLUSION: Choice of dex or acp, when given with buprenorphine, caused minor, clinically detectable, differences in various characteristics of anaesthesia, but not in the level of analgesia. CLINICAL RELEVANCE: A combination of buprenorphine with either acp or dex, followed by either PRO or ALF, and then isoflurane, accompanied by an NSAID, was suitable for anaesthesia in dogs and cats undergoing elective surgery. Choice of sedative agent may influence dose of anaesthetic induction agent.

Impact of free-ranging domestic cats on wildlife.
Hutchins, M.

Evaluation of the efficacy of selamectin spot-on in cats infested with Aelurostrongylus abstrusus (Strongylida, Filarioidea) in a Central Italy cat shelter.
Vet Parasitol (2013)
Iannino, F., L. Iannetti, D. Paganico, and M. Podaliri Vulpiani
In recent years Aelurostrongylus abstrusus has often been reported in Italy. This lungworm is very common in cat colonies due to its route of transmission. Deciding a therapeutic approach can be difficult in such colonies, because there is no certainty whether oral medicines administered with food, or with what dose, will be taken. In this field study, stool samples were taken from 42 cats and analysed for A. abstrusus L1 larvae with Baermann technique. Ten cats testing positive were treated with a spot-on formulation of selamectin 45mg. Clinical examinations and laboratory tests, repeated four times in two months, demonstrated the success of the treatment in 9 of the 10 cats. Improvements in respiratory signs and general clinical condition were reported after treatment.

Cholesterol granuloma associated with otitis media in a cat.
Ilha, M. R., and C. Wisell
An 8-year-old, male neutered Siamese cat was presented with Horner syndrome and right head tilt. A soft tissue mass was observed in the right tympanic cavity, and bulla osteotomy was performed. Tissue samples retrieved from the tympanic cavity were sent for histology, and a middle ear fluid swab was sent for bacterial culture and sensitivity. Histologic diagnosis was of otitis media associated with cholesterol granuloma (CG). Bacterial culture yielded Pasteurella multocida and Leifsonia (Corynebacterium) aquaticum. Middle ear CG is frequently seen in human beings and is associated with a variety of middle ear diseases including otitis media. Cholesterol granuloma of the middle ear has been experimentally induced in cats. The clinical and pathological findings of a spontaneous case of CG in the tympanic cavity of a cat with otitis media are described herein.

Immunocytochemical demonstration of feline infectious peritonitis virus within cerebrospinal fluid macrophages.
Ives, E. J., A. E. Vanhaesebrouck, and F. Cian
A 4-month-old female entire domestic shorthair cat presented with an acute onset of blindness, tetraparesis and subsequent generalised seizure activity. Haematology and serum biochemistry demonstrated a moderate, poorly regenerative anaemia, hypoalbuminæmia and hyperglobulinaemia with a low albumin:globulin ratio. Serology for feline coronavirus antibody was positive with an elevated alpha-1 acid glycoprotein. Analysis of cisternal cerebrospinal fluid (CSF) demonstrated markedly elevated protein and a mixed, predominately neutrophilic pleocytosis. Immunocytochemistry for feline coronavirus was performed on the CSF with positive staining observed inside macrophages. The cat was subsequently euthanased, and both histopathology and immunohistochemistry were consistent with a diagnosis of feline infectious peritonitis. This is the first reported use of immunocytochemistry for detection of feline coronavirus within CSF macrophages. If this test proves highly specific, as for identification of feline coronavirus within tissue or effusion macrophages, it would be strongly supportive of an ante-mortem diagnosis of feline infectious peritonitis in cats with central nervous system involvement without the need for biopsy.

Prevalence and risk factor analysis of feline haemoplasma infection in New Zealand domestic cats using a real-time PCR assay.
J Jenkins, K. S., K. E. Dittmer, J. C. Marshall, and S. Tasker

Haemotropic mycoplasmas (haemoplasmas) are small epierythrocytic bacteria that have the potential to cause severe, life-threatening haemolytic anaemia. The aim of the current study was to evaluate feline haemoplasma prevalence using real-time polymerase chain reaction (PCR) from a convenience sample of New Zealand domestic cats, including blood film examination and a risk factor analysis. DNA was extracted from 200 blood samples submitted to a diagnostic laboratory for routine haematology over a 12-month period. Species-specific real-time PCR assays identified 62 cats that were positive for haemoplasma DNA, giving an overall prevalence of 31%. Twelve of the positive cats had dual infections. The prevalence for the three feline haemoplasmas was 25% for ‘Candidatus Mycoplasma haemominutum’, 7.5% for Mycoplasma haemofelis and 4.5% for ‘Candidatus Mycoplasma turicensis’ (CMt). All samples were positive for an internal control (feline 28S rDNA) by real-time PCR. Sensitivity and specificity of blood smear examination for haemoplasma infection in this study was 9.7% and 97.8%, respectively. Retroviral infection was tested using the Idexx Snap Feline Triple test on all samples. Twenty cats (10%) were feline immunodeficiency virus (FIV) positive and 11 cats (5.5%) were feline leukaemia virus (FeLV) positive. Statistical comparisons, using multivariate logistic regression, indicated that positive FIV status, male gender and non-pedigree breed were significantly (P <0.05) associated with haemoplasma infection, with odds ratios of 10.16, 5.04 and 3.03 respectively. The results of this study demonstrate the prevalence of the three main feline haemoplasma species in New Zealand for the first time, with prevalences correlating with previous overseas studies. This is the first report of CMt in New Zealand.

A novel canine influenza H3N2 virus isolated from cats in an animal shelter.

The interspecies transmission of avian-origin H3N2 canine influenza virus (CIV) to dogs was first reported in 2007. The present study characterized a novel CIV H3N2 isolated from cats in an animal shelter. A comparative analysis of the deduced amino acid sequences of the A/Canine/Korea/CY009/2010(H3N2) (CY009) and A/Feline/Korea/FY028/2010 (H3N2) (FY028) strains isolated from dogs and cats, respectively, in the animal shelter identified point mutations in 18 amino acid positions within eight viral genes. Interestingly, CY009 and FY028 replicated well in specific pathogen-free embryonated chicken eggs and in mice, respectively. Mice infected with the FY028 strain exhibited significant over expression of IL-10, TNF-alpha, and IFN-gamma (p<0.001) at 3 days postinfection. Thus, an emergency monitoring system should be developed to identify influenza mutations that occur during interspecies transmission in companion animals and for continuous public health surveillance.

Urban sporotrichosis and cats.
Joob, B., and V. Wiwanitkit
EXPERIMENTAL TRANSMISSION OF SARCOCYSTIS MURIS (COCCIDIA: APICOMPLEXA) FROM THE FECES OF A NATURALLY INFECTED FERAL CAT (FELIS CA TUS) FROM EGYPT.
J Parasitol (2013)
Kappany, A., S. Abu-Elwafa, M. Hilali, B. Rosenthal, D. Dunams, and J. P. Dubey
Abstract Cats serve as definitive hosts for zoonotic Toxoplasma gondii, a protozoan that threatens human reproductive health, but they also excrete sporocysts of related protozoan that pose no known human health risk. Here, we provide the first definitive evidence for natural infection with Sarcocystis muris, 1 such enzootic parasite. Sporulated Sarcocystis sp. sporocysts were found in rectal contents of an adult feral cat (Felis catus) in Giza, Egypt. After orally inoculating these into 2 Swiss Webster mice, sarcocysts were found to have developed in skeletal muscles 114 days later. By transmission electron microscopy, the cyst wall corresponded to Type 1, and the parasitophorous vacuolar membrane had tiny outpocketing of blebs (<200 nm thick) that were not invaginated into the interior of the cyst; these structures were identical to sarcocyst wall described for a Costa Rican isolate of S. muris that has served as an experimental model for nearly 4 decades. Two parasite-free cats fed sarcocysts infected muscles developed patent infections; fully sporulated sporocysts (10-11 x 7.0 mum) were found in the lamina propria of small intestines of cats killed 6 and 7 days post-inoculation (PI). Interferon gamma gene knockout (KO) mice were orally inoculated with sporocysts from experimentally-infected cats, and their tissues were examined histologically; sarcocysts were found in 5 KO mice killed 87,115,196,196,196 days PI but, no stages were seen in 5 KO mice 10,14,14,18, and 39 days PI. Bradyzoites were released from intramuscular sarcocysts of a KO mice killed 115 days PI and orally inoculated in to 5 KO mice. No stage of Sarcocystis was found in any organ (including intestinal lamina propria) of KO mice killed 4, 8, 81, 190, and 190 day PI, confirming that the definitive host is required to complete the lifecycle even in the case of immunodeficient mice. This is the first confirmation of S. muris infection in a naturally-infected cat anywhere.

Application of the single blood sample method to estimate feline glomerular filtration rate in a clinically relevant situation.
Katayama, M., A. Sasaki, M. Takayasu, S. Shimamura, Y. Uzuka, I. Murayama, H. Satoh, and K. Furuhama
To compare glomerular filtration rate (GFR) estimated by a single blood sample method, the non-ionic contrast medium ioxixanol (40 mg I/kg) and the standard GFR tracer inulin (50 mg/kg) were co-administered as a bolus intravenous injection to 12 cats, followed by blood collection 60 and 90 mins later. Serum ioxixanol and inulin concentrations were measured separately by high-performance liquid chromatography and colourimetric assay. A correlation (r = 0.90, P <0.01) was noted between GFR values estimated by the single-blood-sample method using ioxixanol and inulin, indicating that this procedure can apply to feline GFR estimates, even if different GFR tracers are used. In a feline kidney transplantation study, the GFR was monitored subsequently by this simplified ioxixanol method throughout a 750-day observation period with no adverse reactions. The results demonstrate that the simplified method, including the volume of distribution, can be used as an alternative or expedient tool in a clinically relevant situation.

Unusual rib metastasis in two cats with pulmonary carcinoma.
Two cats had chronic respiratory signs associated with pulmonary carcinoma. In each case, computed tomography demonstrated similar pulmonary masses, pleural fluid and osteolytic expansile rib lesions as a result of local costal spread. This is the first report of feline primary pulmonary adenocarcinoma with local spread to the ribs, causing osteolysis. Although pleural involvement is common with this neoplasm, local spread to ribs is rarely reported.

Cats and chemotherapy: treat as ‘small dogs’ at your peril.
PRACTICAL RELEVANCE: To safely and effectively treat cats with cancer it is important to understand the drugs being used and some species-specific concerns in relation to chemotherapy. CLINICAL CHALLENGES: While many of the same principles in treating cats with chemotherapy and targeted agents hold true as for other species, including dogs, cats display altered metabolism of drugs and species-specific toxicities that can present particular challenges for veterinarians.

AUDIENCE: This article is aimed at practitioners who treat feline cancer or who help manage cats undergoing cancer therapy. EVIDENCE BASE: The article reviews the known literature regarding species differences between dogs and cats relating to the use of chemotherapy and targeted therapies. For many of the drugs mentioned there are limited studies and caution must be exercised when using drugs that have a low therapeutic index.

2011 AND 2012 EARLY CAREERS ACHIEVEMENT AWARDS: Use of genomic biology to study companion animal intestinal microbiota.
Kerr, K. R., A. N. Beloshapka, and K. S. Swanson
Although dogs and cats are quite different than many livestock species in that they have evolved by eating diets high in fat and protein and low in carbohydrates, the gastrointestinal microbiota still play a key role in the gut and overall host health of these species. Early experiments in this field used culture-based techniques to evaluate the effects of dietary ingredients, such as fibers and prebiotics, on microbiota and indices of gut health (e.g., fecal scores, pH, fermentative end products). Such studies, however, were limited in scope and lacked precision as it pertained to the microbiota. The DNA-based techniques that have become available over the past decade have greatly upgraded research capabilities and have provided a more encompassing view of the canine and feline gastrointestinal microbiomes. High-throughput sequencing techniques that are much cheaper and faster than Sanger sequencing have been a key development in this progress. Sequence data not only allow for the identification of all microbial taxa but also provide information regarding functional capacity when a shotgun sequencing approach is used. The few canine and feline studies that have used 454 pyrosequencing have identified the predominant microbial taxa and metabolic functions present in healthy populations, differences between healthy and diseased dog and cat populations, and the effects of diet (e.g., dietary fibers, prebiotics, protein to carbohydrate ratio) on gastrointestinal microbiota. Although these studies have provided a foundation from which to work, more research is needed to increase our general understanding of the gastro-intestinal microbiome, how it impacts host health, how its composition and activity may be altered by age, genetic, or environmental factors, and test whether specific pathogens or disease signatures can be identified and used in diagnosis and/or treatment of disease.

COMPANION ANIMALS SYMPOSIUM: Dietary management of feline lower urinary tract symptoms.
Kerr, K. R.
Experimental and clinical investigations have confirmed the importance of dietary modifications in medical protocols designed to treat and prevent feline lower urinary tract signs (LUTS). The objective of this review is to discuss common medical conditions contributing to feline LUTS and to present currently used and potential preventative dietary modifications. Feline LUTS are a set of clinical conditions with similar symptoms related to inappropriate urine elimination due to a combination of genetics, stress and frustration reactions, environment, and medical condition or conditions, for example, idiopathic cystitis, urolithiasis, urethral obstruction, and urinary tract infection. The main goals of dietary modifications to prevent LUTS are 1) promote large dilute volumes of urine, 2) decrease the relative supersaturation of urine for specific stone types, and 3) promote healthy bacterial populations in the gastrointestinal and urogenital tracts. The impact of dietary composition, including dietary moisture, protein concentration and digestibility, mineral concentrations (i.e., Na, Cl, Ca, P, and Mg), inclusion of acidifiers and alkalinizing agents, inclusion of vitamin B6, eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and gamma-linolenic acid, fiber concentration and characteristics, and oxalate degrading probiotics, on these outcomes is discussed, and dietary guidelines for cats are provided. Because of the complex interaction of diet composition, environment, and animal physiology, there is a need for clinical research linking current recommendations or dietary options for the treatment and prevention of LUTS with physiological outcomes (i.e., decreased relative supersaturation and LUTS recurrence). Additionally, for many recommendations (e.g., probiotic administration, EPA, DHA), extrapolation from other species was necessary. Research is needed in feline patients with LUTS on these dietary components.
Influence of dietary fiber type and amount on energy and nutrient digestibility, fecal characteristics, and fecal fermentative end-product concentrations in captive exotic felids fed a raw beef-based diet.


Kerr, K. R., C. L. Morris, S. L. Burke, and K. S. Swanson

Little nutritional or metabolic information has been collected from captive exotic cats fed raw diets. In particular, fiber types and concentrations for use in raw meat-based diets for captive exotic felids have not been well studied. Our objective was to evaluate the effects of fiber type and concentration on apparent total tract energy and macronutrient digestibility, fecal characteristics, and fecal fermentative end-products in captive exotic felids. Four animals of each captive exotic species (jaguar (Panthera onca), cheetah (Acinonyx jubatus), Malayan tiger (Panthera tigris corbetti), and Siberian tiger (Panthera tigris altaica) were randomized in four 4 x 4 Latin square designs (1 Latin square per species) to 1 of the 4 raw beef-based dietary treatments (94.7 to 96.7% beef trimmings): 2 or 4% cellulose or 2 or 4% beet pulp. Felid species, fiber type, and fiber concentration all impacted digestibility and fecal fermentative end-products. Inclusion of beet pulp increased (P ≤ 0.05) fecal short-chain fatty acids and fecal output in all cats. Inclusion of 2 and 4% cellulose, and 4% beet pulp increased (P ≤ 0.05) fecal bulk and diluted fecal branched-chain fatty acid concentrations compared with 2% beet pulp. Apparent total tract DM, OM, fat, and GE digestibility coefficients decreased (P ≤ 0.05) linearly with BW of cats. Additionally, fecal moisture, fecal score, and concentrations of fermentative end-products increased (P ≤ 0.05) with BW. Although the response of many outcomes was dependent on cat size, in general, beet pulp increased wet fecal weight, fecal scores, and fecal metabolites, and reduced fecal pH. Cellulose generally reduced DM and OM digestibility, but increased dry fecal weight and fecal percent DM. Although beet pulp and cellulose fibers were tested individually in this study, these data indicate that the optimum fiber type and concentration for inclusion in captive exotic felid diets is likely a combination of fermentable and nonfermentable fibers, with the optimal fiber blend being dependent on species. Smaller cats, such as cheetahs and jaguars, tolerated fermentable fibers, whereas larger cats, such as Malayan and Siberian tigers, appeared to require more insoluble fibers that limit fermentation and provide fecal bulk. Further research is required to test whether these trends hold true when fed in combination.

PCR-Based Molecular Characterization of Toxocara spp. Using Feces of Stray Cats: A Study from Southwest Iran.


Khademvatan, S., F. Rahim, M. Tavalla, R. Abdizadeh, and M. Hashemitabar

Feces of stray cat are potential sources of gastrointestinal parasites and play a crucial role in spreading and transmitting parasite eggs, larvae, and oocysts through contamination of soil, food, or water. In this study, we investigated the prevalence of Toxocara spp. infection in stray cats in Ahvaz city, southwest Iran. Eggs of Toxocara spp. in feces of stray cats were detected by the sucrose flotation method, and identification was conducted by polymerase chain reaction (PCR) and DNA sequencing. Of the 140 fecal samples that were randomly collected from public environments during the months of January to May 2012, 45% were found to harbour Toxocara spp. eggs. The highest prevalence of Toxocara spp. eggs was found in the central area of Ahvaz city (28.6%). T. canis eggs were found in 4 (6.34%) of the 63 positive samples. Stray cats are found in parks, playgrounds, and other public places and may be a potential contamination risk. Identification of Toxocara spp. using molecular methods is sufficiently sensitive to detect low levels of parasites and identify the different Toxocara spp. in feces. The relatively high prevalence of Toxocara spp. infection may continue to increase due to lack of effective environmental hygiene control in Iran. Consequently, there is a need to plan adequate programs to detect, identify, and control this infection as well as stray cats in the region.

Inter- and intraspecies transmission of canine influenza virus (H3N2) in dogs, cats, and ferrets.

Influenza Other Respi Viruses (2013) 7:265-270.

Kim, H., D. Song, H. Moon, M. Yeom, S. Park, M. Hong, W. Na, R. J. Webby, R. G. Webster, B. Park, J. K. Kim, and B. Kang

BACKGROUND: The emergence of zoonotic viruses in domestic animals is a significant public health concern. Canine influenza virus (CIV) H3N2 is a virus that can infect companion animals and is, therefore, a potential public health concern. OBJECTIVE: This study investigated the inter- and intraspecies transmission of CIV among dogs, cats, and ferrets, under
laboratory conditions, to determine whether transmission of the virus was possible between as well as within these domestic animal species. METHOD: The transmission routes for inter- and intraspecies transmission were airborne and direct contact, respectively. Transmission was conducted through intranasal infection of dogs followed by exposure to either cats or ferrets and by comingling infected and naive animals of the same species. RESULTS: The interspecies transmission of CIV H3N2 via airborne was only observed from dogs to cats and not from dogs to ferrets. However, direct intranasal infection of either cats or ferrets with CIV could induce influenza-like clinical signs, viral shedding, and serological responses. Additionally, naive cats and ferrets could be infected by CIV via direct contact with infected animals of the same species. CONCLUSION: Cats appear to be another susceptible host of CIV H3N2, whereas ferrets are not likely natural hosts. The molecular-based mechanism of interspecies and intraspecies transmission of CIV H3N2 should be further studied.

Characterization of feline TRIM genes: molecular cloning, expression in tissues, and response to type I interferon.
Koba, R., C. Kokaji, G. Fujisaki, K. Oguma, and H. Sentsui
Members of the tripartite motif (TRIM) protein family in mammals are responsible for various cellular processes. Previous studies have revealed that several TRIM proteins were induced by interferons (IFN) and that these proteins were involved in innate immune response against retroviral infection. Although retroviral infection is prevalent in domestic cats, the expression profiles and roles of feline TRIM genes against these viral infections are not well understood. In the present study, we examined tissue expression and IFN inducibility of nine feline TRIM genes. In addition, the complete coding sequences of six cloned TRIM genes were determined, and their structures were analyzed. Nine TRIM genes were expressed in feline tissues and five were up-regulated by type I IFN. The predicted amino acid sequence of six feline TRIM proteins showed high sequence similarities to other mammalian TRIM proteins, and suggest that feline TRIM genes are potentially involved in antiviral reactivity in IFN-mediated immune response.

Endocrine emergencies in dogs and cats.
Koenig, A.
Success in treatment of endocrine emergencies is contingent on early recognition and treatment. Many endocrine diseases presenting emergently have nonspecific signs and symptoms. In addition, these endocrine crises are often precipitated by concurrent disease, further making early identification difficult. This article concentrates on recognition and emergency management of the most common endocrine crises in dogs and cats.

A comparison between fixation methods of femoral diaphyseal fractures in cats - a retrospective study.
Konning, T., R. J. Maarschalkerweerd, N. Endenburg, and L. F. Theyse
OBJECTIVES: To compare the outcome of three different fixation methods and to determine prognostic factors in cats with diaphyseal femoral fractures. METHODS: Retrospective analysis of case records of cats with diaphyseal femoral fractures surgically corrected using external fixators, bone plate or plate-rod construct. Outcome was evaluated by estimating the time to bone healing and by calculating the complication rate. RESULTS: In total, an external fixator was used in 30 cases, a bone plate in 20 cases and a plate-rod construct in 56 cases. All methods were successful in achieving bone healing without significant differences. There was a significant difference between the categorized complication rates between the treatment groups. The external fixation group had the most complications overall. When only the major and catastrophic complications were taken into account, it had the fewest complications. The plate-rod construct had the fewest complications overall, with most being major complications. The bone plate group had a complication rate between that of the external fixation and plate-rod construct groups. It had the most catastrophic complications in relative terms. CLINICAL SIGNIFICANCE: There was no statistically significant difference in the time to achieve bone healing but there was a significant difference in categorized complication rates between the groups.
Investigating Coxiella burnetii infection in a breeding cattery at the centre of a Q fever outbreak.
Kopecny, L., K. L. Bosward, A. Shapiro, and J. M. Norris
The potential role of cats in transmitting Coxiella burnetii to humans was highlighted in a Q fever outbreak, linked to a caesarean section in a breeding queen, in an Australian small animal veterinary hospital. The objectives of this study were to evaluate the C. burnetii seroreactivity of the breeding queen and other cats residing at the same breeding cattery (n = 27) and to evaluate C. burnetii infection of the breeding queen by molecular and histological methods. Three assays [complement fixation test (CFT), indirect immunofluorescence assay (IFA) and enzyme-linked immunosorbent assay (ELISA)] were used for serological evaluation. Additionally, uterine and ovarian samples collected from the breeding queen 11 weeks post-parturition were assessed by routine and specialised histological methods and polymerase chain reaction. The breeding queen showed strong seropositivity using CFT (titre 1/32), IFA (titre phase I 1/8192 and phase II 1/8192) and ELISA; however, the reproductive tract showed no evidence of pathology or C. burnetii infection. A number of cattery-confined cats were identified as seropositive to phase II and/or phase I C. burnetii. Serological detection of C. burnetii in a breeding cattery linked to a Q fever outbreak indicates likely infection by this bacterium in Australian feline populations, re-confirming the relevance of this zoonosis.

Variation of cats under domestication: genetic assignment of domestic cats to breeds and worldwide random-bred populations.
Kurushima, J. D., M. J. Lipinski, B. Gandolfi, L. Froenicke, J. C. Grahn, R. A. Grahn, and L. A. Lyons
Both cat breeders and the lay public have interests in the origins of their pets, not only in the genetic identity of the purebred individuals, but also in the historical origins of common household cats. The cat fancy is a relatively new institution with over 85% of its 40-50 breeds arising only in the past 75 years, primarily through selection on single-gene aesthetic traits. The short, yet intense cat breed history poses a significant challenge to the development of a genetic marker-based breed identification strategy. Using different breed assignment strategies and methods, 477 cats representing 29 fancy breeds were analysed with 38 short tandem repeats, 148 intergenic and five phenotypic single nucleotide polymorphisms. Results suggest the frequentist method of Paetkau (single nucleotide polymorphisms = 0.78, short tandem repeats = 0.88) surpasses the Bayesian method of Rannala and Mountain (single nucleotide polymorphisms = 0.56, short tandem repeats = 0.83) for accurate assignment of individuals to the correct breed. Additionally, a post-assignment verification step with the five phenotypic single nucleotide polymorphisms accurately identified between 0.31 and 0.58 of the misassigned individuals raising the sensitivity of assignment with the frequentist method to 0.89 and 0.92 for single nucleotide polymorphisms and short tandem repeats respectively. This study provides a novel multistep assignment strategy and suggests that, despite their short breed history and breed family groupings, a majority of cats can be assigned to their proper breed or population of origin, that is, race.

Injection site-associated sarcoma in the cat: treatment recommendations and results to date.
Ladlow, J.
PRACTICAL RELEVANCE: Feline injection site-associated sarcomas (FISSs) have been the cause of much controversy and concern since they were first reported in the early 1990s. While not solely associated with vaccination, there are implications for vaccination sites and schedules and, while guidance has been published, this appears to be permeating only slowly through to general practice. CLINICAL CHALLENGES: Up to one-quarter of cats with this difficult condition have metastatic lung involvement. The mainstay of treatment is aggressive surgery, but even in cases where full excision with clean margins is achieved, tumour recurrence is anticipated in about one-third of cases. The role of radiotherapy and chemotherapy as adjuvant treatments has yet to be clearly defined. PATIENT GROUP: FISSs are often seen in younger cats, with a peak presentation at 6-7 years and a second peak at 10-11 years. EVIDENCE BASE: This review summarises the diagnosis and management of FISS with reference to the latest published treatment results. It focuses on surgical excision but also covers adjuvant radiotherapy and chemotherapy, and gives median survival times for the different treatment approaches.
Pharmacokinetics, pharmacodynamics and therapeutics of pradofloxacin in the dog and cat.
Lees, P.
Pradofloxacin is a third-generation fluoroquinolone, licensed in the EU for use in a range of indications in the dog and cat and authorized more recently in the USA for one therapeutic indication (skin infections) in the cat. This review summarizes and appraises current knowledge on the physico-chemical, pharmacological (pharmacokinetics (PK) and pharmacodynamics (PD)), safety and therapeutic properties of pradofloxacin in the target species. Pradofloxacin contains two centres of asymmetry and is the pure SS enantiomer. After oral dosing of tablets (dog) or tablets and oral suspension (cat), maximum plasma concentrations (Cmax) are achieved in less than 3.0 h, and terminal half-life is of the order of 5-10 h. Accumulation is slight or absent with once daily oral dosing. Free drug concentrations in plasma are in the range of 63-71% of total concentration. As for other fluoroquinolones, antibacterial activity is attributable to inhibition of bacterial replication at two sites, subunit A of topoisomerase II and topoisomerase IV. The antimicrobial spectrum includes gram-negative and gram-positive organisms, anaerobes, Mycoplasma spp. and some intracellular organisms (Rickettsia spp. and Mycobacterium spp.). The killing action is of the concentration-dependent type. Pradofloxacin has high potency (low MIC values) in comparison with first- and second-generation fluoroquinolones. Integration of in vivo PK and in vitro PD data provides values of Cmax /MIC and area under plasma concentration-time curve (AUC24 h)/MIC ratios predictive of good clinical efficacy against sensitive organisms, when administered at recommended dose rates. Clinical trial evaluation of pradofloxacin, in comparison with other authorized antimicrobial drugs, has demonstrated either noninferiority or superiority of pradofloxacin. Data indicating clinical and, in some instances, bacteriological cure have been reported: (i) in cats, for wound infections, abscesses, upper respiratory tract infections, conjunctivitis, feline infectious anaemia and lower urinary tract infections and (ii) in dogs, for wound infections, superficial and deep pyoderma, acute urinary tract infections and adjunctive treatment of infections of gingival and periodontal tissues. At clinical dose rates pradofloxacin was well tolerated in preclinical studies and in clinical trials. Among the advantages of pradofloxacin are (i) successful treatment of infections caused by strains resistant to some other fluoroquinolones, as predicted by PK/PD data, but depending on the specific MIC of the target strain and (ii) a reduced propensity for resistance development based on MPC measurements. The preclinical and clinical data on pradofloxacin suggest that this drug should commonly be the fluoroquinolone of choice when a drug of this class is indicated. However, the PK/PD data on pradofloxacin, in comparison with other fluoroquinolones, are not a factor that leads automatically to greater clinical efficacy.

Clinical feline dental radiography.
Lemmons, M.
Dental radiography is a necessary diagnostic modality in small animal practice. It is not possible to accurately assess and diagnose tooth resorption, periodontal disease, endodontic disease, neoplasia and injury without it. Dental radiography is also necessary for treatment and assessment of the patient postoperatively.

Therapeutic decision making and planning in veterinary dentistry and oral surgery.
Lewis, J. R.
Veterinary dentistry is an exacting science, in which decisions are made not only for an individual patient, but also for individual teeth, which may vary in severity of disease. Multiple therapeutic decisions and treatment plans may be necessary for a single patient. Veterinary dental patients must be anesthetized to receive thorough treatment, which results in additional decisions that may not be necessary for human dental patients. This article discusses considerations and approaches toward therapeutic decision making and treatment planning in veterinary dentistry and oral surgery.

Clinical Findings and Survival in Cats Naturally Infected with Feline Immunodeficiency Virus.
BACKGROUND: The clinical course and outcome of natural feline immunodeficiency virus (FIV) infection are variable and incompletely understood. Assigning clinical relevance to FIV infection in individual cats represents a considerable clinical challenge. OBJECTIVE: To compare signalment, hematologic and biochemical data, major clinical problem, and survival among client-owned, FIV-infected, and uninfected domestic cats. ANIMALS: Client-owned, domestic cats tested for FIV (n = 520). METHODS: Retrospective, case control study. Logistic regression analyses were conducted to identify risk factors for FIV infection and to compare hematologic and biochemical data between cases and controls, after adjusting for potential confounders. Survival times were compared using Kaplan-Meier curves. RESULTS: The prevalence of FIV infection was 14.6%. Mixed breed, male sex, and older age were risk factors for FIV infection. Hematologic abnormalities, biochemical abnormalities or both were common in both FIV-infected and uninfected cats. Lymphoid malignancies were slightly more common in FIV-infected than uninfected cats. Survival of FIV-infected cats was not significantly different from that of uninfected cats. CONCLUSIONS AND CLINICAL IMPORTANCE: Multiple hematologic and biochemical abnormalities are common in old, sick cats regardless of their FIV status. Their presence should not be assumed to indicate clinical progression of FIV infection. A negative effect of FIV on survival was not apparent in this study.

Full genome analysis of a novel type II feline coronavirus NTU156.

Lin, C. N., R. Y. Chang, B. L. Su, and L. L. Chueh
Infections by type II feline coronaviruses (FCoVs) have been shown to be significantly correlated with fatal feline infectious peritonitis (FIP). Despite nearly six decades having passed since its first emergence, different studies have shown that type II FCoV represents only a small portion of the total FCoV seropositivity in cats; hence, there is very limited knowledge of the evolution of type II FCoV. To elucidate the correlation between viral emergence and FIP, a local isolate (NTU156) that was derived from a FIP cat was analyzed along with other worldwide strains. Containing an in-frame deletion of 442 nucleotides in open reading frame 3c, the complete genome size of NTU156 (28,897 nucleotides) appears to be the smallest among the known type II feline coronaviruses. Bootscan analysis revealed that NTU156 evolved from two crossover events between type I FCoV and canine coronavirus, with recombination sites located in the RNA-dependent RNA polymerase and M genes. With an exchange of nearly one-third of the genome with other members of alphacoronaviruses, the new emerging virus could gain new antigenicity, posing a threat to cats that either have been infected with a type I virus before or never have been infected with FCoV.

The effect of experimentally induced chronic hyperglycaemia on serum and pancreatic insulin, pancreatic islet IGF-I and plasma and urinary ketones in the domestic cat (Felis felis).

Link, K. R., I. Allio, J. S. Rand, and E. Eppler
Like in humans, diabetes mellitus is on the rise in cats. Feline diabetes is a suitable model for human type-2 diabetes. We investigated magnitude and timing of insulin suppression with induced hyperglycaemia and its relationship to plasma and urinary ketones and to pancreatic islet insulin. IGF-I is under discussion as a protective mechanism but little is known about its role in diabetes in general and its distinct localisation in feline pancreatic islets in particular. Thirteen healthy, adult cats were allocated to 2 groups and infused with glucose to maintain their blood glucose at a high or moderate concentration for 42 days resulting in insulin secretion suppression. After initial increase, insulin levels declined to baseline but were still detectable in the blood at a very low level after 6 weeks of glucose infusion and then increased after a 3 week recovery period. While IGF-I in healthy cats was primarily located in glucagon cells, in hyperglycaemia-challenge IGF-I was pronounced in the beta-cells 3 weeks after cessation of infusion. Six/8 cats developing glucose toxicity became ketonuric after 3-4 weeks. Gross lipaemia occurred approx 1 week prior to ketonuria. Ketonuric cats required 1-2 weeks of insulin therapy after-infusion until beta-cell recovery. In conclusion, ketosis and hyperlipidaemia are likely to occur in diabetic cats with glucose at 30 mmol/L, especially after 2 weeks. Three weeks after cessation of infusions, clinical and morphological recovery occurred. We propose a local protective effect of IGF-I to support survival and insulin production in the hyperglycaemic state and recovery period.
Canine and feline paroviruses preferentially recognize the non-human cell surface sialic acid N-glycolylneuraminic acid.
Lofling, J., S. Michael Lyi, C. R. Parrish, and A. Varki
Feline panleukopenia virus (FPV) is a pathogen whose canine-adapted form (canine parvovirus (CPV)) emerged in 1978. These viruses infect by binding host transferrin receptor type-1 (TfR), but also hemagglutinate erythrocytes. We show that hemagglutination involves selective recognition of the non-human sialic acid N-glycolylneuraminic acid (Neu5Gc) but not N-acetylneuraminic acid (Neu5Ac), which differs by only one oxygen atom from Neu5Gc. Overexpression of alpha2-6 sialyltransferase did not change binding, indicating that both alpha2-3 and alpha2-6 linkages are recognized. However, Neu5Gc expression on target cells did not enhance CPV or FPV infection in vitro. Thus, the conserved Neu5Gc-binding preference of these viruses likely plays a role in the natural history of the virus in vivo. Further studies must clarify relationships between virus infection and host Neu5Gc expression. As a first step, we show that transcripts of CMAH (which generates Neu5Gc from Neu5Ac) are at very low levels in Western dog breed cells.

Lommer, M. J.
Sixteen cats with chronic stomatitis, that had previously undergone premolar-molar or full-mouth extractions, were randomly assigned a group to receive 2.5 mg/kg cyclosporine or placebo orally twice daily Neither the clinician nor the clients were aware of the group assignments. Cats were evaluated prior to treatment and every 2 weeks for 6 weeks using a 30 point Stomatitis Disease Activity Index (SDAI) score. Mean improvement in SDAI scores among cats in the treatment group after 6 weeks was 52.7 %. This was significantly different from the mean improvement (12.2 %) of cats in the placebo group. During the 6 week study period, 7 of the 9 cats in the treatment group (77.8 %) showed a > 40 % improvement in SDAI score, while 1 of 7 cats in placebo group (14.3 %) showed a > 40 % improvement in SDAI score. This difference was statistically significant. Individual variability in the absorption of orally-administered cyclosporine was high. Trough whole-blood cyclosporine levels ranged firm 32.1 ng/ml to 1,576.2 ng/ml. At the end of the 6 week observation period, there was a statistically significant difference among cats with trough whole-blood cyclosporine levels >300 ng/ml (72.3 % improvement) compared with cats with cyclosporine levels < 300 ng/ml (28.2 % improvement). Whole-blood cyclosporine levels > 300 ng/ml were associated with significant improvement in oral inflammation in cats with chronic stomatitis that had previously undergone premolar-molar or full-mouth extraction.

Oral inflammation in small animals.
Lommer, M. J.
The oral cavity can be affected by a wide variety of disorders characterized by inflammation of the gingiva and/or oral mucosa. In dogs and cats, differential diagnoses for generalized oral inflammatory disorders include plaque-reactive mucositis, chronic gingivostomatitis, eosinophilic granuloma complex, pemphigus and pemphigoid disorders, erythema multiforme, and systemic lupus erythematosus. In addition, endodontic or periodontal abscesses, infectious conditions, reactive lesions, and neoplastic conditions may initially present with localized or generalized inflammation of the oral mucosa. Determination of the underlying cause of an oral inflammatory condition relies on a thorough history, complete physical and oral examination, and incisional biopsy and histopathologic examination of lesions.

Long-term use of gabapentin for musculoskeletal disease and trauma in three cats.
Lorenz, N. D., E. J. Comerford, and I. Iff
Gabapentin has been widely used in human medicine to control acute and chronic pain. Although the exact mechanism of action has yet to be determined, its use in veterinary medicine is increasing. The clinical use of gabapentin for analgesia in cats has been reported in review articles and one case report. Managing chronic pain, particularly in the feline patient, poses
a challenge to veterinary surgeons. This report details the long-term use of gabapentin for musculoskeletal pain or head trauma in three cats. All cats received gabapentin for several months at an average dose of 6.5 mg/kg q12h. Clinical signs suggestive of pain, such as aggression, avoiding human interaction and loss of appetite, were observed to decrease with the administration of gabapentin, used as part of an analgesia regime or as sole medication. Long-term follow-up with the owners of all cats indicated that satisfactory pain management was achieved, administration was easy and no obvious side effects during the period of administration occurred. We conclude that long-term treatment with gabapentin is of potential benefit in controlling pain in cases of head trauma, as well as musculoskeletal disease. It may provide a valuable adjunct for the management of chronic pain in cats and should be investigated further for its clinical use and safety.

OBJECTIVE: A visual prosthesis based on penetrating electrode stimulation within the optic nerve (ON) is a potential way to restore partial functional vision for blind patients. We investigated the retinotopic organization of ON stimulation and its spatial resolution. APPROACH: A five-electrode array was inserted perpendicularly into the ON or a single electrode was advanced to different depths within the ON (~1-2 mm behind the eyeball, 13 cats). A sparse noise method was used to map ON electrode position and the visual cortex. Cortical responses were recorded by a 5 x 6 array. The visuotopic correspondence between the retinotopic position of the ON electrode was compared with the visual evoked cortical map and the electrical evoked potentials elicited in response to ON stimulation. MAIN RESULTS: Electrical stimulation with penetrating ON electrodes elicited cortical responses in visuotopographically corresponding areas of the cortex. Stimulation of the temporal side of the ON elicited cortical responses corresponding to the central visual field. The visual field position shifted from the lower to central visual field as the electrode penetrated through the depth of the ON. A spatial resolution of ~ 2 degrees to 3 degrees within a limited cortical visuotopic representation could be obtained by this approach. SIGNIFICANCE: Visuotopic electrical stimulation with a relatively fine spatial resolution can be accomplished using penetrating electrodes implanted at multiple sites and at different depths within the ON just behind the globe. This study also provides useful experimental data for the design of electrode density and the distribution of penetrating ON electrodes for a visual prosthesis.

This case-controlled study evaluated urinalyses from 111 primary cases diagnosed with feline lower urinary tract disease (FLUTD) and 101 healthy control cats. Urine samples were analysed by standardised procedures, and differences between the two groups were compared by multivariable logistic regression analysis, while controlling for age, body weight, gender and reproductive status. Further, the ability of using urine sediment findings to predict bacteriuria was evaluated. In addition, urinalyses from cats with bacterial cystitis, idiopathic cystitis, urolithiasis and urethral plugs were compared. The main findings were that increasing body weight was significantly associated with increased odds of FLUTD, while the influence of age and reproductive status were of less importance. Increasing amounts of red blood cells and epithelial cells were significantly associated with increased odds of FLUTD. The predictive ability of using bacterial sediment findings to predict bacterial growth was dependent on subjective grading of the amount of bacteria in the sediment and was, at best, only moderate. The few significant differences found between the different FLUTD diagnoses were of limited diagnostic value.

Pet dogs and cats in the USA are commonly exposed to potentially hazardous substances found in domestic environments.
Requests for assistance and advice received by the Kansas State Veterinary Diagnostic Laboratory regarding exposures in dogs and cats to substances perceived by their caretakers to be potentially harmful included 1,616 phone calls, over a 3-year period covering 2009-2012. Enquiries occurred more often during summer. Dogs were involved in 84.7 % of calls and cats in 15.3 %. Oral exposures were reported in 95.5 % of calls, dermal exposures in 3.7 % of calls, inhalation exposures in 0.6 % of calls, and parenteral exposures in 0.2 % of calls. Therapeutic drugs were the most frequently reported substances, accounting for 35.4 % of calls, followed by household chemicals (15.5 %); foods (14.8 %); pesticides (13.9 %); plants (12 %); industrial chemicals and fertilizers (3.6 %); cosmetics and personal care products (2.8 %); and animal, insect, and microorganism toxins (2.1 %). Although requests for information or assistance are not a measure of poisoning incidence, it can provide insight regarding relative exposure rates, help to identify changing exposure trends and emerging exposures, and reflect the public concern regarding actual or apparent harmful exposures in pets.

Feline cutaneous nerve sheath tumours: Histological features and immunohistochemical evaluations.

Mandara, M. T., E. Fabriani, S. Pavone, and M. Pumarola

Feline cutaneous nerve sheath tumours (CNSTs) are uncommonly reported in the skin, since they are underestimated relative to the more common spindle cell tumours of soft tissue. In this study, 26 nerve sheath tumours selected from 337 skin neoplasms of cats were examined. Histologically, they were classified into malignant (MPNSTs) and benign tumours (BPNSTs) based on degree of cellular atypia and polymorphism as well as mitotic rate and diffuse necrosis. CPNSTs were tipically characterised by Antoni A pattern, in some cases associated with Antoni B pattern. In the malignant peripheral nerve sheath tumours (MPNSTs) the polymorphism was marked, while it was mild to moderate in the benign forms (BPNSTs). In the MPNSTs the mitotic activity was generally higher than in the BPNSTs. In five cases, including three MPNSTs and two BPNSTs, there were multinucleated giant cells. Necrotic foci occurred in a BPNST and in two MPNSTs, while osseous/chondroid metaplasia was found in two cases. Immunohistochemically, all the tumours showed a marked diffuse vimentin expression. S-100 protein was expressed in 17 cases, including 81.8% of BPNSTs and 57.14% of MPNSTs. Twenty-five tumours expressed NSE and twenty-four cases showed immunoreaction for laminin. Thirteen tumours were positive for GFAP, while five tumours were positive for SMA. PGP 9.5 expression was detected in all cases, except for two MPNSTs. NGFR was expressed in eleven cases, including four MPNSTs and seven BPNSTs. Ki67 was expressed in twenty tumours without any relationship with morphologic malignancy of the neoplasm. In this case series we confirmed neoplastic spindloid cells with wavy cytoplasm arranged in compact areas, with occasional nuclear palisading or whirls, and interchanged with loosely arranged areas, as the morphological features supporting a diagnosis of CPNST. A constant concurrent expression of vimentin, NSE, and laminin might confirm the diagnosis of PNST in the absence of clear S-100 protein positivity, especially in the malignant forms. In this study, conclusive data were not obtained on the diagnostic relevance of NGFR- and PGP 9.5-expression in feline CPNSTs.

World Association for the Advancement of Veterinary Parasitology (W.A.A.V.P.) second edition: guidelines for evaluating the efficacy of parasiticides for the treatment, prevention and control of flea and tick infestations on dogs and cats.


These second edition guidelines, updated from the 2007 version (Marchiondo et al., 2007), are intended to assist the planning and conduct of laboratory and clinical studies to assess the efficacy of ectoparasiticides applied to dogs or cats for the purpose of treating, preventing and controlling flea and tick infestations. Major revisions to this second edition include guidelines on the assessment of systemic flea and tick products, an update of the geographical distribution of the common fleas and ticks species on dogs and cats, determination of flea and tick efficacy based on geometric versus arithmetic means with respect to geographic regulatory agencies, modification of tick categorization in the assessment of efficacy, expanded guidelines on repellency and anti-feeding effects, enhanced practical field study guidance, and considerations on the ranges of flea and ticks for infestations in laboratory studies. The term ectoparasiticide includes insecticidal and acaricidal compounds, as well as insect growth regulators. The range of biological activities from animal treatment that are considered include: repellency and anti-feeding effects, knockdown, speed of kill, immediate and persistent lethal effects, and interference with egg fertility and subsequent development of off-host life cycle stages. Information is provided on the selection of animals, dose determination, dose confirmation and field studies, record keeping, interpretation of results and animal welfare. These guidelines are also intended to assist regulatory authorities involved in the approval and registration of new ectoparasiticides.


Marconato, L., J. Buchholz, M. Keller, G. Bettini, P. Valenti, and B. Kaser-Hotz

Feline head and neck squamous cell carcinoma (SCC) is a loco-regional disease harbouring a poor prognosis. The complex anatomic location precludes aggressive surgical resection and tumours recur within weeks to few months. Response to chemotherapy and local control after radiation therapy has been disappointing. In this study, a multimodal approach including medical treatment (thalidomide, piroxicam and bleomycin), radiation therapy (accelerated, hypofractionated protocol) and surgery was attempted in six cats. Treatment was well tolerated. Three cats with sublingual SCC were alive and in complete remission at data analysis closure after 759, 458 and 362 days. One cat with laryngeal SCC died of renal lymphoma after 51 days and the other with maxillary SCC died of a primary lung tumour 82 days after diagnosis. In both cats, the SCC was in complete remission. Only one cat developed metastases after 144 days. These encouraging preliminary results merit further evaluation in future trials.

Magnetic resonance (MR) imaging and MR cholangiopancreatography findings in cats with cholangitis and pancreatitis.


Marolf, A. J., S. L. Kraft, T. R. Dunphy, and D. C. Twedt

Cholangiohepatitis/cholangitis is second only to hepatic lipidosis as the most common liver disease in cats and is often associated with concurrent pancreatitis. Magnetic resonance imaging (MRI) and MR cholangiopancreatography (MRCP) have developed into an accurate, highly sensitive and specific imaging tool for the diagnosis of biliary and pancreatic duct disorders in humans. In this prospective case series, 10 cats with suspected cholangitis and/or pancreatitis were enrolled based on clinical history, physical examination and appropriate diagnostic test results. MRI and MRCP sequences with secretin stimulation of the cranial abdomen were performed, and sonography and laparoscopic biopsies for histologic diagnosis were obtained for comparison. MRI detected pancreatic abnormalities in cats suspected of pancreatitis, including T1 pre-contrast hypointense and T2 hyperintense pancreatic parenchyma and a dilated pancreatic duct. The MRI findings of the liver were non-specific. Nine of 10 cats had biliary abnormalities, including gall bladder wall thickening, gall bladder wall moderate contrast enhancement and/or gall bladder debris. Eight of 10 cats had histologic evidence of pancreatitis, as well as hepatitis or cholangitis, with one cat diagnosed with hepatic lymphoma. The advantages of MRI/MRCP over sonography of these cats included the striking pancreatic signal changes associated with pancreatitis and the ability to comprehensibly assess and measure the pancreas and hepatobiliary structures without operator dependence or interference from bowel gas. MRI/MRCP imaging of the feline abdomen may be beneficial in cases with equivocal ultrasound imaging findings.

Intramuscular glargine with or without concurrent subcutaneous administration for treatment of feline diabetic ketoacidosis.


Marshall, R. D., J. S. Rand, M. N. Gunew, and V. H. Menrath

OBJECTIVE: To describe treatment response and outcome in 15 cats with diabetic ketoacidosis (DKA) initially stabilized with glargine administered intramuscularly (IM) with or without subcutaneous (SC) glargine. MATERIALS AND METHODS: Fifteen cats diagnosed with DKA were initially administered IM glargine (1-2 U) and in most cats (12/15 cats) this was combined with SC glargine (1-3 U). This was followed by intermittent IM glargine as required at intervals of 2 or more hours (range 2-22 h) and SC glargine (1-2 U) every 12 hours. KEY FINDINGS: All 15 cats survived and were discharged from hospital (median 4 d; range 2-5 d) and one-third (5/15) of cats subsequently achieved remission (median time 20 d; range 15-29 d). Complications included hypokalemia and hypophosphatemia, which were likely the result of DKA therapy rather than glargine treatment specifically. SIGNIFICANCE: This study demonstrates that glargine administered IM is an effective treatment for DKA in cats, and may provide an alternative to regular insulin. The same vial
Comparison of high-definition oscillometry -- a non-invasive technology for arterial blood pressure measurement -- with a direct invasive method using radio-telemetry in awake healthy cats.
This study compared indirect blood pressure measurements using a non-invasive method, high-definition oscillometry (HDO), with direct measurements using a radio-telemetry device in awake cats. Paired measurements partitioned to five sub-ranges were collected in six cats using both methods. The results were analysed for assessment of correlation and agreement between the two methods, taking into account all pressure ranges, and with data separated in three sub-groups, low, normal and high ranges of systolic (SBP) and diastolic (DBP) blood pressure. SBP data displayed a mean correlation coefficient of 0.92 +/- 0.02 that was reduced for low SBP. The agreement level evaluated from the whole data set was high and slightly reduced for low SBP values. The mean correlation coefficient of DBP was lower than for SBP (ie, 0.81 +/- 0.02). The bias for DBP between the two methods was 22.3 +/- 1.6 mmHg, suggesting that HDO produced lower values than telemetry. These results suggest that HDO met the validation criteria defined by the American College of Veterinary Internal Medicine consensus panel and provided a faithful measurement of SBP in conscious cats. For DBP, results suggest that HDO tended to underestimate DBP. This finding is clearly inconsistent with the good agreement reported in dogs, but is similar to outcomes achieved in marmosets and cynomolgus monkeys, suggesting that this is not related to HDO but is species related. The data support that the HDO is the first and only validated non-invasive blood pressure device and, as such, it is the only non-invasive reference technique that should be used in future validation studies.

Impact of demographic characteristics in pet ownership: modeling animal count according to owners income and age.
Pet owner characteristics such as age, gender, income/social class, marital status, rural/urban residence and household type have been shown to be associated with the number of owned pets. However, few studies to date have attempted to evaluate these associations in Brazil. Accordingly, the aim of this study was to evaluate the association between age and income of owners and the number of owned dogs and cats in a Brazilian urban center. Pinhais, metropolitan area of Curitiba, Southern Brazil, the seventh largest city in Brazil, was chosen for this study. Questionnaires were administered door-to-door between January and February 2007 and data were analyzed by zero-inflated negative binomial (ZINB) models. A total of 13,555 of 30,380 (44.62%) households were interviewed. The majority (62.43%) of households reported having one or more dogs, with one or two dogs being the most common (29.97% and 19.71%, respectively). Cat ownership per household was much lower (P=0.001) than dog ownership, with 90% of the households reported having no owned cats. ZINB analyses indicated that income is not associated with the number of both dogs and cats among households that have pets. However, households from higher income categories were more likely to have dogs (but not cats) when compared to the lowest income category (P<0.05), contradicting a common belief that the poorer the family, the more likely they have pets. Certain age categories were significantly associated with the number of dogs or cats in households that have pets. In addition, most age categories were significantly associated with having dogs and/or cats (P<0.05). In conclusion, our study has found that age but not household income is associated with the number of dogs or cats in households that have pets; higher income households were more likely to have dogs when compared to low-income households.

Impact of free-ranging cats on wildlife.
Mathusa, M. S.
A simple and rapid method to differentiate Arthroderma benhamiae from Microsporum canis.
Mayser, P., and D. Budihardja

BACKGROUND: Arthroderma benhamiae is increasingly isolated in Central Europe. In culture, this dermatophyte is difficult to differentiate macroscopically from Microsporum canis, which is microscopically also true for weak or non-sporulating strains. Although there are valid molecular methods for differentiating between these two dermatophytes, in everyday practice it would be helpful for epidemiological and treatment considerations to have a simple and rapid method available for discrimination. METHODS: Five commercially available chromogenic agar media were incubated with culture material of M. canis and A. benhamiae of different ages (2-21 days). Their color was evaluated at different temperatures (4, 20, 25, and 30 \(\text{\degree}C\)) and for different incubation periods (2 hours - 7 days). RESULTS: Under the selected conditions, Candi-Select(TM) 4 was most suitable. All M. canis strains tested (n = 21) showed a pink or purple coloration of the agar, while 5 out of 6 A. benhamiae strains (n = 30) showed a turquoise coloration. The best results were achieved with an incubation temperature of 25 \(\text{\degree}C\) and small inocula derived from primary cultures. Results could be evaluated after 2-4 hours. CONCLUSIONS: In addition to searching for the origin of infection (in A. benhamiae almost exclusively guinea pigs, and for M. canis dogs and cats), distinguishing between the Trichophyton and Microsporum genera is most important, especially for the selection of a systemic antmycotic agent in the treatment of tinea capitis in children. In the case of M. canis terbinafine is not the first choice, but rather griseofulvin, fluconazole or itraconazole. We present a method of differentiation using Candi-Select(TM) 4. When done with a primary culture, this allows for presumptive identification within a few hours and thus prompt initiation of pathogen-specific therapy.

Samples with high virus load cause a trend toward lower signal in feline coronavirus antibody tests.

Measurement of feline coronavirus (FCoV) antibody titres is utilised mainly for diagnosing feline infectious peritonitis (FIP) and for quarantine purposes. However, occasional samples show a falsely low or negative FCoV antibody test. We tested the hypothesis that such results are due to virus in the sample binding antibody and rendering it unavailable to antigen in the test. Thirteen effusions, one plasma and three undefined samples from cats with FIP, which gave unexpectedly low FCoV antibody titres, were examined by real-time reverse transcriptase polymerase chain reaction (RT-PCR). Increasing amounts of virus correlated with lower signals in indirect immunofluorescent, enzyme-linked immunosorbent asssay and rapid immunomigration antibody tests. However, five samples were negative by RT-PCR, so the presence of virus alone may not explain all cases of false-negative FCoV antibody tests, although it is a possible explanation in 71% of discordant samples. We conclude that falsely low or negative FCoV antibody tests can occur in samples rich in virus.

Future challenges for parasitology: Vector control and ‘One health’ in Europe: The veterinary medicinal view on CVBDs such as tick borreliosis, rickettsiosis and canine leishmaniosis.
Mencke, N.
The medical as well as the veterinary importance of parasitic arthropods or ectoparasites in general terms, is characterized by the primary or secondary impact on the health of humans and companion animals alike. The parasitic arthropods addressed here are those ectoparasites belong to the class of insects, such as fleas and sand flies, or the subclass of acarids, such as ticks. These parasitic arthropods interact intensively with their hosts by blood feeding. Fleas, sand flies and ticks hold the vector capacity to transmit pathogens such as virus, bacteria or protozoa to cats, dogs and humans. The diseases caused by these pathogens are summarized under the terms canine vector-borne diseases (CVBD), feline vector-borne diseases (FVBD) or metazoonoses. In small animal practice, it is important to understand that the transmitted pathogen may either lead to a disease with clinical signs, or more often to asymptomatic, clinically healthy, or silent infections. Blocking of the vector-host interactions, the blood feeding and subsequently the transmission of pathogens during blood feeding is a key element of CVBD control. The focus of this review is on the current knowledge of the epidemiology of parasitic vectors
and three important CVBDs they transmit; rickettsiosis, tick borreliosis and canine leishmaniosis from a European perspective, and how veterinary medicine may contribute to the challenges of CVBDs and their control. Prevention of CVBDs is fundamentally based on ectoparasite control. Ectoparasite management in cats and dogs is important not only for the health and well-being of the individual companion animal but for public health in general and is therefore a perfect example of the ‘One health’ approach.

Seroprevalence of Encephalitozoon cuniculi in Wild Rodents, Foxes and Domestic Cats in Three Sites in the United Kingdom.
Transbound Emerg Dis (2013)
Meredith, A. L., S. C. Cleaveland, J. Brown, A. Mahajan, and D. J. Shaw
Encephalitozoon cuniculi is an obligate intracellular microsporidian that is the causal agent of encephalitozoonosis, an important and emerging disease in both humans and animals. Little is known about its occurrence in wildlife. In this study, serum samples from 793 wild rodents [178 bank voles (BV), 312 field voles (FV) and 303 wood mice (WM)], 96 foxes and 27 domestic cats from three study areas in the UK were tested for the presence of antibodies to E. cuniculi using a direct agglutination test (DAT). Seroprevalence in the wild rodents ranged from 1.00% to 10.67% depending on species (overall 5.31%) and was significantly higher in foxes [49.50% (50/96)]. None of the 27 cats sampled were found to be seropositive. This is the first report of seroprevalence to E. cuniculi in BV, FV, WM, foxes and cats in the UK and provides some evidence that foxes could act as sentinels for the presence of E. cuniculi in rodents. The study demonstrates that wildlife species could be significant reservoirs of infection for both domestic animals and humans.

Clinical, imaging, and pathologic characteristics of gurltia paralysans myelopathy in domestic cats from chile.
Gurltia paralysans is a rare metastrongylid nematode of domestic cats that is found mainly in the veins of the spinal cord subarachnoid space and parenchyma. Endemic regions for G. paralysans mainly include Chile and Argentina. The ante mortem diagnosis of gurltiosis is difficult and based primarily on neurological signs, epidemiological factors, and the exclusion of other causes of feline myelopathies. The purpose of this retrospective case series was to describe clinical, imaging, and pathologic characteristics in nine domestic cats naturally infected with G. paralysans. Imaging tests included radiography, myelography, computed tomographic myelography (myelo-CT), and magnetic resonance imaging (MRI). Neurological signs included paraparesis, paraplegia, pelvic limb ataxia and proprioceptive deficits, pelvic limb tremors, lumbosacral hyperesthesia, and tail trembling or atony. Complete blood count findings included a decrease in the mean corpuscular hemoglobin concentration value in eight cats. Eosinophilia in peripheral blood was observed in three cats, and thrombocytopenia was observed in three cats. Cerebrospinal fluid analysis revealed mononuclear pleocytosis in five cases. Myelo-CT showed diffuse enlargement of the spinal cord at the midthoracic, lumbar, and sacral regions in all cats. Magnetic resonance image findings in the thoracic and lumbar region demonstrated multiple small nodular areas of T2 hyperintensity in the periphery of the spinal cord parenchyma. Localized intraparenchymal areas of increased T2 intensity were also observed in the thoracolumbar spinal cord and lumbosacral conus medullaris. In conclusion, G. paralysans should be considered as a differential diagnosis for domestic cats in endemic regions that have this combination of clinical and imaging characteristics.

CD8+ clonality is associated with prolonged acute plasma viremia and altered mRNA cytokine profiles during the course of feline immunodeficiency virus infection.
Miller, M. M., E. M. Thompson, S. E. Suter, and J. E. Fogle
Acute lentiviral infection is characterized by early CD8(+) cytotoxic T cell (CTL) activity and a subsequent decline in plasma viremia. However, CD8(+) lymphocytes fail to eliminate the virus and a progressive T cell immune dysfunction develops during the course of chronic lentiviral infection. To further define this CD8(+) immune dysfunction we utilized PARR (PCR for antigen receptor rearrangements), a technique which measures clonally expanded lymphocyte populations by comparison of highly conserved T cell receptor (TCR) regions to identify the prevalence of clonal CD8(+) T cells
following FIV infection. We then compared phenotype, mRNA profiles, CD8(+) proliferation and plasma viremia during acute and chronic infection for PARR positive (PARR(+)) and PARR negative (PARR(-)) Feline Immunodeficiency Virus (FIV) infected cats. We demonstrated that approximately forty percent of the FIV(+) cats examined exhibit CD8(+) clonality compared to none of the FIV(-) control cats. There were no phenotypic differences between PARR(+) and PARR(-) CD8(+) lymphocytes from FIV(+) cats but retrospective analysis of plasma viremia over the course of infection revealed a delayed peak in plasma viremia and a decline in lymphocyte counts were observed in the PARR(+) group during acute infection. CD8(+) lymphocytes isolated from chronically infected PARR(-) cats exhibited significantly higher mRNA expression of IFN-gamma and IL-2 following mitogenic stimulation when compared to PARR(+) CD8(+) lymphocytes. These data suggest that clonal CD8(+) expansion may be related to impaired control of acute viremia and less effective CD8(+) anti-viral function. Using PARR to assess changes in CD8(+) clonality during the progression from acute to chronic FIV infection may help to better characterize the factors which contribute to CD8(+) anergy and lentiviral persistence.

Feline glycoprotein A repetitions predominant anchors transforming growth factor beta on the surface of activated CD4(+)CD25(+) regulatory T cells and mediates AIDS lentivirus-induced T cell immunodeficiency.
Miller, M. M., J. E. Fogle, P. Ross, and M. B. Tompkins

Using the feline immunodeficiency virus (FIV) model for AIDS-lentivirus infection, our laboratory has previously demonstrated that T regulatory (Treg) cell-mediated immune T and B cell dysfunction contributes to lentivirus persistence and chronic disease through membrane bound transforming growth factor beta (mTGFb). Studying Treg cells in the context of infection has been problematic as no inducible marker for activated Treg cells had been identified. However, recent reports in human Treg studies have described a novel protein, glycoprotein A repetitions predominant (GARP), as a unique marker of activated human Treg cells that anchros mTGFb. Herein we extend these studies to the feline Treg system, identifying feline GARP and demonstrating that human and feline GARP proteins are homologous in structure, expression pattern, and ability to form a complex with TGFb. We further demonstrate that GARP and TGFb form a complex on the surface of activated Treg cells and that these GARP(+)TGFb(+) Treg cells are highly efficient suppressor cells. Analysis of expression of this Treg activation marker in the FIV-AIDS model reveals an up-regulation of GARP expressing Treg cells during chronic FIV infection. We demonstrate that the GARP(+) Treg cells from FIV-infected cats suppress T helper cells in vivo and that blocking GARP or TGFb eliminates this suppression. These data suggest that GARP is expressed in complex with TGFb on the surface of activated Treg cells and plays an important role in TGFb(+) Treg-mediated T cell immune suppression during lentivirus infection.

Cardiac disease in dogs and cats: is breed screening the answer?
Mills, G.

Feline sporotrichosis: Histopathological profile of cutaneous lesions and their correlation with clinical presentation.
Miranda, L. H., F. Conceicao-Silva, L. P. Quintella, B. P. Kuraiem, S. A. Pereira, and T. M. Schubach

Cutaneous lesions of feline sporotrichosis show high fungal load and are associated with severe disease and elevated zoonotic potential. The present study describes the histopathology and fungal load of the lesions in different clinical presentations of feline sporotrichosis. Cats with sporotrichosis were separated into groups L1, L2 and L3 (lesions in one, two and three or more locations, respectively) and subjected to skin biopsies for histopathology. Eighty-six cats were included in the study. Lesions were suppurative granulomatous in 84 cases and poorly formed granulomas were predominant. The well-formed granulomas were associated with group L1. The high fungal load was predominant in group L3 and in poorly formed granuloma cases and did not occur in well-formed granulomas cases. The good general condition was associated with low fungal load. These findings suggest that the fungal load control in animals with more localized lesions and well-organized response is linked with the improvement in the outcome of infected cats.
Macroparasite communities in stray cat populations from urban cities in Peninsular Malaysia.
Vet Parasitol (2013)
Mohd Zain, S. N., N. Sahimin, P. Pal, and J. W. Lewis
The occurrence of macroparasites was studied from 543 stray cats in four urban cities from the west (Kuala Lumpur), east (Kuantan), north (Georgetown) and south (Malacca) of Peninsular Malaysia from May 2007 to August 2010. Five ectoparasites species were recovered namely, Ctenocephalides felis, Felicola subrostratus, Haemaphysalis bispinosa, Heterodoxus spiniger and Lynxacarus radovskyi. Two cats from Georgetown were infested with the dog louse, H. spiniger and this represented the first host record for this species in Malaysia. Up to nine species of helminths were recovered with overall high prevalences of infection of 83% in Kuantan, followed by 75.1% in Kuala Lumpur, 71.6% in Georgetown and 68% in Malacca. The helminth species comprised five nematodes, Toxocara malaysiensis, Toxocara cati, Ancylostoma braziliensis, Ancylostoma ceylanicum, Physaloptera praeputialis, two cestodes Taenia taeniaeformis, Dipylidium caninum and one trematode, Platyonosomum fastosum. The majority of helminths were present in the four study sites except for the absence of P. praeputialis in Kuala Lumpur. The prevalence and abundance of infections were analysed taking intrinsic (host age and sex) and extrinsic (season) factors into consideration. Levels of infection and infestation were mainly influenced by host age and to a lesser extent sex and season, whereas four nematode species exhibited significant interactions within the intestine of the cat host. The potential for transmission of some macroparasite species from stray cats to the human population in urban areas is discussed.

Clinical signs, MRI features and outcome in two cats with thiamine deficiency secondary to diet change.
Moon, S. J., M. H. Kang, and H. M. Park
Two cats were presented with vestibular signs and seizure. Both cats were diagnosed with thiamine deficiency. The transverse and dorsal T2-weighted MR images revealed bilateral, hyperintense lesions at the specific nuclei of the midbrain, cerebellum and brainstem. After thiamine supplementation, the clinical signs improved gradually and repeated MR images three weeks after starting thiamine supplementation showed that the lesions were nearly resolved. This case report demonstrated clinical and MR findings regarding thiamine deficiency in two cats.

Extranodal lymphoma in the cat: prognostic factors and treatment options.
Moore, A.
PRACTICAL RELEVANCE: The majority of feline lymphoma is extranodal. While the gastrointestinal (GI) tract is the most commonly affected site, non-GI extranodal lymphomas, which are the focus of this review, account for a large proportion of lymphomas in cats. This article discusses prognostic factors for the most common of these extranodal lymphomas, both in general terms and specifically for individual sites. CLINICAL CHALLENGES: Prognostic factors remain poorly defined for feline lymphoma. Many cats with extranodal lymphoma have stage I disease at an accessible site. A major question for patients with apparently localised extranodal lymphoma is whether the tumour can be treated with localised therapy alone or requires systemic treatment as well. Again there is often no specific information available for a particular site, such as a localised intramuscular lymphoma. Instead, reliance must be placed on careful patient staging, particularly if local therapy alone is planned. EVIDENCE BASE: Until such time as further studies looking at stage, anatomic site, histological grade and immunophenotype are available to assist treatment decision making for an individual cat with extranodal lymphoma, it seems reasonable to draw inferences from other common extranodal sites for which more specific information exists, such as nasal lymphoma.

Quantifying sources of environmental contamination with Toxocara spp. eggs.
Morgan, E. R., D. Azam, and K. Pegler
A rich body of work has reported levels of infection with Toxocara species in definitive hosts, and the frequency of eggs in
the environment, in many different regions and situations. These have greatly increased our understanding of the relationship between egg excretion from companion and wild animals and the risk of human infection by inadvertent ingestion of eggs from soil and other environmental reservoirs. Nevertheless, it is difficult to compare studies directly because of vagaries in sampling and laboratory methods, a preponderance of prevalence rather than abundance data, and a lack of studies that systematically sample different sympatric definitive host populations. Such comparisons could be instructive, for example to determine the relative contributions of different definitive host populations and categories to environmental contamination in specified areas, and hence guide priorities for control. In this article we use estimates of host density and infection levels in the city of Bristol, UK, as a case study to evaluate the relative contribution of sympatric cats, dogs and foxes to overall environmental contamination with eggs. Results suggest that dogs, especially those less than 12 weeks of age, dominate total egg output, but that this is modified by degree of access to public areas and removal of faeces, such that foxes could take over as the primary source of eggs. Results and conclusions are likely to differ among specific locations. The general aim is to show how an improved quantitative framework for epidemiological studies of Toxocara spp. egg contamination can help to advance understanding and the effectiveness of control strategies in future.

Five observations of a third morphologically distinct feline Demodex mite.
Vet Dermatol (2013)
Moriello, K. A., S. Newbury, and H. Steinberg
BACKGROUND: Feline demodicosis is caused by infestation with Demodex cati and/or Demodex gatoi. These two mites have distinctive morphological appearances. OBJECTIVES: To describe five observations of a morphologically distinct feline Demodex mite in 10 cats. All cats were in or adopted from an animal shelter. RESULTS: A mite with blunted ends longer than D. gatoi but shorter than D. cati was observed in one or multiple cats from animal shelters. Mean mite size was 139 +/- 4.5 mum (n = 41 mites). Similar features among the cases included a history of recent recovery or presence of concurrent illness at the time of diagnosis. Pruritus was variable. Hairs were easily epilated in large amounts, and mites were found on either skin scrapings or hair trichograms; mites were most commonly found on the proximal third of hairs examined via trichogram. CLINICAL IMPORTANCE: Reports of this mite are uncommon but when present tend to be in cats with concurrent illnesses. Awareness of this mite morphology will hopefully provide other investigators with specimens for molecular testing to determine whether this is a third species or a variant of D. gatoi or D. cati.

Mammary tumours in the cat: size matters, so early intervention saves lives.
Morris, J.
PRACTICAL RELEVANCE: Mammary tumours are among the most common neoplasms in both cats and dogs, but the prevalence of malignant histological types is far higher in cats (ratio of malignant:benign is at least 4:1). CLINICAL CHALLENGES: The more aggressive nature of mammary neoplasia in cats poses challenges for management. Prognosis is affected by tumour size and, therefore, early recognition and treatment of mammary tumours is paramount. Although the primary tumour can be excised surgically, no studies have shown that chemotherapy significantly extends survival time; hence, metastatic spread remains an important clinical problem. PATIENT GROUP: Mammary tumours usually affect older female cats, mainly entire females. Siamese and Oriental breeds may be predisposed. Male cats can develop mammary neoplasia, but this is rare. EVIDENCE BASE: This review summarises the current literature relating to aetiology, pathology, presentation, diagnosis, staging, treatment and prognosis of feline mammary tumours.

Treating permethrin poisoning in cats.
Muentener, C. R., C. Spicher, and S. W. Page

Genomic characterization of Felis catus papillomavirus-3: A novel papillomavirus detected in a feline Bowenoid in
There is increasing evidence that papillomaviruses (PVs) may cause skin cancer in cats. Neoplasms most frequently contain Felis domesticus PV type 2 (FdPV-2) DNA, but other PV DNA sequences have also been detected suggesting multiple PVs could cause disease. One of these sequences, FdPV-MY2, was previously detected in 5 of a series of 70 feline skin cancers. The aim was to determine the genome sequence of this PV. Using the circular nature of PV DNA, ‘outward facing’ primers specific for FdPV-MY2 were designed and amplified a 7300bp length of DNA from a feline Bowenoid in situ carcinoma (BISC) that showed microscopic evidence of a viral etiology and tested positive for FdPV-MY2 DNA. The PCR product was sequenced using next generation sequencing technology. The full genomic sequence of the virus, comprising 7583bp, was assembled and analyzed. As this is the third PV from a domestic cat, the virus was designated Felis catus PV type 3 (FcaPV-3). Consistent with other PVs, the putative coding regions of FcaPV-3 were predicted to produce 6 early proteins and 2 late ones. Classification was difficult as the virus contained over 60% nucleotide similarity within the ORF L1 with PVs from 3 different genera. However, based on phylogenetic analysis of ORF L1, FcaPV-3 was most closely related to the tau-PVs CPV-2 and CPV-7. As FcaPV-3 has over 60% nucleotide similarity with the ORF L1 of both tau-PVs, it is proposed that FcaPV-3 is classified in the genus Taupapillomavirus and is the first non-canine PV in this genus.

A case of combined bilothorax and bile peritonitis secondary to gunshot wounds in a cat.
Murgia, D.
This report describes a case of bile peritonitis and bilothorax associated with diaphragmatic laceration secondary to gunshot wounds in a cat. Surgical treatment comprising cholecystectomy, placement of a chest tube for thoracic lavage and tube feeding led to an uneventful recovery. Bilothorax and bile peritonitis are a rare presentation in cats. There are only four cases reported in the literature and combined bilothorax and bile peritonitis secondary to gunshot lesion has not been documented before. This report describes positioning of the chest tube for pleural lavage through the diaphragmatic defect created by a pellet’s trajectory. The tube was then allowed to exit the laparotomy incision instead of exiting the thoracic wall.

Cutaneous squamous cell carcinoma in the cat: current understanding and treatment approaches.
Murphy, S.
PRACTICAL RELEVANCE: Squamous cell carcinoma (SCC) is a tumour that commonly involves the skin or oral cavity and is, therefore, an important differential diagnosis for any cutaneous lesion(s), especially any non-healing scabbing lesions on the eyelids, nasal planum or ears of light-coloured cats. CLINICAL CHALLENGES: Superficial lesions of the nasal planum, discrete small eyelid lesions and lesions on the tips of pinnae are relatively easily treated, but higher stage lesions are more challenging to manage and may compromise the cosmetic appearance of the cat. AUDIENCE: This review article is aimed at all veterinary practitioners that see cats. EVIDENCE BASE: The review summarises the peer-reviewed literature relating to our understanding of feline cutaneous SCC. Unfortunately, the literature is limited and in need of updating in areas.

Doing our best for cats with cancer.
Murphy, S.

Ultrastructural characterization of male and female Physaloptera rara (Spirurida: Physalopteridae): feline stomach worms.
Physaloptera rara (Spirurida: Physalopteridae) has been found in dogs, coyotes, raccoons, wolves, foxes, cats, and bobcats in North America. The parasites’ developmental cycles involve insects, including beetles, cockroaches, and crickets, as intermediate hosts. The nematodes firmly attach to the wall of the stomach and duodenum, where they feed on the mucosa and suck blood. Frequent movement of these nematodes results in erosions and ulcers in the gastrointestinal tract. The present study reports the morphological features of adult P. rara using scanning electron microscopy. Adult worms were removed from the stomach of an infected domestic cat. Male and female worms measured 25-29 and 27-41 mm, respectively. The worms were stout and the cuticle was reflected over the lips to form a large cephalic collarate with fine transverse striations. The worms possessed two large, simple triangular lateral pseudolabia, each armed with one external tooth, three internal teeth, two submedian cephalic papillae, an amphid, and three porous-like circumscribed regions. The internal margins of the lips had a pair of cuticular folds. At the anterior end of both male and female worms, an excretory pore was located on the ventral side and a pair of lateral ciliated cervical papillae was seen. The vulva was anterior to the middle of the body of female worms. The tail ends of the female worms were stumpy, with two large phasmids near their extremities. The males’ tails bore large lateral alae. Ventral ornamentation, in male worms, was composed of three different cuticular patterns; cobblestone-like formations, longitudinal cuticular ridges, and rows of bead-like structures. The spicules were unequal and dissimilar; the right spicule had a thick end and the left spicule had a sharp tip. At the posterior end of the males, four pairs of stalked precloacal papillae, three pairs of postcloacal papillae, and two phasmids were present. Three and four sessile papillae were seen directly anterior and posterior to the cloaca, respectively. The middle papilla of the three sessile papillae, directly anterior to cloaca was different in shape and size.

Nagore, L., C. Soler, L. Gil, I. Serra, G. Soler, and J. I. Redondo
The purpose of this study was to assess the clinical effects of dexmedetomidine, both alone and combined with pethidine or butorphanol, in cats. A prospective randomized blind study was performed. Thirty cats were randomly assigned to three groups of 10 animals: D: dexmedetomidine (20 mug/kg IM); DP: dexmedetomidine (10 mug/kg IM) and pethidine (2.5 mg/kg IM); DB: dexmedetomidine (10 mug/kg IM) and butorphanol (0.4 mg/kg IM). Quality of sedation, analgesia, muscle relaxation and the possibility of performing some clinical procedures were compared using a multifactorial scale. Sedation, analgesia and muscle relaxation increased progressively over time and did not differ in the three protocols. The three protocols facilitated the completion of several clinical procedures. The clinical variables studied showed a similar behaviour in the three protocols and remained close to the baseline, except for a drop in heart rate in protocol D. In conclusion, dexmedetomidine, either alone or combined with pethidine or butorphanol, offers suitable sedation, analgesia and relaxation to perform various clinical procedures in cats.

Carpal joint injuries in cats - an epidemiological study. Vet Comp Orthop Traumatol (2013) 26
Nakladal, B., F. Vom Hagen, M. Brunnberg, M. Gross, H. Nietz, and L. Brunnberg
Objective: Injuries of the carpal joint are rare in cats. The most common cause is a fall from a height, known as ‘high-rise syndrome’. So far, only limited data about carpal joint injuries (CJI) in cats are available. The aim of this study was to investigate the epidemiology, aetiology, location, and type of CJI in cats. Methods: Case records of cats diagnosed with CJI between 1998 and 2010 were retrospectively analysed. Data concerning signalment, history and type of CJI, accompanying systemic injuries and further orthopaedic injuries were collected. Results: During the study period, 73 cats were diagnosed with CJI (87 injured carpal joints) and the prevalence in our hospital population was 0.26% (73 out of 28,482). Cats with CJI were more likely to be presented in the period from April-October (85%, p = 0.003) compared with the rest of the year. Carpal joint injuries were caused by a fall from a height in 72.6% of the cases. Of all carpal joints, the antebrachiocarpal joint was predominantly injured (50.6%, p = 0.001) and this was commonly caused by a fall from the fourth floor or higher (p = 0.002). The carpometacarpal joint was predominantly affected by a fall from heights up to the third floor (p = 0.004). Clinical significance: The data of this study confirm previous data with respect to time of occurrence and cause of injury. Of note, the height of the fall appears to influence the location of the injury within the carpus of cats.

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[Comparison of projection radiography and computed tomography for the detection of pulmonary nodules in the dog and cat].


Niesterok, C., C. Kohler, E. Ludewig, M. Alef, G. Oechtering, and I. Kiefer

Objective: The aim of our study was to evaluate the value of projection radiography as a standard screening method for the detection of lung nodules compared to computed tomography (CT). Furthermore, we attempted to describe the reasons that might lead to a failed detection of pulmonary nodules in radiography. Materials and methods: From dogs and cats which were diagnosed in CT (multislice CT) with nodular changes in the lung pattern we selected radiographs (projection radiography with soft copy reading) in at least two projection planes produced in the same timeframe as the CT images. Exclusion criteria were nodules > 3 cm and homogenously calcified nodules (osteomata). A total of 70 animals (50 dogs and 20 cats) met the inclusion criteria. Results: In 43 animals (61%), nodular changes had already been detected using radiography and were then confirmed by the results of the computed tomography. In detail, 32 of 50 dogs (64%) and 11 of 20 cats (55%) showed nodular lesions in the radiographs. In cats, undetected nodules were often accompanied by highly changed lung opacities, resulting in a poor contrast of the lung. In dogs the reasons for a failed detection of lung nodules were relatively equally distributed to several causes. Interestingly, small nodule size itself was not the predominant reason for missing the nodules in radiographs. Conclusion and clinical relevance: In general, radiography still plays an important role as a screening method for the detection of nodular lung lesions. However, one needs to be aware, that a quite high percentage of nodular lung changes can be missed in radiographs. The overall detection rate in this study was 61%. Furthermore, we showed that plane radiographs are of poor diagnostic value when concurrent problems exist which lead to increased lung opacity.

ACCURACY OF CT AND MRI FOR CONTOURING THE FELINE OPTIC APPARATUS FOR RADIATION THERAPY PLANNING.

Vet Radiol Ultrasound (2013)


Consistency and accuracy in normal tissue contouring in radiotherapy planning is important for comparison of dosimetry and toxicity data between studies. The purpose of this study was to determine whether magnetic resonance imaging (MRI) improves the accuracy of optic apparatus contouring as compared with computed tomography (CT) in both normal and acromegalic cats, and to construct a reference contour of the feline optic apparatus. Both CT and MRI were performed on cadavers of four healthy cats, as well as on five radiotherapy patients with feline acromegaly. Contours of the optic apparatus were drawn for each imaging study. The volume, center of mass, and the degree of concordance and mismatch were determined for each, and compared with a reference standard. Precontrast CT was found to overestimate volume as compared with MRI in acromegalic cats; no other statistically significant differences were identified in the volume, concordance index or mismatch index values of normal or acromegalic cats. Contours derived from T2-weighted MRI were subjectively considered to best match the reference standard. The caudal margin of the optic chiasm and the optic tracts were difficult to confidently contour regardless of which imaging modality and/or sequence was used. In conclusion, findings from the current study supported the use of a combination of CT and MR images and a priori knowledge of the shape of the optic apparatus to guide accurate contouring, especially where image contrast is not sufficient to clearly delineate the margins. Guidelines for feline optic apparatus contouring developed in this study can be used for future studies.

Development of SNP markers identifying European wildcats, domestic cats, and their admixed progeny.


Nussberger, B., M. P. Greminger, C. Grossen, L. F. Keller, and P. Wandeler

Introgression can be an important evolutionary force but it can also lead to species extinction and as such is a crucial issue for species conservation. However, introgression is difficult to detect, morphologically as well as genetically. Hybridization with domestic cats (Felis silvestris catus) is a major concern for the conservation of European wildcats (Felis s. silvestris). The available morphologic and genetic markers for the two Felis subspecies are not sufficient to reliably detect hybrids beyond first generation. Here we present a single nucleotide polymorphism (SNP) based approach that allows the identification of introgressed individuals. Using high-throughput sequencing of reduced representation libraries we
developed a diagnostic marker set containing 48 SNPs (Fst > 0.8) which allows the identification of wildcats, domestic cats, their hybrids and backcrosses. This allows assessing introgression rate in natural wildcat populations and is key for a better understanding of hybridization processes.

**Complete genome sequence of the feline calicivirus 2280 strain from the american tissue culture collection.**

*Genome Announc (2013) 1*

Oka, T., H. Takagi, L. J. Saif, and Q. Wang

Feline calicivirus (FCV) is a highly contagious pathogen of cats that can be grown in cultured cells. FCV is used as a model to study nonculturable caliciviruses, such as noroviruses. We determined the complete genome sequence of the FCV 2280 strain from the American Tissue Culture Collection.

**Veterinary and public health aspects of Toxocara spp.**


Overgaauw, P. A., and F. van Knapen

Pet dogs and cats can play an important role in the transmission of zoonotic nematodes such as Toxocara canis and Toxocara cati, by excreting eggs directly into the human environment, without the involvement of vectors or intermediate hosts. Human toxocarosis remains a hazard despite the availability of highly effective anthelmintics for dogs and cats. A good understanding of the biology and epidemiology of these parasites, and the risk factors that lead to their transmission to humans is required for effective prevention strategies. In this respect, the maintenance of high quality continuing education for veterinarians and the provision of suitably presented information to pet owners are of priority importance. A closer collaboration between veterinary and public health professionals within the ‘One Health’ concept is also required.

**Safety and efficacy of spinosad chewable tablets for treatment of flea infestations of cats.**


OBJECTIVE: To compare safety and efficacy of spinosad and selamectin and determine effects of those products on flea allergy dermatitis (FAD) in cats. DESIGN: Randomized clinical trial. Animals-211 client-owned cats. PROCEDURES: Cats with >/= 5 fleas evaluated at 8 veterinary clinics were allocated to receive spinosad (50 to 100 mg/kg [22.7 to 45.5 mg/lb], PO; n = 139) or selamectin (>/= 6 mg/kg [>/= 2.7 mg/lb], topically; 72) once per month. Flea comb counts and FAD scores were determined on day 1, between days 27 and 33, and between days 85 and 95 (evaluations 1, 2, and 3, respectively); day 0 was the first day of drug administration. RESULTS: The most common adverse event was vomiting (14.3% and 2.4% of spinosad- and selamectin-treated cats, respectively). Evaluation 2 and 3 geometric mean flea counts for spinosad-treated cats were significantly lower than those for selamectin-treated cats. Percentage reductions in flea counts for the spinosad and selamectin groups were 97.5% and 88.8% (evaluation 2) and 99.3% and 97.7% (evaluation 3), respectively. At evaluations 2 and 3, 70.6% and 92.6% of spinosad-treated cats and 29.4% and 64.7% of selamectin-treated cats were free of fleas, respectively. Weighted FAD scores for spinosad- and selamectin-treated cats decreased 94.2% and 80.0% during the study, respectively. Spinosad tablets were successfully administered during 98.1% of treatments. CONCLUSIONS AND CLINICAL RELEVANCE: Results of this study indicated spinosad and selamectin both reduced flea counts and FAD scores for cats, although spinosad was more effective. Monthly oral administration of spinosad may be practical for treatment of flea infestations and FAD in cats.

**Treatment and long-term follow-up of cats with suspected primary epilepsy.**


Pakozdy, A., A. A. Sarchahi, M. Leschnik, A. G. Tichy, P. Halasz, and J. G. Thalhammer

We report an evaluation of the treatment and outcome of cats with suspected primary epilepsy. Phenobarbital therapy was used alone or in combination with other anti-epileptic drugs. Outcome after treatment was evaluated mainly on the basis of number of seizures per year and categorised into four groups: seizure-free, good control (1-5 seizures per year), moderate
control (6-10 seizures per year) and poor control (more than 10 seizures per year). About 40-50% of cases became seizure-free, 20-30% were considered good-to-moderately controlled and about 30% were poorly controlled depending on the year of treatment considered. The duration of seizure events after treatment decreased in 26/36 cats and was unchanged in eight cats. The subjective severity of seizure also decreased in 25 cats and was unchanged in nine cats. Twenty-six cats had a good quality of life, nine cats an impaired quality of life and one cat a bad quality of life. Despite being free of seizures for years, cessation of treatment may lead to recurrence of seizures in most cats.

Feline mammary carcinoma stem cells are tumorigenic, radioresistant, chemoresistant and defective in activation of the ATM/p53 DNA damage pathway.
Cancer stem cells were identified in a feline mammary carcinoma cell line by demonstrating expression of CD133 and utilising the tumour sphere assay. A population of cells was identified that had an invasive, mesenchymal phenotype, expressed markers of pluripotency and enhanced tumour formation in the NOD-SCID mouse and chick embryo models. This population of feline mammary carcinoma stem cells was resistant to chemotherapy and radiation, possibly due to aberrant activation of the ATM/p53 DNA damage pathway. Epithelial-mesenchymal transition was a feature of the invasive phenotype. These data demonstrate that cancer stem cells are a feature of mammary cancer in cats.

Development and validation of a microsatellite marker-based method for tracing infections by Microsporum canis.
BACKGROUND: Microsporum canis is a dermatophyte fungus harbored by cats and dogs and is frequently transmitted to humans. Molecular tools able to discriminate fungal isolates at the strain level would prove extremely useful for confirming the route of infection, thus contributing to optimization of prophylaxis and hygienic regimens. OBJECTIVE: To develop and validate a microsatellite marker-based method for use in tracking infections by M. canis. METHODS: Primers were designed against sequences flanking the microsatellites individuated by a BLAST search using the nucleotide sequence information assembled by the M. canis CBS 113480 genome project. The PCR conditions were standardized and fragment analysis was performed using a genetic analyzer. The resolving power of the markers was investigated on 26 unrelated M. canis strains while the reproducibility of the technique and the stability of the markers were evaluated on a single strain subcultured in time as well as on 36 strains isolated from nine outbreak episodes. RESULTS: Eight markers were recognized as being the most polymorphic within the set of M. canis strains isolated from unrelated distant hosts, with a total of 22 multilocus genotypes, which corresponded to a genotypic diversity of 97%. Repeated tests on subcultures of M. canis reference strain CBS 113480 always yielded the same results. Identical multilocus genotypes were obtained for all the isolates from each outbreak episode. CONCLUSION: The high resolving power and reproducibility of the markers that were identified support the potential of these tools to detect sources and routes of infection by M. canis.

Monitoring and treating chronic pain in cats: bring on the challenge!
Pelligand, L., and P. Lees

More answers needed on congenital portosystemic shunts in dogs and cats.
Philbey, A. W.
Phase I Clinical Trial of Vinorelbine in Tumor-Bearing Cats.


Pierro, J. A., C. L. Mallett, and C. F. Saba

BACKGROUND: Vinorelbine (VRL) has been investigated in dogs, but its use in cats has not been studied.

HYPOTHESIS/OBJECTIVES: To determine the maximal tolerated dose (MTD) and dose-limiting toxicity (DLT) of VRL in tumor-bearing cats. ANIMALS: Cats were included in this prospective phase I trial if they had confirmed malignancy, received >/=1 VRL treatment, and had adequate follow-up. Previous treatment was acceptable, but concurrent chemotherapy or radiotherapy was not permitted. METHODS: Using a modified phase I design, cats were enrolled in cohorts of 3 at a starting dosage of 9 mg/m². Cats tolerating the first treatment well were eligible to receive additional VRL treatments at escalating dosages; escalations beyond the perceived MTD were permitted based on individual tolerance. Intended treatment interval was 7 days. Patient histories, physical examinations, and complete blood counts were performed weekly. RESULTS: Nineteen cats were included. Sixty-one VRL treatments were administered. Median number of treatments was 2 (range, 1-9). Starting dosages were 9-12 mg/m². Maximal dosage administered was 15.5 mg/m². The MTD was 11.5 mg/m². Acute DLTs were neutropenia, vomiting, and nephrotoxicity. Other notable toxicities were weight loss and anemia. CONCLUSIONS AND CLINICAL IMPORTANCE: Vinorelbine is tolerated in cats at a weekly interval. Recommended starting dosage is 11.5 mg/m². Neutropenia was transient, lasting <7 days; vomiting was self-limiting in most cases. Although VRL-associated nephrotoxicity has not been reported, potential attribution of this toxicity to VRL must not be discounted. Further investigation of the efficacy of VRL in feline malignancies is warranted.

Identification of feline panleukopenia virus proteins expressed in Purkinje cell nuclei of cats with cerebellar hypoplasia.


Parvoviruses depend on initiation of host cell division for their replication. Undefined parvoviral proteins have been detected in Purkinje cells of the cerebellum after experimental feline panleukopenia virus (FPV) infection of neonatal kittens and in naturally occurring cases of feline cerebellar hypoplasia. In this study, a parvoviral protein in the nucleus of Purkinje cells of kittens with cerebellar hypoplasia was shown by immunoprecipitation to be the FPV viral capsid protein VP2. In PCR-confirmed, FPV-associated feline cerebellar hypoplasia, expression of the FPV VP2 protein was demonstrated by immunohistochemistry in Purkinje cell nuclei in 4/10 cases and expression of the FPV non-structural protein NS1 was demonstrated in Purkinje cell nuclei in 5/10 cases. Increased nuclear ERK1 expression was observed in several Purkinje cells in 1/10 kittens. No expression of the G1 and S mitotic phase marker proliferating cell nuclear antigen (PCNA) was evident in Purkinje cell nuclei. These results support the hypothesis that FPV is able to proceed far into its replication cycle in post-mitotic Purkinje cells.

Opisthorchis felineus, an emerging infection in Italy and its implication for the European Union.


Pozio, E., O. Armignacco, F. Ferri, and M. A. Gomez Morales

The liver fluke Opisthorchis felineus is one of the few zoonotic trematodes that circulates in the European Union (EU). It is transmitted from freshwater snails to fish and then to fish-eating mammals, including humans, in which it causes opisthorchiasis. In the 20th century, the majority of infections in humans have been reported in Eastern Europe (e.g., Belarus, Russia, and Ukraine) and Asia (Siberia). In EU in the last fifty years, the parasite has been detected in humans of Germany and Greece, and in red foxes, polecats, cats, dogs, fish and mollusks of Germany, Italy, Poland, Portugal and Spain. In Italy, four individual cases and eight outbreaks of opisthorchiasis were reported from 2003 to 2011, for a total of 211 confirmed infections in humans. All infected persons had consumed raw fillets of tench (Tinca tinca) fished from two lakes in central Italy, but some of infected people were tourists who developed the disease in their respective home-countries. In the past decade, it has become increasingly popular to consume raw marinated fillets of fish. The objective of this review is to show how a change in human food habits have caused and increased the transmission of O. felineus, which has probably been circulating in the EU yet in a silent form for many years.
Assessment of blood types of Ragdoll cats for transfusion purposes.
BACKGROUND: Transfusion of compatible blood types ensures the vitality of transfused erythrocytes and avoids transfusion reactions. Cats with types A, B, and AB blood should receive transfusions of the same blood type. In a feline blood donor program, it is therefore essential to have blood donors of all blood types available. OBJECTIVES: The objectives of this study were the identification of the 3 feline blood types in Ragdoll cats, the comparison of their frequencies with those of Domestic Shorthair (DSH) cats, and the determination of whether Ragdolls are suitable donors in a feline blood donor program. METHODS: The blood type was determined by gel column agglutination from Ragdoll cats. The relationships between phenotypic traits, the origin of the cats, and the different blood types were examined. The frequencies for potential transfusion reactions and the risk for neonatal isoerythrolysis (NI) were estimated. RESULTS: Of 61 typed Ragdolls, 77.1% had type A, 4.9% type B, and 18% type AB blood. The frequency of blood type A in Ragdolls was lower than in DSH cats (P =.02), while the frequency of blood type AB in Ragdolls was higher than in DSH cats (P =.0002). No relationship was found between blood type and origin of the cat or phenotypic traits. The estimated frequencies of major and minor transfusion reactions following an unmatched transfusion between Ragdolls (donors and recipients), Ragdoll donors and DSH recipients, and DSH donors and Ragdoll recipients were 4.7%, 6.7%, 4.6%, and 18.5%, 20.8%, 7.6%, respectively. The frequency of kittens at risk for NI was 5%. CONCLUSION: The presence of all 3 feline blood types and a relatively high incidence of AB type cats make Ragdolls an ideal donor breed to include in feline blood transfusion programs.

Feline chronic kidney disease is associated with shortened telomeres and increased cellular senescence.
Telomeres are protective structures at the ends of chromosomes that have important implications for aging. To address the question of whether telomeres contribute to feline chronic kidney disease (CKD), we evaluated kidney, liver and skin samples from 12 cats with naturally occurring CKD, 12 young normal cats and 6 old normal cats. Telomere length was assessed using standard telomere fluorescent in situ hybridization (TEL-FISH) combined with immunohistochemistry (TELI-FISH) to identify proximal (PTEC) and distal tubular epithelial cells (DTEC), while senescence-associated beta-galactosidase (SABG) staining was used to evaluate senescence. Results revealed statistically significant decreases in the average telomere fluorescence intensity (TFI) of PTEC in CKD cats compared to young and geriatric normal cats, and in the DTEC of CKD cats compared to young normal cats. When histograms of individual TFI were compared, statistically significant decreases in the PTEC and DTEC of CKD cats were observed compared to young and geriatric normal cats. Concomitantly, a statistically significant increase in SABG staining was seen in CKD kidney samples compared to young normal cats. CKD cats tended to have increased SABG staining in the kidney compared to normal geriatric cats, but this did not reach statistical significance. No significant telomere shortening in liver or skin from any group was observed. Real-time quantitative telomeric repeat amplification protocol (RTQ-TRAP) assessment of renal telomerase activity revealed comparable low levels of telomerase activity in all groups. Our results suggest that shortened telomeres and increased senescence in the kidneys of CKD cats may represent novel targets for interventional therapy.

Safety and efficacy of intravenous infusion of allogeneic cryopreserved mesenchymal stem cells for treatment of chronic kidney disease in cats: results of three sequential pilot studies.
Quinby, J. M., T. L. Webb, L. M. Habenicht, and S. W. Dow
INTRODUCTION: Administration of mesenchymal stem cells (MSCs) has been shown to improve renal function in rodent models of chronic kidney disease (CKD), in part by reducing intrarenal inflammation and suppressing fibrosis. CKD in cats is characterized by tubulointerstitial inflammation and fibrosis, and thus treatment with MSCs might improve renal function and urinary markers of inflammation in this disease. Therefore, a series of pilot studies was conducted to assess the safety and efficacy of intravenous administration of allogeneic adipose-derived MSCs (aMSCs) in cats with naturally occurring CKD. METHODS: Cats enrolled in these studies received an intravenous infusion of allogeneic aMSCs every 2 weeks collected from healthy, young, specific pathogen-free cats. Cats in pilot study 1 (six cats) received 2 x 106 cryopreserved
aMSCs per infusion, cats in pilot study 2 (five cats) received 4 x 10^6 cryopreserved aMSCs per infusion, and cats in pilot study 3 (five cats) received 4 x 10^6 aMSCs cultured from cryopreserved adipose. Serum biochemistry, complete blood count, urinalysis, urine protein, glomerular filtration rate, and urinary cytokine concentrations were monitored during the treatment period. Changes in clinical parameters were compared statistically by means of repeated measures analysis of variance (ANOVA) followed by Bonferroni’s correction. RESULTS: Cats in pilot study 1 had few adverse effects from the aMSC infusions and there was a statistically significant decrease in serum creatinine concentrations during the study period, however the degree of decrease seems unlikely to be clinically relevant. Adverse effects of the aMSC infusion in cats in pilot study 2 included vomiting (2/5 cats) during infusion and increased respiratory rate and effort (4/5 cats). Cats in pilot study 3 did not experience any adverse side effects. Serum creatinine concentrations and glomerular filtration rates did not change significantly in cats in pilot studies 2 and 3. CONCLUSIONS: Administration of cryopreserved aMSCs was associated with significant adverse effects and no discernible clinically relevant improvement in renal functional parameters. Administration of aMSCs cultured from cryopreserved adipose was not associated with adverse effects, but was also not associated with improvement in renal functional parameters.

Environmental, climatic, and residential neighborhood determinants of feline tularemia.
Abstract Background: Tularemia, caused by a Gram-negative bacterium Francisella tularensis, is an occasional disease of cats in the midwestern United States and a public health concern due to its zoonotic potential. Different environmental, climatic, and pet-owner’s housing and socioeconomic conditions were evaluated as potential risk factors for feline tularemia using Geographic Information Systems (GIS) in a retrospective case-control study. Methods: The study included 46 cases identified as positive for tularemia based upon positive immunohistochemistry, isolation of F. tularensis using bacterial culture, and 4-fold or greater change in serum antibody titer for F. tularensis. Cats with a history of fever, malaise, icterus, and anorexia but no lesions characteristic of tularemia and/or negative immunohistochemistry, no isolation of bacteria in bacterial culture, and less than 4-fold raise in serum antibody titer for F. tularensis were treated as controls (n=93). Candidate geospatial variables from multiple thematic sources were analyzed for association with case status. Variables from National Land Cover Dataset, Soil Survey Geographic Database, US Census Bureau, and Daymet were extracted surrounding geocoded case-control household locations. Univariable screening of candidate variables followed by stepwise multivariable logistic modeling and odds ratios were used to identify strengths of variable associations and risk factors. Results: Living in a residence located in newly urbanized/suburban areas, residences surrounded by areas dominated by grassland vegetation, and mean vapor pressure conditions recorded during the 8(th) week prior to case arrival at the hospital are significant risk factors for feline tularemia. Conclusions: Prevention strategies such as acaricide applications in residential backyards during spring and early summer periods and any behavior modifications suitable for cats that will prevent them from contracting infection from ticks or dead animals are necessary. Mean vapor pressure conditions recorded during the 8(th) week prior to case arrival at a diagnostic facility is a predictor for feline tularemia.

Intrapancreatic ectopic splenic tissue in dogs and cats.
Ramirez, G. A., J. Altimira, B. Garcia-Gonzalez, and M. Vilafranca
Ectopic splenic tissue in the pancreas is a rare incidental finding in man that is often mistaken for pancreatic neoplasia. This condition is documented rarely in animals. This report describes the clinical and pathological features of four cases of intrapancreatic accessory spleens in dogs and cats. This is the first description of this lesion in the dog. The lesions comprised firm, well-demarcated, dark red, spherical masses that were composed microscopically of normal splenic tissue. The possible origin, differential diagnoses and potential practical significance of these lesions are discussed.

Sedation of hyperthyroid cats with subcutaneous administration of a combination of alfaxalone and butorphanol.
Ramoo, S., L. A. Bradbury, G. A. Anderson, and L. A. Abraham
OBJECTIVE: To evaluate the sedative, respiratory and cardiovascular effects of subcutaneously administered alfaxalone
and butorphanol in a group of hyperthyroid cats. DESIGN: A prospective, single-centre observational study. METHODS: Client-owned hyperthyroid cats (n=20) were examined and sedated with alfaxalone (3 mg/kg) and butorphanol (0.2 mg/kg) administered subcutaneously. Sedation scores, heart rate, respiratory rate and blood pressure were measured at 15-min intervals during the 45-min observation period and compared with pre-sedation values. At the end of 45 min, cats were assessed to be adequately sedated for oral administration of iodine-131 if there was minimal resistance and an intact gag reflex. RESULTS: The maximum median sedation score was reached 45 min after injection. The lowest mean heart and respiratory rates and blood pressure values occurred 30 min after injection. Significant decreases were noted in respiratory rates at all three time points (P<0.001). Systolic, diastolic and mean blood pressure measurements were also significantly decreased at 15 and 30 min after injection (P<0.05). CONCLUSION: Subcutaneously administered alfaxalone and butorphanol can be used for sedation in cats undergoing procedures of short duration. Blood pressure should be monitored because of transient decreases observed in some cats. Further studies are required to determine whether the sedative, respiratory and cardiovascular effects are similar in euthyroid cats.

18F-fluorodeoxyglucose positron emission tomography combined with computed tomography (18FDG-PET/CT) has been shown to be effective for staging human oral squamous cell carcinoma (SCC) but its application for cats with oral SCC is unknown. Twelve cats with biopsy-proven oral SCC were imaged with whole body 18FDG-PET/CT to determine its value as a diagnostic imaging and staging tool and fine needle aspirates were obtained of accessible regional lymph nodes. All tumors were FDG avid and conspicuous on 18FDG-PET/CT images, with an average of the maximum standardized uptake value 9.88 +/- 5.33 SD (range 2.9-24.9). Soft tissue infiltrative tumors that were subtle and ill defined on CT were highly visible and more extensive on FDG-PET/CT. Tumors invading the osseous structures were more similar in extent on 18FDG-PET/CT and CT although they were more conspicuous on PET images. Three cytologically confirmed metastases were hypermetabolic on PET, while two of those metastases were equivocal on CT.


This article provides an overview of equipment used for oral surgery. Specific instruments and materials used when performing relevant operative procedures are also mentioned in other articles in this issue.

BACKGROUND: Increasing salt intake to promote diuresis has been suggested in the management of feline lower urinary tract disease. However, high dietary salt intake might adversely affect blood pressure and renal function. OBJECTIVES: The objective of this study was to assess the long-term effects of increased salt intake on renal function in healthy aged cats. METHODS: This study was controlled, randomized, and blinded. Twenty healthy neutered cats (10.1 +/- 2.4 years) were randomly allocated into 2 matched groups. One group was fed a high salt diet (3.1 g/Mcal sodium, 5.5 g/Mcal chloride) and...
the other a control diet of same composition except for salt content (1.0 g/Mcal sodium, 2.2 g/Mcal chloride). Clinical examination, glomerular filtration rate, blood pressure measurement, cardiac and kidney ultrasonography, and urinary and blood tests were performed before and after 24 months after diet implementation. Statistics were performed using a general linear model. RESULTS: Sixteen cats completed the 2 year study. The only variables affected by dietary salt intake were plasma aldosterone and urinary sodium/creatinine ratio, respectively, higher and lower in the control group all over the study period and urinary specific gravity, lower in the high salt diet group at 3 months. CONCLUSIONS AND CLINICAL IMPORTANCE: Glomerular filtration rate (GFR), blood pressure, and other routine clinical pathological variables in healthy aged cats were not affected by dietary salt content. The results of this 2 year study do not support the suggestion that chronic increases in dietary salt intake are harmful to renal function in older cats.

Experimental infection with Trichinella T12 in domestic cats.

Trichinella spiralis has been documented in wild animals in Argentina, including puma, armadillos, rats and wild boars. In 2008, molecular analysis identified Trichinella T12 from a naturally infected puma (Puma concolor) from Patagonia. The aim of the present work was to study the relationship between the infectivity and pathology of Trichinella T12 in the puma and in domestic cats, and the possible risks that may be present for transmission among these animals. Two cats (A and B) were orally-infected with 3300 and 1850 Trichinella T12 muscle larvae, respectively; one additional cat was used as a control. During the 54 days post-infection, a daily examination was performed which included monitoring body temperature, and cardiac and respiration rates; the animals were then euthanized. Hematological studies included hematocrit ($\%$), hemoglobin (g/dl), and white cell, neutrophil, lymphocyte and eosinophil counts. Blood biochemistry included urea, creatinine, AST, ALT, CK, LDH and ALP. An ELISA assay was also performed. At necropsy, organs (liver, spleen, brain, cerebellum and kidney), nails and muscle samples were obtained for histopathology studies and artificial digestion. The muscles that were studied included the diaphragm, masseter, cutaneous, temporal, intercostals, lumbar, tongue, limbs, neck and tail. Clinical signs, such as anorexia, diarrhea, vomiting, shaggy hair, decay and muscle pain, were observed in both cats. The eosinophil counts were elevated in both cats A and B. Trichinella larvae were recovered from all of the muscles analyzed where the histopathology showed larvae in several muscles without degenerative reaction. Neither larvae nor lesions were observed in non-muscular organs. Cat A had a maximum of 246 larvae per gram (lpg) in the temporal muscle and a minimum of 80 lpg in the tongue, while cat B had a maximum of 65 lpg in muscles of the leg and a minimum of 10 lpg in tail muscles. This study represents the first record of experimental infection of cats with Trichinella T12.

Phylogenetic Analysis Reveals a High Prevalence of Sporothrix brasiliensis in Feline Sporotrichosis Outbreaks.

Sporothrix schenckii, previously assumed to be the sole agent of human and animal sporotrichosis, is in fact a species complex. Recently recognized taxa include S. brasiliensis, S. globosa, S. mexicana, and S. luriei, in addition to S. schenckii sensu stricto. Over the last decades, large epidemics of sporotrichosis occurred in Brazil due to zoonotic transmission, and cats were pointed out as key susceptible hosts. In order to understand the eco-epidemiology of feline sporotrichosis and its role in human sporotrichosis a survey was conducted among symptomatic cats. Prevalence and phylogenetic relationships among feline Sporothrix species were investigated by reconstructing their phylogenetic origin using the calmodulin (CAL) and the translation elongation factor-1 alpha (EF1alpha) loci in strains originated from Rio de Janeiro (RJ, n = 15), Rio Grande do Sul (RS, n = 10), Parana (PR, n = 4), Sao Paulo (SP, n = 3) and Minas Gerais (MG, n = 1). Our results showed that S. brasiliensis is highly prevalent among cats (96.9%) with sporotrichosis, while S. schenckii was identified only once. The genotype of Sporothrix from cats was found identical to S. brasiliensis from human sources confirming that the disease is transmitted by cats. Sporothrix brasiliensis presented low genetic diversity compared to its sister taxon S. schenckii. No evidence of recombination in S. brasiliensis was found by split decomposition or PHI-test analysis, suggesting that S. brasiliensis is a clonal species. Strains recovered in states SP, MG and PR share the genotype of the RJ outbreak, different from the RS clone. The occurrence of separate genotypes among strains indicated that the Brazilian S. brasiliensis epidemic has at least two distinct sources. We suggest that cats represent a major host and the main source of cat and human S. brasiliensis infections in Brazil.
Hyposialylated alpha1-acid glycoprotein inhibits phagocytosis of feline neutrophils.
Rossi, G., L. Capitani, F. Ceciliani, L. Restelli, and S. Paltrinieri
Feline alpha1-acid glycoprotein (fAGP) modifies both its serum concentration and its glycan moiety during diseases. fAGP is hyposialylated in cats with feline infectious peritonitis (FIP), but not in clinically healthy cats or in cats with other diseases. This study was aimed to determine whether hyposialylated fAGP influences phagocytosis. A flow cytometric method based on ingestion of fluoresceinated bacteria and adapted to feline blood was used to assess phagocytosis of leukocytes incubated with 'non-pathological' fAGP (purified from sera with normal concentrations of AGP) and 'pathological' fAGP (purified from sera with >1.5mg/mL hyposialylated AGP). The flow cytometric method provided repeatable results for neutrophils (coefficients of variations, CVs <15%) but not for monocytes (CVs>20%) which had also a high individual variability. Compared with saline solution and with non-pathological fAGP, pathological fAGP significantly decreased phagocytosis in neutrophils and monocytes. This study demonstrated that hyposialylated fAGP down-regulates the phagocytic activity of feline neutrophils.

Ingredients and foods associated with adverse reactions in dogs and cats.
Roudebush, P.

CLINICAL AND LOW-FIELD MRI CHARACTERISTICS OF INJECTION SITE SARCOMA IN 19 CATS.
Vet Radiol Ultrasound (2013)
Rousset, N., M. A. Holmes, A. Caine, J. Dobson, and M. E. Herrtage
Magnetic resonance imaging (MRI) has been recommended for staging and surgical planning in cats with injection site sarcomas (ISS). The purpose of this retrospective study was to describe low-field MRI characteristics of confirmed injection site sarcomas in a group of cats. Low-field MR images, thoracic radiographs, histopathology findings, and medical records of cats that fulfilled histological criteria of injection site sarcoma were retrieved and reviewed retrospectively. Presence or absence of tumor mineralization and pulmonary metastases were recorded from thoracic radiographs. Characteristics recorded from low-field MRI studies included tumor number, volume (ellipsoid method), intensity relative to surrounding musculature, homogeneity, regions of signal void (mineralization) or cavitation, degree and pattern of contrast enhancement, tumor margination, presence of a peripheral T2W hyperintense zone, and bone contact. A total of 19 cats met inclusion criteria. Cats with multiple tumors were more likely to have had previous excisional biopsy, and were less likely to undergo definitive surgery. All tumors were hyperintense relative to surrounding musculature on T1W and T2W images. Larger tumors were more likely to exhibit mineralization (P < 0.05). Tumor volume could not predict tumor-free margins at definitive surgery. The majority of tumors showed moderate to marked heterogeneous contrast enhancement. Infiltrative margins and the presence of a peripheral T2W hyperintense zone were more prevalent following excisional biopsy, while cavitation was more prevalent following incisional biopsy. Findings indicated that low-field MRI characteristics of injection site sarcoma may vary widely and may be affected by prior incisional or excisional biopsy.

The potential for enhancement of immunity in cats by dietary supplementation.
Rutherford-Markwick, K. J., W. H. Hendriks, P. C. Morel, and D. G. Thomas
This study was conducted to examine the potential benefits of dietary supplementation on the feline immune system. Forty three cats (8 or 9 per group) were fed a low protein control diet (22.7% DM basis), the same diet supplemented with yeast-derived nucleotides, salmon oil or l-arginine or a commercial moist high protein diet (53.0% DM basis) for a period of five weeks. The low protein diets were formulated using a commercial moist diet base with added fat and starch and fed ad libitum, along with water. Specific immune assays showed that supplementation with arginine caused a significant
enhancement of lymphocyte proliferative responses to the T-cell mitogen PHA after 35 days (P=0.018), while supplementation with either nucleotides or salmon oil resulted in significant enhancement after both 14 (P=0.0048, P<0.0001 respectively) and 35 days (both P<0.0001). Dietary supplementation with arginine, nucleotides or salmon oil each led to significant increases in blood leucocyte phagocytic activity after both 14 (P=0.0003, P=0.0077, P<0.0001 respectively) and 35 days (P<0.0001). This indicates that a number of dietary ingredients have the ability to modulate the immune system of healthy cats possibly resulting in a greater ability to fight infection and disease.

Histological and molecular characterisation of feline humeral condylar osteoarthritis.

Ryan, J. M., B. D. Lascelles, J. Benito, J. Hash, S. H. Smith, D. Bennett, D. J. Argyle, and D. N. Clements

BACKGROUND: Osteoarthritis (OA) is a clinically important and common disease of older cats. The pathological changes and molecular mechanisms which underpin the disease have yet to be described. In this study we evaluated selected histological and transcriptomic measures in the articular cartilage and subchondral bone (SCB) of the humeral condyle of cats with or without OA. RESULTS: The histomorphometric changes in humeral condyle were concentrated in the medial aspect of the condyle. Cats with OA had a reduction in articular chondrocyte density, an increase in the histopathological score of the articular cartilage and a decrease in the SCB porosity of the medial part of the humeral condyle. An increase in LUM gene expression was observed in OA cartilage from the medial part of the humeral condyle. CONCLUSIONS: Histopathological changes identified in OA of the feline humeral condyle appear to primarily affect the medial aspect of the joint. Histological changes suggest that SCB is involved in the OA process in cats. Differentiating which changes represent OA rather than the aging process, or the effects of obesity and or bodyweight requires further investigation.

The Role of Food for the Formation and Prevention of Gastrointestinal Lesions Induced by Aspirin in Cats.

Dig Dis Sci (2013)
Satoh, H., K. Amagase, and K. Takeuchi

BACKGROUND/AIMS: The effects of feeding conditions (fasted or fed) and dietary fiber (DF) in the diet on gastrointestinal (GI) damage induced by aspirin (ASA) were examined in cats. METHODS: Plain ASA (P-ASA, 20 mg/kg) or one enteric-coated ASA tablet (EC-ASA, containing 100 mg ASA) was administered p.o. once daily for 3 or 7 days just after morning meal, 3 h after the evening meal, or in the morning without a morning meal (fasted). Several types of diet, dry food (DRY, DF: 2.8 %), canned food (CAN, DF: 0.4 %), and diets with added cellulose or pectin were provided twice daily. RESULTS: P-ASA or EC-ASA administered just after feeding of DRY caused marked lesions in the GI tract, although EC-ASA did not produce any lesions in the stomach. GI damage was markedly decreased when ASA was administered 3 h after the evening meal. The induction of lesions by EC-ASA was markedly decreased in cats that ate CAN, but lesions were induced in cats fed CAN with added cellulose (6 %). The addition of pectin (6 %) to the DRY markedly decreased the induction of lesions by EC-ASA. CONCLUSIONS: The results indicate that the induction of GI lesions by ASA was highly dependent on the feeding conditions and DF. To minimize the induction of GI damage, it would be better to take ASA 3 h after the evening meal, or after consuming diets that contain low amounts of insoluble DF and high amounts of soluble DF.

Effect of treatment with atenolol on 5-year survival in cats with preclinical (asymptomatic) hypertrophic cardiomyopathy.

Schober, K. E., J. Zientek, X. Li, V. L. Fuentes, and J. D. Bonagura

OBJECTIVES: To investigate the effect of treatment with atenolol on 5-year survival in cats with preclinical hypertrophic cardiomyopathy (HCM). ANIMALS: 63 Client-owned cats with preclinical HCM and 31 healthy control cats. METHODS: Prospective, observational, open-label, clinical cohort study. Cats with HCM were diagnosed by echocardiography, treated with atenolol (6.25-12.5 mg q12h, PO; n = 42) or untreated (n = 21), and were observed for 5 years after enrollment. The study end point was death from any cause. Cats of similar body weight, age, gender, and breed without evidence of heart disease were studied concurrently and served as controls. RESULTS: During the observational period, 27 cats with HCM died; 14 (22%) due to cardiac disease and 13 (21%) due to non-cardiac disease. Ten control cats (32%) died of non-cardiac disease. There was no significant difference (P = 0.307) in all-cause mortality between control and HCM. Cardiac mortality
was higher in cats with HCM compared to control cats (P = 0.005). There was no significant difference in all-cause mortality (P = 0.729) and cardiac mortality (P = 0.897) between cats with HCM treated or untreated with atenolol. Age and left atrial size at diagnosis were the only predictors of 5-year outcome. CONCLUSIONS: Our study failed to demonstrate an effect of atenolol on 5-year survival in cats with preclinical HCM.

Pharmacogenomics of Cytauxzoon felis cytochrome b: implications for atovaquone and azithromycin therapy in domestic cats with cytauxzoonosis.
J Clin Microbiol (2013)
Cytauxzoon felis, an emerging virulent protozoan parasite that infects domestic cats, is treated with atovaquone and azithromycin (A&A). Atovaquone targets parasite cytochrome b. We characterized the C. felis cytochrome b gene (cytb) in cats with cytauxzoonosis, and found a cytb genotype that was associated with survival in A&A-treated cats.

Scott, D. W., W. H. Miller, and H. N. Erb
Medical records of 1407 cats with dermatologic diagnoses made at Cornell University teaching hospital from 1988 to 2003 were tabulated. We expressed the diagnoses as counts, percentages of the cats with dermatologic disease (1407) and percentages of all cats seen at the university hospital (22,135) during the same period. A total of 1887 diagnoses were made in the 1407 cats. We compared the age, sex and breed group of our cases with all those 22,135 cats in (‘1-by-c’) chi(2) tests in which the hospital population was considered a standard (rather than a ‘sample’). The 10 most common dermatoses, their counts, and the proportions of dermatologic diagnoses and of the total cat population that the cats with these dermatoses represented were: allergy (298; 15.8%; 1.35%), atopic dermatitis (194; 10.3%; 0.88%), bacterial folliculitis/furunculosis (189; 10.0%; 0.85%), otodectic mange (115; 6.1%; 0.52%), flea infestation (99; 5.2%; 0.45%), feline acne (74; 3.9%; 0.33%), flea-bite allergy (70; 3.7%; 0.32%), cutaneous adverse drug reaction (56; 3.0%; 0.25%), idiopathic eosinophilic-granuloma complex (55; 2.9%; 0.25%) and abscess (51; 2.7%; 0.23%). Allergies of all types, combined, accounted for 32.7% of all the feline dermatoses. Relative to the standard of the total hospital population, cats <2 years old and females (both intact and spayed) were significantly under-represented (all P</=0.001) in the dermatologic case series. In contrast, Himalayans (compared with domestic short- or longhair, Persian, Siamese and other breeds) and males (both intact and neutered) were significantly over-represented (all P</=0.001).

Superficial bacterial pyoderma in cats.
Scott, D. W., and W. H. J. Miller

A Retrospective Study of Acute Kidney Injury in Cats and Development of a Novel Clinical Scoring System for Predicting Outcome for Cats Managed by Hemodialysis.
Segev, G., R. Nivy, P. H. Kass, and L. D. Cowgill
BACKGROUND: Information regarding acute kidney injury (AKI) in cats is limited, and there are no reliable tools to objectively assess disease severity and predict outcome. OBJECTIVES: To assess clinical signs, clinicopathologic abnormalities, etiology, and outcome of cats with AKI, and to develop models using clinical metrics and empirically derived scores to predict outcome. ANIMALS: One hundred and thirty-two client-owned cats. METHODS: Retrospective study. Bivariate logistic regression analyses were performed to identify variables predictive of 30-day survival. Continuous variables outside the reference range were divided into quartiles to yield quartile-specific odds ratios (OR) for survival. Models were developed incorporating weighting factors assigned to each quartile based on the OR. A predictive score for
OBJECTIVE: To determine the incidence of adverse events within 24 hours after contrast-enhanced ultrasonography (CEUS) in dogs and cats and compare the risk of death within 24 hours after imaging for animals that underwent ultrasonography with and without injection of a contrast agent. DESIGN: Retrospective case-control study. ANIMALS: 750 animals (411 case dogs, 238 control dogs, 77 case cats, and 24 control cats). PROCEDURES: At 11 institutions, medical records were reviewed of dogs and cats that had CEUS performed (cases) as were medical records of dogs and cats with clinical signs similar to those of case animals that had ultrasonography performed without injection of a contrast agent (controls). Information regarding signalment; preexisting disease; type, dose, and administration route of contrast agent used; immediate (within 1 hour after CEUS) and delayed (> and <= 24 hours after CEUS) adverse events; and occurrence and cause of death (when available) was extracted from each medical record. Risk of death within 24 hours after ultrasonography was compared between case and control animals. RESULTS: Of the 411 case dogs, 3 had immediate adverse events (vomiting or syncope) and 1 had a delayed adverse event (vomiting). No adverse events were recorded for case cats. Twenty-three of 357 (6.4%) clinically ill case animals and 14 of 262 (5.3%) clinically ill control animals died within 24 hours after ultrasonography; risk of death did not differ between cases and controls. CONCLUSIONS AND CLINICAL RELEVANCE: Results indicated that CEUS was safe in dogs and cats.

Endothelin-1 Concentrations in Bronchoalveolar Lavage Fluid of Cats with Experimentally Induced Asthma.
Sharp, C. R., T. M. Lee-Fowler, and C. R. Reinero
BACKGROUND: There is a need for biomarkers for diagnosis, therapeutic monitoring, and prognosis for asthma in cats. Endothelin-1 (ET-1) is implicated in the pathogenesis of inflammatory airway diseases in other species but not the cat. OBJECTIVE: To conduct a prospective experimental study to show that experimentally asthmatic cats, but not control cats without airway inflammation, would have increased concentrations of ET in BALF. ANIMALS: Eleven healthy, adult research cats. METHODS: Prospective experimental study. Six healthy cats without airway inflammation were used as controls. Asthma was induced using Bermuda grass allergen (BGA) in 5 cats. Collection of BALF for total nucleated cell and differential counts was performed. The concentration of ET-1 in cell-free BALF samples was determined. Data were analyzed using a Mann-Whitney U-test with P <.05 considered significant. RESULTS: The median [range] BALF total cell numbers, eosinophil numbers, and eosinophil percentages were significantly higher in the cats following experimental induction of asthma (1,870 cells/μL [1,450-3,440], 711 cells/μL [356-1,686] and 38% [20-49]) compared to baseline control parameters (462 cells/μL [239-780], 18 cells/μL [18-62] and 3.5% [0-8]) (P <.01). The median [range] BALF ET concentration was also significantly higher after induction of asthma (1.393 fmol/mL [0.977-2.247]) compared to healthy control cats (0.83250 fmol/mL [0.625-1.038]) (P =.012). CONCLUSIONS AND CLINICAL IMPORTANCE: This study suggests that BAL ET-1 concentration can be used to differentiate normal cats from those with experimentally induced asthma. If the same holds true for cats with naturally developing asthma, BAL ET-1 may prove a useful diagnostic biomarker for asthma.
**Retrobulbar and peribulbar regional techniques in cats: a preliminary study in cadavers.**
*Vet Anaesth Analg* (2013)
**Shilo-Benjami, Y., P. J. Pascoe, D. J. Maggs, P. H. Kass, and E. R. Wisner**
OBJECTIVE: To compare injectate distribution and potential complications of retrobulbar and peribulbar injections in cat cadavers. STUDY DESIGN: Prospective randomized masked study. ANIMALS: Ten cat cadavers (20 eyes). METHODS: A dorsomedial retrobulbar injection (RB) of 1 mL of 0.5% bupivacaine and iopamidol (1:1) was performed in seven eyes. A dorsomedial peribulbar injection (PB-1) of 4 mL of the same injectate was performed in seven eyes, and two peribulbar injections (PB-2) of the same injectate, divided equally between the dorsomedial and ventrolateral regions (2 mL each) were performed in six eyes. Intraocular pressure (IOP) was measured before, immediately and 15 minutes after injection. Cadavers underwent computed tomography before and following injections. A radiologist scored injectate distribution within the intracanal space (none, moderate, or large) and around the optic nerve (degrees). An injection was defined as likely to provide adequate regional anesthesia if the volume of distribution of intracanal injectate was ‘large’ and it contacted over 270 degrees of the optic nerve circumference. RESULTS: The success rate (95% confidence interval) of RB, PB-1, and PB-2 injections was 71% (29.0-96.3%), 86% (42.1-99.6%), and 67% (22.3-95.7%), respectively. With all three techniques, IOP increased significantly after injection, but returned to baseline by 15 minutes following RB injection. No intraocular, intravascular, intrathecal, or intraneural injectate was observed. CONCLUSION AND CLINICAL RELEVANCE: The single-peribulbar injection technique may be superior to retrobulbar or double-peribulbar injections, however, all techniques require further studies in live cats to determine safety and efficacy prior to clinical use.

**Characterization of feline ASCT1 and ASCT2 as RD-114 virus receptor.**
**Shimode, S., R. Nakaoka, H. Shogen, and T. Miyazawa**
RD-114 virus is a replication-competent feline endogenous retrovirus (ERV). RD-114 virus had been thought to be xenotropic; however, recent findings indicate that RD-114 virus is polytropic and can infect and grow efficiently in feline cells. Receptor(s) for RD-114 virus has not been identified and characterized in cats. In this study, we confirmed that two feline sodium-dependent neutral amino acid transporters (ASCTs), fASCT1 and fASCT2, function as RD-114 virus receptors. By chimeric analyses of feline and murine ASCTs, we revealed that extracellular loop 2 of both fASCT1 and fASCT2 determines the susceptibility to RD-114 virus. Further, we revealed ubiquitous expression of these genes, consistent with the general metabolic role of the ASCT molecules. Our study indicates that RD-114 virus may reinfect tissues and cells in cats, once the virus is activated. Implications of the involvement of RD-114 virus in feline oncogenesis are also discussed.

**The first case of Demodex gatoi in Austria, detected with fecal flotation.**
*Parasitol Res* (2013)
**Silbermayr, K., A. Joachim, B. Litschauer, L. Panakova, N. Sastre, L. Ferrer, and C. Horvath-Ungerboeck**
Feline demodicosis is a rare parasitic condition caused by three different species of mites (Demodex cati, Demodex gatoi, and an unnamed species). D. gatoi inhabits the superficial skin layer (stratum corneum) and is easily transmitted between carrier animals. DNA was extracted from the flotation liquid, and a PCR protocol for the species verification was designed. A fragment targeting a 325-bp DNA fragment of the D. gatoi mitochondrial 16S rDNA gene was amplified with a 100 % similarity to the D. gatoi entry in GenBank(R) (GI 421920216). We report the first finding of D. gatoi in Austria and propose fecal flotation as a valuable tool for mite detection. Fecal flotation liquid is suitable for DNA extraction and PCR-based species verification of D. gatoi.
Ultrastructural characteristics of fibrin clots from canine and feline platelet concentrates activated with calcium gluconate or calcium gluconate plus batroxobin.  
Silva, R. F., J. U. Carmona, and C. M. Rezende

BACKGROUND: The aim of this study was to use transmission electron microscopy to describe the ultrastructural characteristics of clots obtained from canine and feline platelet concentrates (PC) that had been activated with calcium gluconate (CG) or CG plus batroxobin (CGB). Platelets from fibrin clots were classified according their morphological changes. The area of the intercellular space (μm²), the area of the fibrin fibers (μm²), and the width of the fibrin fibers (μm) were determined for the dog clots. The platelet area (μm²), the area of fibrin fibers (μm²), the ratio of the minor and major axes of platelets, the ratio of the major and minor axes of platelets, and the number of alpha-granules found within platelets were measured for the cat clots. RESULTS: Cat platelets displayed full activation. Dog platelets displayed lysis with loss of normal architecture. In both species, a statistically significant difference was found (P < 0.01) between the fibrin fiber measurements in the PC clots activated with CG and CGB. CONCLUSIONS: The findings suggest that activation with CG caused platelet alpha granules to release their contents. In cats, fibrin production was greater when the PC was activated with CG. In dogs, activation with CG produced thick fibrin fibers.

A web resource on DNA tests for canine and feline hereditary diseases.
Vet J (2013)  
Slutsky, J., K. Raj, S. Yuhnke, J. Bell, N. Fretwell, A. Hedhammar, C. Wade, and U. Giger

Following the first identification of a disease-causing mutation in dogs in 1989 and the more recent completion of canine and feline genome sequences, much progress has been made in the molecular characterization of hereditary diseases in dogs and cats. To increase access to information on diagnosing hereditary diseases in dogs and cats, a web application has been developed to collect, organize and display information on available DNA tests and other supporting information, including gene and chromosomal locations, mutations, primary research citations and disease descriptions. The DNA testing information can be accessed at the URL: http://research.vet.upenn.edu/WSAVA-LabSearch. There are currently 131 molecular genetic tests available for hereditary diseases in dogs and cats offered by 43 laboratories worldwide. This tool should provide clinicians, researchers, breeders and companion animal owners with a single comprehensive, up-to-date and readily searchable webpage for information on hereditary disease testing.

Detection of Ascitic Feline Coronavirus RNA from Clinically Suspected Cats of Feline Infectious Peritonitis.  
Soma, T., M. Wada, S. Taharaguchi, and T. Tajima

Ascitic feline coronavirus (FCoV) RNA was examined in 854 feline infectious peritonitis (FIP)-suspected cats by RT-PCR. The positivity was significantly higher in purebreds (62.2%) than in crossbreds (34.8%) (P<0.0001). Among purebreds, the positivity in Norwegian Forest Cat (92.3%) and Scottish Fold (77.6%) were significantly higher than the average of purebreds (P=0.0274 and 0.0251, respectively). The positivity was significantly higher in males (51.5%) than in females (35.7%) (P<0.0001), whereas no gender difference has generally been noted in FCoV antibody-prevalence, indicating that FIP more frequently develops in males among FCoV-infected cats. Genotyping was performed for 377 gene-positive specimens. Type I (8.3%) was far more predominantly detected than type II (10.6%) (P<0.0001), similar to previous serological and genetic surveys.

Penicillium species-induced granuloma in cats resulting in chronic lower urinary tract disease.  
Soonthornsit, J., W. Banlunara, W. Niyomthum, and R. Pusoonthornthum

A 5-year-old, female neutered Persian cat was admitted to the Small Animal Hospital (Chulalongkorn University, Bangkok, Thailand) with clinical signs of dysuria, haematuria and partial urethral obstruction that had manifested over several months. The animal also had hyperkalaemia and severe azotaemia at the time of presentation. Urinalysis showed haematuria, pyuria and the presence of several transitional cells. In addition, ultrasonography demonstrated an extraluminal
mass between the neck of urinary bladder and the colon. Fine-needle aspiration of the mass revealed a fungal form with branching and septate hyphae. Consequently, itraconazole treatment was prescribed and clinical signs of improvement were seen after 7 days. However, 1 month later, the cat died of acute anaemia. Necropsy revealed the presence of extraluminal multifocal fungal granuloma at the neck of the urinary bladder, and contracted kidneys. Histopathological analysis of the fungal granuloma was found to be composed of branching, septate hyphal fungi together with inflammatory cells. Subsequent fungal culture and identification revealed this to be a species of *Penicillium.*

**Agreement between auricular and rectal measurements of body temperature in healthy cats.**

Sousa, M. G., R. Carareto, V. A. Pereira-Junior, and M. C. Aquino
Measurement of body temperature is a routine part of the clinical assessment of a patient. However, this procedure may be time-consuming and stressful to most animals because the standard site of temperature acquisition remains the rectal mucosa. Although an increasing number of clinicians have been using auricular temperature to estimate core body temperature, evidence is still lacking regarding agreement between these two methods in cats. In this investigation, we evaluated the agreement between temperatures measured in the rectum and ear in 29 healthy cats over a 2-week period. Temperatures were measured in the rectum (using digital and mercury-in-glass thermometers) and ear once a day for 14 consecutive days, producing 406 temperature readings for each thermometer. Mean temperature and confidence intervals were similar between methods, and Bland-Altman plots showed small biases and narrow limits of agreement acceptable for clinical purposes. The interobserver variability was also checked, which indicated a strong correlation between two near-simultaneous temperature readings. Results are consistent with auricular thermometry being a reliable alternative to rectal thermometry for assessing core body temperature in healthy cats.

**A survey of North American shelter practices relating to feline upper respiratory management.**

Spindel, M. E., M. R. Slater, and D. Boothe
An internet-based survey was conducted to determine common strategies for control of feline upper respiratory infections (URI) in animal shelters. Two hundred and fifty-eight North American shelters responded, representing a spectrum of 57% private non-profit, 27% municipal and 16% combined private non-profit-municipal shelters. All but nine shelters reported having a regular relationship with a veterinarian, 53% had full-time veterinarians and 62% indicated full-time (non-veterinarian) medical staff. However, in 35% of facilities, non-medical shelter management staff determined what medication an individual cat could receive, with 5% of facilities making that decision without indicating the involvement of a veterinarian or technician. Ninety-one percent of shelters had an isolation area for clinically ill cats. The most commonly used antimicrobial was doxycycline (52%), followed by amoxicillin/clavulanic acid (33%). Shelters are using a wide range of prevention measures and therapeutics, leaving room for studying URI in different settings to improve understanding of optimal protocols.

**Postoperative complications following TECA-LBO in the dog and cat.**

Spivack, R. E., A. D. Elkins, G. E. Moore, and G. C. Lantz
The medical records for 133 total ear canal ablations combined with lateral bulla osteotomies (TECA-LBOs) performed on 82 dogs (121 ears) and 11 cats (12 ears) between 2004 and 2010 were reviewed to determine if the duration of preoperative clinical signs was associated with the incidence of postoperative facial nerve injury and Horner’s syndrome. Other perioperative complications, such as a head tilt, nystagmus, incisional drainage, draining tracts, hearing loss, as well as bacterial culture results, were noted. Postoperative facial nerve paresis occurred in 36 of 133 ears (27.1%), and paralysis occurred in 29 of 133 ears (21.8%), with no significant difference between species. Thus, postoperative facial nerve deficits occurred in 48.9% of ears. The median duration of clinically evident temporary facial nerve deficits was 2 wk for dogs and 4 wk for cats. Dogs had a significantly longer duration of preoperative clinical signs and were less likely than cats to have a mass in the ear canal. Dogs were less likely to have residual (> 1 yr) postoperative facial nerve deficits. The incidence of postoperative Horner’s syndrome was significantly higher in cats than dogs. The duration of preoperative clinical signs of
Computed tomography of nonanesthetized cats with upper airway obstruction.
Stadler, K., and R. O’Brien
Upper airway obstruction is a potentially life-threatening problem in cats and for which a noninvasive, sensitive method rapid diagnosis is needed. The purposes of this prospective study were to describe a computed tomography (CT) technique for nonanesthetized cats with upper airway obstruction, CT characteristics of obstructive diseases, and comparisons between CT findings and findings from other diagnostic tests. Ten cats with clinical signs of upper airway obstruction were recruited for the study. Four cats with no clinical signs of upper airway obstruction were recruited as controls. All cats underwent computed tomography imaging without sedation or anesthesia, using a 16-slice helical CT scanner and a previously described transparent positional device. Three-dimensional (3D) internal volume rendering was performed on all CT image sets and 3D external volume rendering was also performed on cats with evidence of mass lesions. Confirmation of upper airway obstruction was based on visual laryngeal examination, endoscopy, fine-needle aspirate, biopsy, or necropsy. Seven cats were diagnosed with intramural upper airway masses, two with laryngotracheitis, and one with laryngeal paralysis. The CT and 3D volume-rendered images identified lesions consistent with upper airway disease in all cats. In cats with mass lesions, CT accurately identified the mass and location. Findings from this study supported the use of CT imaging as an effective technique for diagnosing upper airway obstruction in nonanesthetized cats.

Dose tapering for ciclosporin in cats with nonflea-induced hypersensitivity dermatitis.
BACKGROUND: Little information is available on the ciclosporin dose-tapering regimen and clinical response in the treatment of feline hypersensitivity dermatitis. HYPOTHESIS/OBJECTIVES: To test a dose-tapering regimen and assess efficacy and clinical safety for up to 18 weeks. ANIMALS: Eighty-eight client-owned cats with feline hypersensitivity dermatitis. METHODS: Cats that received either a placebo or ciclosporin at 2.5 mg/kg or 7 mg/kg daily for 6 weeks were given 7 mg/kg ciclosporin daily for 4 weeks. Depending on the clinical response, the dose was tapered from daily to every other day over the next 4 weeks and further to twice a week for an additional 4 weeks. RESULTS: After all cats received 7 mg/kg for 4 weeks, the dose could be tapered to every other day for the next 4 weeks in 70% of cats remaining in the study. During the next 4 weeks, 57, 15 and 22% of cats remaining in the study could be treated at twice a week, every other day or daily, respectively. After the first 4 weeks, the mean lesion score and owner-assessed pruritus improved over baseline by 69 and 61%, respectively, and remained stable during the following 8 weeks. Approximately 65% of the cats in the study were reported to have an adverse event (AE), very often mild and resolving spontaneously. The most frequent AEs were gastrointestinal and included primarily vomiting and diarrhoea. Eighty per cent of AEs occurred when cats were on daily treatment. CONCLUSIONS AND CLINICAL IMPORTANCE: Results suggest that the induction dose of 7 mg/kg ciclosporin can be tapered as soon as 4 weeks without deterioration of the clinical response. Establishment of the lowest effective dosing regimen of ciclosporin reduced the frequency of AEs.

Hybrid cutting balloon dilatation for treatment of cor triatriatum sinister in a cat.
J Vet Cardiol (2013)
A hybrid surgical approach and balloon dilatation were performed successfully in a cat with cor triatriatum sinister and clinical signs of congestive heart failure. Left lateral thoracotomy was used to access the heart and cutting balloon followed by standard balloon dilatation were utilized to dilate the perforation in the anomalous left atrial membrane. Clinical signs resolved completely after dilation of the anomalous left atrial membrane. Based upon the outcome of this case, balloon dilatation appears to be a viable treatment option for cats affected with cor triatriatum sinister.
Sequence variation of the feline immunodeficiency virus genome and its clinical relevance.


Stickney, A. L., M. Dunowska, and N. J. Cave

The ongoing evolution of feline immunodeficiency virus (FIV) has resulted in the existence of a diverse continuum of viruses. FIV isolates differ with regards to their mutation and replication rates, plasma viral loads, cell tropism and the ability to induce apoptosis. Clinical disease in FIV-infected cats is also inconsistent. Genomic sequence variation of FIV is likely to be responsible for some of the variation in viral behaviour. The specific genetic sequences that influence these key viral properties remain to be determined. With knowledge of the specific key determinants of pathogenicity, there is the potential for veterinarians in the future to apply this information for prognostic purposes. Genomic sequence variation of FIV also presents an obstacle to effective vaccine development. Most challenge studies demonstrate acceptable efficacy of a dual-subtype FIV vaccine (Fel-O-Vax FIV) against FIV infection under experimental settings; however, vaccine efficacy in the field still remains to be proven. It is important that we discover the key determinants of immunity induced by this vaccine; such data would compliment vaccine field efficacy studies and provide the basis to make informed recommendations on its use.

Management of respiratory emergencies in small animals.


Sumner, C., and E. Rozanski

Management of respiratory distress involves careful consideration of the history, physical examination, and diagnostic testing. Supplemental oxygen is useful. Urgent procedures, such as intubation, thoracocentesis, or tracheostomy, may be required. The prognosis is dependent on the underlying disease, but is often favorable. This article reviews the approach, differential diagnoses, and the approach to management for dogs and cats with respiratory distress.

Evaluation of glomerular filtration rate in cats with reduced renal mass and administered meloxicam and acetylsalicylic acid.


Surdyk, K. K., C. A. Brown, and S. A. Brown

OBJECTIVE: To determine whether administration of meloxicam or acetylsalicylic acid alters glomerular filtration rate (GFR) in cats with renal azotemia. ANIMALS: 6 young adult cats. PROCEDURES: 3 sexually intact male cats and 3 sexually intact female cats had surgically reduced renal mass and azotemia comparable to International Renal Interest Society chronic kidney disease stages 2 and 3. Renal function was evaluated by measurement of serum creatinine concentration, urinary clearance of exogenously administered creatinine, and the urine protein-to-creatinine concentration ratio (UP:C). Measurements taken in cats receiving placebo at the beginning and end of the study were compared with results obtained at the end of 7 days of treatment with either meloxicam (0.2 mg/kg, SC, on day 1; 0.1 mg/kg, SC, on days 2 to 7) or acetylsalicylic acid (20 mg/kg, PO, on days 1, 4, and 7). RESULTS: No significant treatment effects on urinary clearance of exogenously administered creatinine, serum creatinine concentration, or UP:C were detected. Mean +/- SEM serum creatinine concentration and urinary clearance of exogenously administered creatinine measurements following 7 days of treatment with meloxicam (serum creatinine concentration, 2.67 +/- 0.17 mg/dL; urinary clearance of exogenously administered creatinine, 1.34 +/- 0.08 mL/min/kg) and acetylsalicylic acid (serum creatinine concentration, 2.62 +/- 0.12 mg/dL; urinary clearance of exogenously administered creatinine, 1.35 +/- 0.07 mL/min/kg) were not significantly different from the mean baseline values for these variables (serum creatinine concentration, 2.77 +/- 0.14 mg/dL; urinary clearance of exogenously administered creatinine, 1.36 +/- 0.07 mL/min/kg). CONCLUSIONS AND CLINICAL RELEVANCE: Neither meloxicam nor acetylsalicylic acid had a measurable effect on urinary clearance of exogenously administered creatinine, serum creatinine concentration, or UP:C. These results are consistent with the hypothesis that GFR of euvoelastic cats with normal or reduced renal function is not dependent on cyclooxygenase function.

A case of feline gastrointestinal eosinophilic sclerosing fibroplasia.


Suzuki, M., M. Onchi, and M. Ozaki
Feline gastrointestinal eosinophilic sclerosing fibroplasia was diagnosed in an 8-month-old Scottish fold that had a primary gastrointestinal mass involving the stomach, duodenum and mesenteric lymph nodes. Histopathologically, the most characteristic feature of this mass was granulation tissue with eosinophil infiltration and hyperplasia of sclerosing collagen fiber. Immunohistochemically, large spindle-shaped cells were positive for smooth muscle actin and vimentin. This case emphasizes the importance of feline gastrointestinal eosinophilic sclerosing fibroplasia as a differential diagnosis of gastrointestinal neoplastic lesions such as osteosarcoma and mast cell tumor in cats.

**Histopathological findings in the livers of cats with a congenital portosystemic shunt before and after surgical attenuation.**


_Swinbourne, F., K. C. Smith, V. J. Lipscomb, and M. S. Tivers_

Histopathological changes are reported in the livers of cats with congenital portosystemic shunts (CPSS) before and after surgical attenuation. Medical records, portovenograms and liver biopsies from cats treated surgically for CPSS were reviewed. Biopsies were graded for histopathological features characteristic of CPSS. Of 40 cats with CPSS included in the study, all had portal vein hypoplasia and arteriolar hyperplasia at initial surgery, 20 (50 per cent) had hepatocyte swelling with microvesicular vascular change, 17 (42.5 per cent) had fibrosis, 12 (30 per cent) had hepatocyte swelling with macrovesicular vascular change, 8 (20 per cent) had biliary hyperplasia and 2 (5 per cent) had haemosiderin within Kupffer cells. Cats with macrovesicular vascular change were significantly older than cats without (P = 0.001), with median ages of 18.5 months and 8.5 months, respectively. Twenty-five cats had partial attenuation of the CPSS at initial surgery, and 16 of these had follow-up biopsy samples. There were no significant differences in the histopathological features of biopsies before and after partial attenuation. From first to second surgery, there was a significant improvement in intrahepatic vasculature on portovenography both before (P = 0.001) and after (P = 0.039) temporary complete attenuation. Following partial CPSS attenuation, there was no significant change in histopathological features despite an improvement in intrahepatic vasculature on portovenography.

**Effect of chloroquine on feline infectious peritonitis virus infection in vitro and in vivo.**


_Takano, T., Y. Katoh, T. Doki, and T. Hohdatsu_

Feline infectious peritonitis (FIP) is a feline coronavirus-induced fatal disease in domestic and wild cats. Several studies have investigated potential treatments for FIP. However, there have been no reports on agents that have exhibited a therapeutic effect. Recently, chloroquine has been reported to antiviral effect. We investigated whether chloroquine can be used to treat FIP in vitro and in vivo. It was demonstrated that chloroquine has inhibitory effect against the replication of FIPV and anti-inflammatory effect in vitro. In vivo study using cats with experimentally induced FIP, the clinical score of chloroquine-treatment groups were better than in chloroquine-untreated group. However, alanine aminotransferase levels increased in the chloroquine-treated groups. It will be necessary to further investigate the possibility of FIP treatment with a combination of chloroquine and other agents.

**Serum amyloid A as a prognostic marker in cats with various diseases.**


Serum amyloid A (SAA) is reported not only as a marker for the presence of inflammation but also as a prognostic indicator in human beings. In cats, however, there is no report on the association between SAA concentration and prognosis. The objective of the current study was to evaluate SAA concentration as a prognostic marker in diseased cats. A total of 175 cats with neoplastic diseases, inflammatory diseases, and other diseases were retrospectively recruited, and the medical records of these cats, including follow-up data on mortality, were reviewed. Cats were divided into 2 groups according to SAA concentration, and differences in survival between each group were assessed. Median survival time of cats in the elevated SAA (>0.82 mg/l) group was significantly shorter than that in the nonelevated SAA (<=0.82 mg/l) group (P = 0.001). Furthermore, by multivariate analysis, SAA concentration was shown as a significant and independent prognostic marker in cats with various diseases (P = 0.015). Serum amyloid A concentration in diseased cats is a useful predictive indicator of
Suppression of coronavirus replication by cyclophilin inhibitors.

Tanaka, Y., Y. Sato, and T. Sasaki

Coronaviruses infect a variety of mammalian and avian species and cause serious diseases in humans, cats, mice, and birds in the form of severe acute respiratory syndrome (SARS), feline infectious peritonitis (FIP), mouse hepatitis, and avian infectious bronchitis, respectively. No effective vaccine or treatment has been developed for SARS-coronavirus or FIP virus, both of which cause lethal diseases. It has been reported that a cyclophilin inhibitor, cyclosporin A (CsA), could inhibit the replication of coronaviruses. CsA is a well-known immunosuppressive drug that binds to cellular cyclophilins to inhibit calcineurin, a calcium-calmodulin-activated serine/threonine-specific phosphatase. The inhibition of calcineurin blocks the translocation of nuclear factor of activated T cells from the cytosol into the nucleus, thus preventing the transcription of genes encoding cytokines such as interleukin-2. Cyclophilins are peptidyl-prolyl isomerases with physiological functions that have been described for many years to include chaperone and foldase activities. Also, many viruses require cyclophilins for replication; these include human immunodeficiency virus, vesicular stomatitis virus, and hepatitis C virus. However, the molecular mechanisms leading to the suppression of viral replication differ for different viruses. This review describes the suppressive effects of CsA on coronavirus replication.

An investigation into the seroprevalence of Toxoplasma gondii, Bartonella spp., feline immunodeficiency virus (FIV), and feline leukaemia virus (FeLV) in cats in Addis Ababa, Ethiopia.

Tiao, N., C. Darrington, B. Molla, W. J. Saville, G. Tilahun, O. C. Kwok, W. A. Gebreyes, M. R. Lappin, J. L. Jones, and J. P. Dubey

Toxoplasma gondii and Bartonella spp. are zoonotic pathogens of cats. Feline immunodeficiency virus (FIV), and feline leukaemia virus (FeLV) are immunosuppressive viruses of cats that can affect T. gondii oocyst shedding. In this study, the prevalence of antibodies to T. gondii, Bartonella spp., FIV, as well as FeLV antigens were determined in sera from feral cats (Felis catus) from Addis Ababa, Ethiopia. Using the modified agglutination test, IgG antibodies to T. gondii were found in 41 (85.4%) of the 48 cats with titres of 1:25 in one, 1:50 in one, 1:200 in six, 1:400 in six, 1:800 in six, 1:1600 in eight, and 1:3200 in 13 cats. Toxoplasma gondii IgM antibodies were found in 11/46 cats tested by ELISA, suggesting recent infection. Antibodies to Bartonella spp. were found in five (11%) of 46 cats tested. Antibodies to FIV or FeLV antigen were not detected in any of the 41 cats tested. The results indicate a high prevalence of T. gondii and a low prevalence of Bartonella spp. infection in cats in Ethiopia.

Computed tomography characteristics of fibrosarcoma -- a histological subtype of feline injection-site sarcoma.

Travetti, O., M. di Giancamillo, D. Stefanello, R. Ferrari, C. Giudice, V. Greico, and J. H. Saunders

Feline injection-site sarcoma (FISS) may be a consequence of subcutaneous injection. In the present study, the medical records and the computed tomography (CT) features of 22 cats with a FISS, histopathological subtype fibrosarcoma, were used. The majority of the fibrosarcomas (45%) were located in the interscapular region. All fibrosarcomas, except one with mild enhancement, showed strong contrast uptake, characterised as ring (42%), heterogeneous (36%), homogeneous (9%), heterogeneous/ring (6.5%) or mixed heterogeneous/homogeneous enhancement (6.5%). The longest axis of the mass was in a cranio-caudal (68%) or dorso-ventral (32%) direction. The median volume calculated on CT was 7.57 cm(3). Common features were a marked local invasiveness of the musculature and heterogeneity of the tissue in the periphery of the neoplasia. When the fibrosarcoma was interscapular, performing an additional post-contrast scan with the forelimbs positioned caudally along the body, in addition to the standard protocol with the forelimbs extended cranially, allowed better evaluation of the actual relationship between the tumour and the surrounding tissues. The mean number of muscles involved with the tumour was 2.09 with extended and 1.95 with flexed forelimbs. When a lower number of structures was considered infiltrated through the double positioning, a less invasive surgical approach to underlying muscles and scapula was performed.
Accessory genes confer a high replication rate to virulent feline immunodeficiency virus.
Troyer, R. M., J. Thompson, J. H. Elder, and S. Vandewoude
Feline immunodeficiency virus (FIV) is a lentivirus that causes AIDS in domestic cats, similar to human immunodeficiency virus (HIV)/AIDS in humans. The FIV accessory protein Vif abrogates the inhibition of infection by cat APOBEC3 restriction factors. FIV also encodes a multifunctional OrfA accessory protein that has characteristics similar to HIV Tat, Vpu, Vpr, and Nef. To examine the role of vif and orfA accessory genes in FIV replication and pathogenicity, we generated chimeras between two FIV molecular clones with divergent disease potentials: a highly pathogenic isolate that replicates rapidly in vitro and is associated with significant immunopathology in vivo, FIV-C36 (referred to here as high-virulence FIV [HV-FIV]), and a less-pathogenic strain, FIV-PPR (referred to here as low-virulence FIV [LV-FIV]). Using PCR-driven overlap extension, we produced viruses in which vif, orfA, or both genes from virulent HV-FIV replaced equivalent genes in LV-FIV. The generation of these chimeras is more straightforward in FIV than in primate lentiviruses, since FIV accessory gene open reading frames have very little overlap with other genes. All three chimeric viruses exhibited increased replication kinetics in vitro compared to the replication kinetics of LV-FIV. Chimeras containing HV-Vif or Vif/OrfA had replication rates equivalent to those of the virulent HV-FIV parental virus. Furthermore, small interfering RNA knockdown of feline APOBEC3 genes resulted in equalization of replication rates between LV-FIV and LV-FIV encoding HV-FIV Vif. These findings demonstrate that Vif-APOBEC interactions play a key role in controlling the replication and pathogenicity of this immunodeficiency-inducing virus in its native host species and that accessory genes act as mediators of lentiviral strain-specific virulence.

Modeling effective transmission pathways and control of the world’s most successful parasite.
Turner, M., S. Lenhart, B. Rosenthal, and X. Zhao
Toxoplasma gondii(T. gondii) is a single-celled, intracellular protozoan responsible for the disease toxoplasmosis. The parasite is prevalent worldwide, and it infects all warm-blooded vertebrates. Consumption of meats in which this parasite has encysted confers risk of infection to people and other animals, as does ingestion of water or foods contaminated with environmentally resistant oocysts excreted by cats. Vertical transmission (from mother to offspring) is also possible, leading to disease risk and contributing additional means of ensuring perpetuation of transmission. In this work, we adopt a differential equation model to investigate the effective transmission pathways of T. gondii, as well as potential control mechanisms. Detailed analyses are carried out to examine the significance of transmission routes, virulence, vertical transmission, parasite-induced changes in host behavior, and controls based on vaccination and harvesting. Modeling and analysis efforts may shed insights into understanding the complex life cycle of T. gondii.

Enumeration of feline platelets in ethylenediamine tetra-acetic acid anticoagulated blood with the ADVIA 2120 system and two manual methods: Leucoplate and Thrombo-TIC.
Tvedten, H. W., J. Ljusner, and I. E. Lilliehook
A manual method (Thrombo-TIC; Bioanalytic GmbH, Umkirch/Freiburg, Germany) was advertised to disaggregate platelet clumps and to make human platelets spherical to improve platelet enumeration. The current study’s hypothesis was that this method would perform better than current methods for feline blood anticoagulated with ethylenediamine tetra-acetic acid (EDTA), which often contains platelet aggregates. Platelet concentrations (PLTs) were determined in 21 feline blood samples by 3 methods. Thrombo-TIC was compared to the manual method (Leucoplate; Sobioda, Montbonnot-Saint-Martin, France) currently used in the authors’ laboratory along with an ADVIA 2120 (Siemens AG, Eschborn, Germany) optical platelet concentration. Feline blood samples often contained platelet aggregates. ADVIA flagged for platelet aggregates in 11 of the 21 feline blood samples, and examination of blood smear revealed platelet aggregates in 14 of the 21 samples. The hemocytometers displayed more platelet aggregates with the Thrombo-TIC method than with Leucoplate. The method giving the greatest PLT was considered most accurate. The Leucoplate median PLT (238 x 109/1) was greater than Thrombo-TIC (202 x 109/1) or ADVIA (157 x 109/1). Intra-assay precision was determined for the 3 methods using the 21
feline blood samples. Median Thrombo-TIC and Leucoplate precision (7.4% and 7.3% coefficient of variation [CV], respectively) were similar and not much worse than ADVIA (5.9% CV). The Thrombo-TIC method did not appear to perform better than the current manual method (Leucoplate). Leucoplate appeared least affected by platelet aggregation in feline blood. The ADVIA automated PLT appeared to be most negatively affected by platelet aggregation. The Thrombo-TIC method did not appear to prevent platelet aggregation in feline EDTA blood samples and, thus, is not recommended for such use.

The cat as a model for human obesity: insights into depot-specific inflammation associated with feline obesity.

According to human research, the location of fat accumulation seems to play an important role in the induction of obesity-related inflammatory complications. To evaluate whether an inflammatory response to obesity depends on adipose tissue location, adipokine gene expression, presence of immune cells and adipocyte cell size of subcutaneous adipose tissue (SAT) and visceral adipose tissue (VAT) were compared between lean and obese cats. Additionally, the present study proposes the cat as a model for human obesity and highlights the importance of animal models for human research. A total of ten chronically obese and ten lean control cats were included in the present study. Body weight, body condition score and body composition were determined. T-lymphocyte, B-lymphocyte, macrophage concentrations and adipocyte cell size were measured in adipose tissue at different locations. Serum leptin concentration and the mRNA expression of leptin and adiponectin, monocyte chemotactrant protein-1, chemoligand-5, IL-8, TNF-alpha, interferon-gamma, IL-6 and IL-10 were measured in blood and adipose tissues (abdominal and inguinal SAT, and omental, bladder and renal VAT). Feline obesity was characterised by increased adipocyte cell size and altered adipokine gene expression, in favour of pro-inflammatory cytokines and chemokines. Consequently, concentration of T-lymphocytes was increased in the adipose tissue of obese cats. Alteration of adipose tissue was location dependent in both lean and obese cats. Moreover, the observed changes were more prominent in SAT compared with VAT.

A comparison between the v-gel supraglottic airway device and the cuffed endotracheal tube for airway management in spontaneously breathing cats during isoflurane anaesthesia.
van Oostrom, H., M. W. Krauss, and R. Sap

OBJECTIVE: To compare airway management using the v-gel supraglottic airway device (v-gel SGAD) to that using an endotracheal tube (ETT), with respect to practicability, leakage of volatile anaesthetics and upper airway discomfort in cats.

STUDY DESIGN: Prospective, randomized clinical trial. ANIMALS: Twenty European Shorthair cats (9 males, 11 females), weighing 3.3 +/- 0.7 kg. METHODS: Cats were randomly allocated to one of two groups, in which the airway was managed by either the v-gel SGAD or a cuffed ETT, and anaesthetized for neutering procedures. The dose of propofol necessary to insert the ETT or v-gel SGAD; time from the first injection of propofol to the first clinically acceptable reading on the capnograph; leakage of isoflurane around the airway device; and upper airway discomfort scores during recovery and during the first 24 hours after anaesthesia were recorded. Continuous and discrete variables were analyzed with the Mann-Whitney U-test and the Pearson chi-squared test, respectively. Results were considered statistically significant if p < 0.05.

RESULTS: Time from the first injection of propofol to the first clinically acceptable reading on the capnograph was significantly shorter in the v-gel group. The ETT group showed significantly more stridor during recovery. No other significant differences were found. CONCLUSIONS AND CLINICAL RELEVANCE: Airway management with the v-gel SGAD is a sound and practicable alternative to endotracheal intubation with an ETT. However, larger prospective trials will be needed to draw firm conclusions on the benefits and/or drawbacks of the use of v-gel SGAD for airway management in cats.

Transsplenic portal scintigraphy using 99mTc-pertechnetate for the diagnosis of portosystemic shunts in cats: a retrospective review of 12 patients.
During FIPV infection, possibilities for new therapies targeting specifically NK cells and Tregs to enhance their numbers and/or functionality are opened. However, these results will also open up the suppression of NK cells and Tregs, which is reflected by cell depletion and lowered cell functionality (only NK cells). This was revealed for the first time when compared with healthy cats. This study reveals for the first time the potential of TSPS in the diagnostic work-up of PSS in cats (2005-2012).

**Kinetic and temporospatial parameters in male and female cats walking over a pressure sensing walkway.**


BACKGROUND: Several factors may influence kinetic data measurements, including body conformation and body mass. In addition, gender differences in gait pattern have been observed in healthy humans. Therefore, the aim of this study was to compare the kinetic and temporospatial parameters in clinically healthy male and female cats using a pressure-sensitive walkway. Eighteen crossbreed adult cats were divided into two groups: G1 had ten male cats (nine neutered) aged from 1 to 4 years and body mass 3.1-6.8 kg; G2 had eight spayed female cats, aged from 1 to 6 years and body mass 3.3-4.75 kg. The data from the first five valid trials were collected for each cat. A trial was considered valid if the cat maintained a velocity between 0.54-0.74 m/s and acceleration from -0.20 to 0.20 m/s². The peak vertical force (PVF), vertical impulse (VI), gait cycle time, stance time, swing time, stride length, and percentage body weight distribution among the four limbs were determined. In addition, the lengths of each forelimb and each hind limb were measured using a tape with the animal standing. RESULTS: No significant differences were observed in each group in either the forelimbs or the hind limbs or between the left and right sides for any of the variables. For both groups, the PVF (%BW), the VI, and the percentage body weight distribution were higher at the forelimbs than the hind limbs. The stride length was larger for males; however, the other kinetic and temporospatial variables did not show any statistically significant differences between the groups. The lengths of the forelimbs and hind limbs were larger in the male cats. There was a significant moderate positive correlation between the stride length and the length of the limbs. CONCLUSIONS: In conclusion, the only difference observed between male and female cats was the stride length, and this was due to the greater body size of male cats. This difference did not affect other temporospatial or kinetic variables.

**Suppression of NK cells and regulatory T lymphocytes in cats naturally infected with feline infectious peritonitis virus.**


A strong cell-mediated immunity (CMI) is thought to be indispensable for protection against infection with feline infectious peritonitis virus (FIPV) in cats. In this study, the role of natural killer (NK) cells and regulatory T cells (Tregs), central players in the innate and adaptive CMI respectively, was examined during natural FIPV infection. When quantified, both NK cells and Tregs were drastically depleted from the peripheral blood, mesenteric lymph node (LN) and spleen in FIP cats. In contrast, mesentery and kidney from FIP cats did not show any difference when compared to healthy non-infected control animals. In addition, other regulatory lymphocytes (CD4+CD25-Foxp3+ and CD3+CD8+Foxp3+) were found to be depleted from blood and LN as well. Phenotypic analysis of blood-derived NK cells in FIP cats revealed an upregulation of activation markers (CD16 and CD25) and migration markers (CD11b and CD62L) while LN-derived NK cells showed upregulation of only CD16 and CD62L. LN-derived NK cells from FIPV-infected cats were also significantly less cytotoxic when compared with healthy cats. This study reveals for the first time that FIPV infection is associated with severe suppression of NK cells and Tregs, which is reflected by cell depletion and lowered cell functionality (only NK cells). This will un-doubtedly lead to a reduced capacity of the innate immune system (NK cells) to battle FIPV infection and a decreased capacity (Tregs) to suppress the immunopathology typical for FIP. However, these results will also open possibilities for new therapies targeting specifically NK cells and Tregs to enhance their numbers and/or functionality during FIPV infection.
Whole body computed tomographic characteristics of skeletal and cardiac muscular metastatic neoplasia in dogs and cats.


Vignoli, M., R. Terragni, F. Rossi, L. Fruhauf, B. Bacci, L. Ressel, O. Capitani, and L. Marconato

Muscular metastatic neoplasia has been reported to be rare in domestic animals, however previous studies were based primarily on necropsy findings. The purpose of this retrospective study was to describe whole body computed tomography (CT) characteristics of confirmed muscular metastases in a cohort of dogs and cats presented for oncology evaluation.

Medical records of 1201 oncology patients were reviewed. Included animals underwent pre and postcontrast whole body CT, and CT-guided tru-cut biopsy or fine needle aspiration of one or more metastatic lesions. Twenty-one dogs and six cats met inclusion criteria, representing 2.08% of all canine oncology patients and 3.1% of all feline oncology patients. Mean age was 9.6 years. Postcontrast CT characteristics included well-demarcated, oval-to-round lesions with varying enhancement patterns: ring enhancing (n = 16), heterogeneously enhancing (n = 8), or homogeneously enhancing (n = 5). Five animals showed concurrent and varying nodular patterns. In seven cases (five dogs and two cats), one single muscular nodule was observed. In 20 cases, two or more lesions were observed. In two cases, cardiac hypodense nodules were observed in the postcontrast CT, while appearing isodense in the precontrast study. Necropsy confirmed neoplasia in both of them. Locations of muscular metastases included epaxial/paraspinal muscles of the cervical, thoracic, and lumbar spine (n = 18), superficial muscles of the thoracic wall (n = 13), scapular/shoulder region (n = 3), hind limb (n = 3), and abdominal wall muscles (n = 1). Findings supported the use of pre and postcontrast whole body CT for oncologic staging in dogs and cats, especially for primary tumors characterized by a high metastatic rate.

Feline vector-borne pathogens in the north and centre of Portugal.


Vilhena, H., V. L. Martinez-Diaz, L. Cardoso, L. Vieira, L. Aliet, O. Francino, J. Pastor, and A. C. Silvestre-Ferreira

BACKGROUND: In recent years, several clinical cases and epidemiological studies of feline vector-borne diseases (FVBD) have been reported worldwide. Nonetheless, information on FVBD agents and their prevalence in Portugal is scarce.

METHODS: Three-hundred and twenty domestic cats presented to 30 veterinary medical centres in the north and centre regions of Portugal were randomly sampled. Blood was assayed by real-time polymerase chain reaction (PCR) for genera Anaplasma/Ehrlichia, genus Babesia, Hepatozoon canis, Hepatozoon felis, Leishmania infantum and the genus Rickettsia. Babesia-positive samples were further tested for Babesia canis and Babesia vogeli. RESULTS: Eighty (25.0%) out of the 320 cats were positive to at least one vector-borne agent, including seven (2.2%) cats co-infected with two agents. Two cats (0.6%) were infected with Anaplasma/Ehrlichia spp., four (1.3%) with B. canis, 26 (8.1%) with B. vogeli, 50 (15.6%) with H. felis, one (0.3%) with L. infantum and four (1.3%) with Rickettsia spp. No cat tested positive for H. canis. One cat (0.3%) was co-infected with B. canis and B. vogeli, three (0.9%) with B. vogeli and H. felis, one (0.3%) with H. felis and L. infantum, and two (0.6%) with H. felis and Rickettsia spp. CONCLUSIONS: A considerable prevalence of infection with vector-borne pathogens among the domestic feline population of the north and centre of Portugal has been revealed by the present study. Additionally, this is the first detection of B. vogeli in cats from Europe and of H. felis in cats from Portugal.

Outcomes and complications associated with epicardial pacemakers in 28 dogs and 5 cats.


Visser, L. C., B. W. Keene, K. G. Mathews, W. J. Browne, and G. Chanoit

OBJECTIVE: To report signalment, history, indications, complications and outcome for 28 dogs and 5 cats in which 34 permanent epicardial pacing leads were surgically placed by transdiaphragmatic approach (32) or intercostal thoracotomy (2). METHODS: Medical records (2005-2010) were reviewed. Signalment, age, species, gender, clinical signs, presence of structural heart disease and/or congestive heart failure, ECG diagnosis, body weight (<10 or >10 kg), and overall survival rate were recorded. Statistical correlations were made between these variables and major and minor complications rates.

RESULTS: Except for body weight, no statistical differences were identified in prevalence of major (life threatening or requiring replacement of the pacemaker system) or minor (self-limiting) complications; dogs weighing >10 kg had significantly more major complications (P = 0.03). There was a trend (P = 0.051) for lower survival in animals that had major complications. CONCLUSIONS: Larger dogs (>10 kg) may be predisposed to more major complications with epicardial
pacemaker (EP) implantation. Major complication rate and survival time are similar to those reported for transvenous pacing and therefore implantation of EPs remains a suitable alternative.

Parasite communities in stray cat populations from Lisbon, Portugal.
Waap, H., J. Gomes, and T. Nunes
Stray cats live in high-density colonies in urban areas and pose a health hazard to household cats and humans. In Portugal, information on the parasitic fauna of stray cats is limited and relies mostly on results from faecal analysis. The present survey aimed to determine the prevalence, diversity and intensity of parasites in stray cats from the urban area of Lisbon by means of parasitological necropsy. Internal organs were collected from 162 cats captured in different areas of the city and systematically subjected to parasitological dissection. Helminths were identified by macro- and microscopic examination and protozoa by faecal floatation and sedimentation techniques. The overall prevalence of parasites was 90.7% (95% confidence interval (CI): 85.3-94.6%). A total of 12 parasite species was recorded: Cystoisospora felis (14.2%), Cystoisospora rivolta (46.3%), Sarcocystis sp. (1.2%), Ancylostoma tubaeforme (12.4%), Eucocles aerophilus (0.6%), Taenia taeniaeformis (3.1%), Dipylidium caninum (53.1%), Joyeuxiella pasqualei (15.4%) and Diplopylidium nolleri (3.7%). The prevalence and variety of parasites found in our sampling are substantially higher than the numbers previously reported in Portugal. Some of the parasites, including T. cati and A. tubaeforme, are zoonotic, which emphasizes the need for parasite control strategies based on demographic containment of stray cat populations in urban areas to promote public health protection.

Waite, A. H., K. Jackson, T. P. Gregor, and E. L. Krick
OBJECTIVE: To evaluate the clinical response rate, progression-free survival time, overall survival time, and possible prognostic factors associated with a cyclophosphamide-, vincristine-, and prednisone (COP)-based chemotherapy protocol in cats with lymphoma. DESIGN: Retrospective case series. ANIMALS: 114 cats with lymphoma. PROCEDURES: Medical records of cats receiving a weekly COP-based chemotherapy protocol from 1998 to 2008 at the Matthew J. Ryan Veterinary Hospital of the University of Pennsylvania were evaluated for information regarding signalment, anatomic site of involvement, cell morphology, treatment, and outcome. Retroviral status, baseline weight, substage, anatomic location, dose delays, dose reductions, and response to treatment were evaluated for prognostic importance. RESULTS: The majority of cases (94 [82.4%]) were substage b, and the most common anatomic site was the gastrointestinal tract (57 [50%]). Clinical response rate after the first chemotherapy cycle was 47.4%. Response to treatment was significantly associated with progression-free survival time and overall survival time, whereas substage was significantly associated with progression-free survival time. The median progression-free survival time and overall survival time were 65.5 and 108 days, respectively. Compared with nonresponders, responders had significantly longer median progression-free survival time (364 vs 31 days) and median overall survival time (591 vs 73 days). CONCLUSIONS AND CLINICAL RELEVANCE: Clinical response after 1 cycle of COP-based chemotherapy was predictive for progression-free survival time and overall survival time in cats with lymphoma; therefore, response after 1 cycle of chemotherapy could be used to guide decisions about further treatment. No new prognostic factors were identified.

A new species of Tritrichomonas (Sarcomastigophora: Trichomonida) from the domestic cat (Felis catus).
Walden, H. S., C. Dykstra, A. Dillon, S. Rodning, D. Givens, R. Bird, J. Newton, and D. Lindsay
Feline trichomoniasis is an intestinal disease in cats resulting in chronic diarrhea, flatulence, tenesmus, and fecal incontinence. Bovine trichomoniasis is a sexually transmitted disease of cattle infecting the reproductive tract of cows causing pyometra and possible mid- to late-term abortions. The causative agent for both diseases has been reported to be the
flagellated protozoan, Tritrichomonas foetus. However, several published reports support significant biological differences between T. foetus isolated from bovines and felines. In the present study, we describe Tritrichomonas blagburni n.sp. from the domestic cat (Felis catus) as the causative agent of feline intestinal trichomoniasis. We support our proposal based on results of experimental cross-infection studies between cats and cattle using both feline and bovine isolates of the parasite, differences in pathogenicity between the two parasites for the respective host species, and molecular gene sequencing differences between parasites obtained from domestic cats and parasites obtained from cattle.


Watanabe, S., M. Kawamura, Y. Odahara, Y. Anai, H. Ochi, S. Nakagawa, Y. Endo, H. Tsujimoto, and K. Nishigaki

Feline leukemia virus (FeLV) belongs to the genus Gammaretrovirus, and causes a variety of neoplastic and non-neoplastic diseases in cats. Alteration of viral env sequences is thought to be associated with disease specificity, but the way in which genetic diversity of FeLV contributes to the generation of such variants in nature is poorly understood. We isolated FeLV env genes from naturally infected cats in Japan and analyzed the evolutionary dynamics of these genes. Phylogenetic reconstructions separated our FeLV samples into three distinct genetic clusters, termed Genotypes I, II, and III. Genotype I is a major genetic cluster and can be further classified into Clades 1-7 in Japan. Genotypes were correlated with geographical distribution; Genotypes I and II were distributed within Japan, whilst FeLV samples from outside Japan belonged to Genotype III. These results may be due to geographical isolation of FeLVs in Japan. The observed structural diversity of the FeLV env gene appears to be caused primarily by mutation, deletion, insertion and recombination, and these variants may be generated de novo in individual cats. FeLV interference assay revealed that FeLV genotypes did not correlate with known FeLV receptor subgroups. We have identified the genotypes which we consider to be reliable for evaluating phylogenetic relationships of FeLV, which embrace the high structural diversity observed in our sample. Overall, these findings extend our understanding of Gammaretrovirus evolutionary patterns in the field, and may provide a useful basis for assessing the emergence of novel strains and understanding the molecular mechanisms of FeLV transmission in cats.

Indications, durations and outcomes of mechanical ventilation in dogs and cats with tick paralysis caused by Ixodes holocyclus: 61 cases (2008-2011).


Webster, R., P. Mills, and J. Morton

OBJECTIVES: The primary objectives of this research were to describe the indications for mechanical ventilation, the duration of mechanical ventilation and probability of survival in dogs and cats with respiratory failure induced by the Australian paralysis tick (Ixodes holocyclus). METHODS: A retrospective case series and a retrospective single cohort study were conducted using dogs and cats with tick paralysis requiring mechanical ventilation. An index of oxygenating performance of the lung (PF ratio of partial pressure of oxygen in arterial blood to fraction of inspired oxygen) was derived from arterial blood gas analysis; patients euthanased because of veterinary costs were identified and Kaplan-Meier survival analyses performed. RESULTS: In total, 36.6% of patients were ventilated because of hypoxaemia refractory to oxygen therapy, 38.3% because of hypoventilation, 18.3% because of unsustainable respiratory effort and 6.6% because of respiratory arrest. Median duration of mechanical ventilation was 23 h, median time hospitalised was 84 h and 63.9% of all patients requiring mechanical ventilation survived to discharge from the hospital. Survival probability increased to 75% when cases of cost-based euthanasia were right-censored rather than treated as deaths. The survival probability of patients ventilated because of hypoxaemia (52.6%) was significantly less than for those ventilated because of hypoventilation (90.5%). The first measured PF ratio after commencing mechanical ventilation was not significantly associated with survival probability. CONCLUSIONS: Dogs and cats with tick paralysis requiring mechanical ventilation to manage respiratory failure have reasonable survival probability. Dogs and cats requiring mechanical ventilation because of hypoventilation have a higher survival probability than those with oxygenation failure.

The neuter status of cats at four and six months of age is strongly associated with the owners’ intended age of neutering.
Welsh, C. P., T. J. Gruffydd-Jones, and J. K. Murray

The recommended neutering age of client-owned cats reduced recently from six to four months of age. This study assessed the proportion of cats neutered at these ages. Data were obtained from owner-completed questionnaires at recruitment (8-16-week-old kittens) and 6.5-7 months of age. Demographic and lifestyle factors were assessed for potential association with neuter status using univariable and multivariable logistic regression models. Of 751 study cats, 14.1 per cent and 73.5 per cent had been neutered at (or before) four and six months of age, respectively. Multivariable analysis showed that being neutered at four months was significantly more likely for cats whose owners intended to have their cat neutered by this age, cats with a microchip, and from households in deprived regions. The likelihood of being neutered at six months of age was significantly increased for cats that were insured, obtained from an animal welfare organisation, given their second vaccination, from a household with an annual income of >/= pound10 000, and owned by people intending to have their cat neutered by this age. This study suggests that while neutering rates were high at six months of age, they were low at four months of age, and that further work is required to disseminate the recommended neutering age of four months.

Urinary tract infections in cats with chronic kidney disease.
White, J. D., M. Stevenson, R. Malik, D. Snow, and J. M. Norris

Routine urine cultures were performed in cats with chronic kidney disease (CKD) to assess the overall prevalence and clinical signs associated with a positive urine culture (PUC). An occult urinary tract infection (UTI) was defined as a PUC not associated with clinical signs of lower urinary tract disease or pyelonephritis. Multivariate logistic and Cox proportional hazard regression models were used to evaluate the risk factors for an occult UTI and its relationship with survival. There were 31 PUCs from 25 cats. Eighty-seven percent of PUCs had active urine sediments. The most common infectious agent was Escherichia coli and most bacteria were sensitive to amoxicillin-clavulanate. Eighteen of 25 cats had occult UTIs. Among cats with occult UTI, increasing age in female cats was significantly associated with PUC; no significant association between occult UTI and survival was found and serum creatinine was predictive of survival in the short term (200 days) only. In conclusion, among cats with CKD, those with occult UTI were more likely to be older and female, but there was no association with severity of azotaemia. The presence of an occult UTI, when treated, did not influence survival.

Ultrasonographic Findings of the Pancreas in Cats with Elevated Serum Pancreatic Lipase Immunoreactivity.

BACKGROUND: Pancreatitis is a common disease in cats that is difficult to diagnose. HYPOTHESIS/OBJECTIVES: To determine the sensitivity and specificity of ultrasonographic changes of the pancreas with serum feline pancreatic lipase immunoreactivity (fPLI) as the standard for diagnosis of pancreatitis. ANIMALS: 35 cats with clinical signs consistent with pancreatitis with an abdominal ultrasound examination and serum fPLI concentration measured within 3 days of the ultrasound. METHODS: Retrospective study: Pancreatic thickness, pancreatic margination, pancreatic echogenicity, and peripancreatic fat echogenicity were evaluated. Sensitivity and specificity were calculated with an elevated serum fPLI concentration indicative of pancreatitis as the standard for diagnosis. RESULTS: Serum fPLI was elevated and diagnostic for pancreatitis in 19 of 35 cats. The single ultrasound characteristic with the highest sensitivity was hyperechoic peripancreatic fat at 68% (95% confidence interval = 44-87%), indicating a moderate probability that cats with pancreatitis will have this abnormality on ultrasonographic examination. Specificity was >90% for each of increased pancreatic thickness, abnormal pancreatic margin, and hyperechoic peripancreatic fat. The sensitivity and specificity of ultrasound were 84% (95% confidence interval = 60-97%) and 75% (95% confidence interval = 48-93%), respectively, in cats with elevated serum fPLI indicative of pancreatitis. CONCLUSIONS AND CLINICAL IMPORTANCE: The presence of a thick left limb of the pancreas, severely irregular pancreatic margins, and hyperechoic peripancreatic fat in cats with appropriate clinical signs and elevated serum fPLI are highly supportive of pancreatitis.

Renin-angiotensin-aldosterone system activity in hyperthyroid cats with and without concurrent hypertension.
**Williams, T. L., J. Elliott, and H. M. Syme**

**BACKGROUND:** Hypertension is present in some hyperthyroid cats at diagnosis or can develop after treatment for hyperthyroidism. Activation of the renin-angiotensin-aldosterone system (RAAS) could be involved in the pathogenesis of hypertension. **HYPOTHESIS:** Hyperthyroid cats that develop hypertension before or after treatment for hyperthyroidism will have greater RAAS activation than normotensive cats. **ANIMALS:** Ninety-nine hyperthyroid cats. **METHODS:** Retrospective case-control study. Plasma renin activity (PRA) and plasma aldosterone concentration (PAC) were measured in untreated hyperthyroid hypertensive cats (HT-Pre group), initially normotensive hyperthyroid cats that develop hypertension after treatment (HT-Post group), and hyperthyroid cats that are normotensive (NT group). Data are presented as median [25th, 75th percentile]. **RESULTS:** Baseline PRA was not significantly different among the 3 groups (HT-Pre group 1.50 [0.05, 2.37] ng/mL/h, HT-Post group 0.66 [0.17, 2.31] ng/mL/h, NT group 1.11 [0.57, 2.18] ng/mL/h; P =.44). PRA decreased significantly after treatment in the NT group (1.09 [0.53, 2.47] versus 0.22 [0.05, 0.76] ng/mL/h; P <.001) and the HT-Post group (0.71 [0.17, 2.33] versus 0.28 [0.07, 0.57] ng/mL/h; P =.006). Baseline PAC was not significantly different among the 3 groups (HT-Pre group 72.2 [40.0, 145.6] pg/mL, HT-Post group 69.7 [43.3, 142.6] pg/mL, NT group 109.0 [68.2, 184.6] pg/mL; P =.10). PAC decreased significantly after treatment in the NT group (114.4 [56.6, 204.1] versus 59.5 [32.4, 98.2] pg/mL; P <.001) but did not change significantly in the HT-Post group (61.2 [44.9, 124.0] versus 58.4 [42.0, 97.7] pg/mL; P =.59). **CONCLUSIONS AND CLINICAL IMPORTANCE:** RAAS activation occurs in hyperthyroid cats, but is not associated with the development of hypertension. PAC is not influenced by changes in PRA in hyperthyroid cats that develop hypertension after treatment, perhaps indicating RAAS dysfunction in these cats.

**Adaptive host manipulation by Toxoplasma gondii: fact or fiction?**


**Worth, A. R., A. J. Lymbery, and R. C. Thompson**

It is widely accepted that behavioural changes induced by Toxoplasma gondii are an adaptation of the parasite to enhance transmission to its cat definitive host. In our opinion, this explanation requires a rethink. We argue that the experimental evidence that observed behavioural changes will enhance transmission to cats is not convincing. We also argue that cats and sexual reproduction may not be essential for transmission and maintenance of this parasite. Thus, the selection pressure to infect a cat may not be sufficiently strong for the evolution of adaptive host manipulation to have occurred in order to enhance predation by cats.

**Chlamydia felis exposure in companion dogs and cats in Lanzhou, China: a public health concern.**


**BACKGROUND:** Chlamydiaceae is a family of obligate intracellular pathogens with a worldwide distribution in many animal species, including humans. No information exists on the prevalence of Chlamydia felis infections in cats and dogs in Lanzhou, the geographical center of China. The aim of this study was to carry out a census of cats and dogs in Lanzhou and document the seroprevalence of C. felis exposure in these companion animals. **RESULTS:** In this study, blood samples were collected from 485 animals (221 cats and 264 pet dogs) in Lanzhou between November 2010 and July 2011 to identify antibodies against C. felis. Thirteen of 221 (5.9%) cats and 32 of 264 (12.1%) pet dogs were positive for C. felis infection using indirect hemagglutination at a cutoff of 1:16. The seroprevalence in household and stray cats was 3.9% and 14.3%, respectively, and the difference was statistically significant (P < 0.05). Among different age groups, the seroprevalence in cats varied from 1.9 to 7.9%, and that in dogs ranged from 9.6 to 20.4%; however, the differences were not statistically significant (P > 0.05). **CONCLUSIONS:** This is the first report of the seroprevalence of C. felis exposure in cats and dogs in Lanzhou, northwestern China. Our results indicate that the presence of C. felis exposure in cats and dogs may pose a potential threat to human health.

**Comparison between 2-(18) f-fluoro-2-deoxy-d-glucose positron emission tomography and contrast-enhanced computed tomography for measuring gross tumor volume in cats with oral squamous cell carcinoma.**


**Yoshikawa, H., E. K. Randall, S. L. Kraft, and S. M. Larue**
Feline oral squamous cell carcinoma is one of the most refractory feline malignancies. Most patients succumb due to failure in local tumor control. 2-(18) F-fluoro-2-deoxy-D-glucose positron emission tomography ((18) F-FDG PET) is increasingly being used for veterinary oncology staging as it highlights areas with higher glucose metabolism. The goal of the current prospective study was to compare gross tumor volume measurements using (18) F-FDG PET vs. those using computed tomography (CT) for stereotactic radiation therapy planning in cats with oral squamous cell carcinoma. Twelve cats with confirmed oral squamous cell carcinoma underwent pretreatment (18) F-FDG PET/CT. Gross tumor volumes based on contrast-enhanced CT and (18) F-FDG PET were measured and compared among cats. Mean PET gross tumor volume was significantly smaller than mean CT gross tumor volume in the mandibular/maxillary squamous cell carcinoma group (n = 8, P = 0.002) and for the total number of patients (n = 12, P = 0.006), but not in the lingual/laryngeal group (n = 4, P = 0.57). Mismatch fraction analysis revealed that most of the lingual/laryngeal patients had a large region of high-(18) F-FDG activity outside of the CT gross tumor volume. This mismatch fraction was significantly greater in the lingual/laryngeal group than the mandibular/maxillary group (P = 0.028). The effect of poor spatial resolution of PET imaging was greater when the absolute tumor volume was small. Findings from this study indicated that (18) F-FDG PET warrants further investigation as a supplemental imaging modality in cats with oral squamous cell carcinoma because it detected regions of possible primary tumor that were not detected on CT images.

Oral and maxillofacial surgery in dogs and cats.
Zacher, A. M., and S. M. Marretta
Advancements in diagnostic and treatment modalities for oral and maxillofacial surgery have allowed veterinarians to offer clients a range of alternatives for their pets. Categories of oral and maxillofacial surgery reviewed in this article include jaw fracture management, management of palatal/oronasal defects, recognition and treatment of oral masses, and management of several miscellaneous pathologic conditions. Miscellaneous oral lesions discussed in this article include odontogenic cysts, osteonecrosis and osteomyelitis, and lesions of the tongue and lips.

Noninvasive measurements of body composition and body water via quantitative magnetic resonance, deuterium water, and dual-energy x-ray absorptiometry in cats.
OBJECTIVE: To compare quantitative magnetic resonance (QMR), dual-energy x-ray absorptiometry (DXA), and deuterium oxide (D2O) dilution methods for measurement of total body water (TBW), lean body mass (LBM), and fat mass (FM) in healthy cats and to assess QMR precision and accuracy. ANIMALS: Domestic shorthair cats (58 and 32 cats for trials 1 and 2, respectively). PROCEDURES: QMR scans of awake cats performed with 2 units were followed by administration of D2O tracer (100 mg/kg, PO). Cats then were anesthetized, which was followed by QMR and DXA scans. Jugular blood samples were collected before and 120 minutes after D2O administration. RESULTS: QMR precision was similar between units (coefficient of variation < 2.9% for all measures). Fat mass, LBM, and TBW were similar for awake or sedated cats and differed by 4.0%, 3.4%, and 3.9%, respectively, depending on the unit. The QMR minimally underestimated TBW (1.4%) and LBM (4.4%) but significantly underestimated FM (29%), whereas DXA significantly underestimated LBM (9.2%) and quantitatively underestimated FM (9.3%). A significant relationship with D2O measurement was detected for all QMR (r(2) > 0.84) and DXA (r(2) > 0.84) measurements. CONCLUSIONS AND CLINICAL RELEVANCE: QMR was useful for determining body composition in cats; precision was improved over DXA. Quantitative magnetic resonance can be used to safely and rapidly acquire data without the need for anesthesia, facilitating frequent monitoring of weight changes in geriatric, extremely young, or ill pets. Compared with the D2O dilution method, QMR correction equations provided accurate data over a range of body compositions.

Domestic cats and dogs are susceptible to H9N2 avian influenza virus.
Zhang, K., Z. Zhang, Z. Yu, L. Li, K. Cheng, T. Wang, G. Huang, S. Yang, Y. Zhao, N. Feng, J. Fu, C. Qin, Y. Gao, and X. Xia
Replication and transmission of avian influenza virus (AIV) in domestic dogs and cats may pose a risk to humans. The susceptibility of cats and dogs to H9N2 influenza virus was evaluated by intranasally or orally inoculating animals with an H9N2 influenza virus. Cats had recoverable virus in respiratory tissues and the olfactory bulb three days post-inoculation and shed H9N2 virus into nasal washes and pharyngeal swabs from day 2 through day 10 post-inoculation. Virus was recovered from respiratory tissues of dogs three days post-inoculation, but was not detected in nasal washes or pharyngeal swabs. While no virus shedding or replication was detected in cats or dogs following consumption of H9N2-infected chicks, one of two cats and one of two dogs seroconverted. Two of three naive contact cats seroconverted following co-housing with cats that were intranasally inoculated with H9N2 virus, whereas none of the three naive contact dogs seroconverted. Our results demonstrate that H9N2 AIV can infect domestic cats and dogs via the upper respiratory tract and indicate that cats are more susceptible than dogs to H9N2 AIV. These findings suggest that domestic dogs and cats may serve as host species contributing to the adaptation of H9N2 viruses in mammals.

**Serum feline-specific pancreatic lipase immunoreactivity concentrations and abdominal ultrasonographic findings in cats with trauma resulting from high-rise syndrome.**


Zimmermann, E., K. M. Hittmair, J. S. Suchodolski, J. M. Steiner, A. Tichy, and G. Dupre

OBJECTIVE: To evaluate serum feline-specific pancreatic lipase immunoreactivity (fPLI) concentrations and abdominal ultrasonographic findings in cats with trauma resulting from high-rise syndrome. DESIGN: Prospective case series. Animals: 34 client-owned cats. PROCEDURES: From cats evaluated because of high-rise syndrome between March and October 2009, a blood sample was obtained for measurement of serum fPLI concentration within 12 hours after the fall and at 24, 48, and 72 hours after the first blood collection. Pancreatitis was diagnosed in cats with an fPLI concentration > 5.4 mug/L. Each cat had abdominal ultrasonography performed twice 48 hours apart, and pancreatic trauma was assessed via detection of pancreatic enlargement, hypoechoic or heteroechoic pancreatic parenchyma, hyperechoic mesentery, and peritoneal effusion. Cats were assigned 1 point for each abnormality present, and a cumulative score >/= 3 was considered suggestive of traumatic pancreatitis. RESULTS: Traumatic pancreatitis was diagnosed in 9 and 8 cats on the basis of serum fPLI concentration and ultrasonographic findings, respectively. For cats with pancreatitis, fPLI concentration was significantly higher at 12 and 24 hours after the fall than at 48 and 72 hours after the fall, and serum fPLI concentration decreased as time after the fall increased. Significant agreement existed between the use of serum fPLI concentration and abdominal ultrasonography for the diagnosis of traumatic pancreatitis. CONCLUSIONS AND CLINICAL RELEVANCE: Cats with high-rise syndrome often had serum fPLI concentrations > 5.4 mug/L within 12 hours after the fall, and concurrent evaluation of those cats via abdominal ultrasonography twice, 48 hours apart, improved detection of traumatic pancreatitis.