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Contributor

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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.
Comparison of feline core bone marrow biopsies from different sites using 2 techniques and needles.
Abrams-Ogg, A. C., A. Defarges, and D. Bienzle
BACKGROUND: Commonly used 11ga or 13ga biopsy needles are relatively large for cats and often preclude successful collection of bone marrow (BM) core biopsies. OBJECTIVES: The objective was to compare 15ga to 13ga BM core biopsy ease of collection and specimen quality. METHODS: In 10 cats, humeral biopsies obtained with 15ga EZ-IO needles were compared with iliac biopsies obtained with 13ga Jamshidi needles. Body condition, ease of collection, section quality, postprocedure pain, and swelling at biopsy sites were scored. Specimen length on mounted slides was measured and specimens with quality scores of 3-5 out of a maximum value of 5 were considered to be of acceptable diagnostic quality. The distribution of all parameters was assessed by Shapiro-Wilk tests, and differences in parameters were assessed by ANCOVA. RESULTS: There were no significant differences between 15ga and 13ga biopsies, except that the 15ga humeral biopsy was judged to be easier to perform than 13ga iliac biopsy, and there was more severe postbiopsy swelling with 13ga biopsies. Facility score (mean +/- SD), section quality score (median +/- SD) and specimen length (mm, mean +/- SD) were 12.7 +/- 2.3, 2.0 +/- 1.4, and 6.0 +/- 2.1 for 15ga biopsies, respectively, and 8.9 +/- 2.4, 1.0 +/- 1.8, and 7.5 +/- 2.5 for 13ga biopsies, respectively. Three specimens of acceptable quality were obtained with each 15ga and 13ga biopsies. CONCLUSIONS: In cats, BM biopsy of the humerus with a 15ga needle is easier and causes less postbiopsy swelling than biopsy of the ilium with a 13ga needle. Sites and needles are equivalent with respect to yielding specimens of acceptable quality. Neither technique consistently captured high-quality specimens.

A new multi-host species indirect ELISA using protein A/G conjugate for detection of anti-Toxoplasma gondii IgG antibodies with comparison to ELISA-IgG, agglutination assay and Western blot.
Al-Adhami, B. H., and A. A. Gajadhar
Toxoplasma gondii is a zoonotic protozoan parasite which can cause significant disease and losses in livestock and wild animals. It is increasingly recognized as an important foodborne pathogen in a broad range of food animals and products. Effective control strategies require rapid, reliable and cost-effective detection methods for large scale surveys and diagnostic applications in a broad range of warm-blooded animals. To overcome one or more of these shortcomings in the currently available detection methods for T. gondii infection a non-species-specific protein A/G conjugate was used in the development of an indirect ELISA (ELISA-A/G) for the detection of IgG antibodies in serum samples obtained from experimentally infected pigs. The performance of the assay was evaluated using serum samples from pigs, cats, mice and seals with known positive or negative status for T. gondii infection. Results of the ELISA-A/G obtained with pig serum samples were compared with those generated by traditional ELISA using host specific IgG conjugate (ELISA-IgG), modified agglutination test (MAT) and Western blot analysis (WB). Using protein A/G conjugate, comparative analysis of results from 77 samples obtained from T. gondii infected pigs showed excellent agreement between the ELISA-A/G and inhouse ELISA-IgG (0.917 kappa). Similar agreements were also observed when these samples were tested by a commercial ELISA kit (0.816 kappa), MAT (0.816 kappa) and WB (0.79 kappa). A total of 86 serum samples obtained from cats, mice and seals experimentally infected with T. gondii and tested by the ELISA-A/G as well as MAT for the presence of anti-Toxoplasma IgG antibodies yielded Kappa value of 1.0 for cats and mice and 0.79 for seals. These results show that the ELISA-A/G is a suitable method for serological detection of T. gondii infection in multiple host species and has the potential for testing samples from a broad range of domestic, wild, and aquatic mammalian host species. Simultaneous testing of samples from multiple host species on the same ELISA plate, and the use of multiple plates in a single run for large scale screening will enhance the cost effectiveness and speed of the test in the control and management of toxoplasmosis. This study also shows the effectiveness of the protein A/G conjugate in a modified WB assay for confirmation of T. gondii infection in mammalian hosts. Appropriate validation studies using field samples from various host species to validate the performance of ELISA-A/G is recommended prior to its application for diagnostic and surveillance programs.

Reference values and repeatability of buccal mucosal bleeding time in healthy sedated cats.
Alatzas, D. G., M. E. Mylonakis, G. M. Kazakos, P. Kostoulas, M. Kritsepi-Konstantinou, and Z. S. Polizopoulou
Bleeding time is a screening test for the evaluation of primary haemostasis. As there is currently limited information on the
reference interval (RI) and repeatability of the test in the cat compared with the dog, the purpose of the study was to establish the RI of buccal mucosa bleeding time (BMBT) in healthy cats and to investigate the intra-observer repeatability of the test. Fifty-six cats were prospectively enrolled in the study. The animals were deemed to be healthy based on history, physical examination, complete blood count, serum biochemistry, and negative serological testing for feline leukaemia and immunodeficiency viruses. All cats were sedated with ketamine, dexmedetomidine and morphine, and the BMBT was sequentially measured in the left and right exposed buccal mucosa following a standardised incision made by a commercially available, disposable, bleeding time device. The mean BMBT was 58.6 s and the RIs ranged from 34 to 105 s (Bootstrap estimation). The intra-observer repeatability was up to 87 s (Bland-Altman plot). The results of this study imply that the combination of ketamine, dexmedetomidine and morphine is a safe and useful sedative protocol allowing for the reliable measurement of BMBT in the cat. The RI of feline BMBT may range from 34 to 105 s and the BMBT may differ by up to 87 s for any two consecutive readings for an individual cat.

Simultaneous detection of the feline lungworms Troglostrongylus brevior and Aelurostrongylus abstrusus by a newly developed duplex-PCR.
Annoscia, G., M. S. Latrofa, B. E. Campbell, A. Giannelli, R. A. Ramos, F. Dantas-Torres, E. Brianti, and D. Otranto
In addition to Aelurostrongylus abstrusus (Strongylida: Angiostrongylidae), referred to as the feline lungworm, Troglostrongylus brevior (Strongylida: Crenosomatidae) has recently been identified as an agent of broncho-pulmonary infestations in cats. These two parasites have a similar biology, share ecological niches, potentially co-infesting cats, but are difficult to be differentiated due to the morphological similarities of their first-stage larvae (L1). This paper describes a molecular tool, based on single-step duplex polymerase chain reaction (duplex-PCR) on the ribosomal internal transcribed spacer 2 region (ITS-2) for the simultaneous detection and differentiation of T. brevior and A. abstrusus. L1 of both species were collected from faecal samples, morphologically identified, and single larval specimens isolated. An aliquot of faeces was used as a test sample for a case of mixed natural infestation. The duplex-PCR was performed using species-specific forward primer sets for the ITS-2 region (i.e., A. abstrusus: 220bp; T. brevior: 370bp). The detection limit of the molecular assay was also assessed by serial dilutions of DNA from single larvae of both species (from approximately 4.0 to 4.0 x 10(-5) mug/μl). The duplex-PCR carried out on individual DNA samples was able to detect as low as 5.2 x 10(-3) mug/μl of DNA for A. abstrusus, 4.9 x 10(-3)μg/μl for T. brevior, and as low as 4.0 x 10(-3) mug/μl for samples containing both species. Species-specific bands of the expected sizes and two bands were simultaneously amplified from the faecal sample containing both species. The phylogeographic analyses of the ITS-2 sequences here examined and those available for other metastrongyloids were concordant in clustering them with those of other Troglostrongylus brevior and A. abstrusus sequences available in GenBank database. This molecular approach proved to be effective and highly sensitive for the simultaneous detection of the two lungworms species and it might be used for molecular epidemiological studies and for monitoring therapeutic protocols.

A questionnaire on survival of kittens depending on the blood groups of the parents.
Axner, E.
Cats more than 2 months of age have alloantibodies against the blood type antigen that they do not possess. Maternal antibodies, including alloantibodies against blood groups, are transferred to the kittens’ systemic circulation when they suckle colostrum during the first 12-16 h after birth. If kittens with blood group A or AB nurse from a mother with blood group B they may develop neonatal isoerythrolysis (NI). Breeders can prevent kittens at risk of NI from nursing during the first 16-24 h; after this period it is safe to let them nurse. Kittens depend, however, on the passive transfer of antibodies from the colostrum for early protection against infections. Although it is known that kittens deprived of colostrum will also be deprived of passive systemic immunity, it is not known if this will affect their health. Therefore, the aim of this study was to evaluate kitten mortality in litters with B-mothers and A-fathers compared to litters with A-mothers. In addition, the aim was to evaluate the effects of colostrum deprivation on the health of the mothers’, and the breeders’ opinions and experiences of these combinations of breedings. A web-based questionnaire was constructed and distributed to breeders. The results indicate that there is no difference in mortality between planned litters that have mothers with blood group A and litters with mothers that have blood group B and fathers that have blood group A. When managing blood group incompatibility in cats all factors affecting the health of the cats, including genetic variation, should be considered.
Comparative In Vivo Analysis of Recombinant Type II Feline Coronaviruses with Truncated and Completed ORF3 Region.
Balint, A., A. Farsang, Z. Zadori, and S. Belak

Our previous in vitro comparative study on a feline coronavirus (FCoV) pair, differing only in the intactness of their ORF3abc regions, showed that the truncated ORF3abc plays an important role in the efficient macrophage/monocyte tropism of type II feline infectious peritonitis virus (FIPV). In the present study, we describe a challenge experiment with the same recombinant FCoVs in order to gain data on the in vivo characteristics of these viruses. While parent virus FIPV DF-2 developed feline infectious peritonitis in all the infected cats, its recombinant virus PBFIPV-DF-2, differing only in seven nucleotides, proved to be surprisingly low virulent, although caused an acute febrile episode similarly to the original FIPV DF-2. PBFIPV-DF-2 infection induced significantly lower virus neutralization titers than its parent virus, and lacked the second phase of viremia and development of fatal course of the disease. The recombinant PBFIPV-DF-2-R3i with completed ORF3abc gained biological properties that differentiate between the feline enteric coronavirus (FECV) and FIPV biotypes such as intensive replication in the gut, absence of viremia and weak or no serological response. Using reverse genetic approaches our study is the first experimental proof that ORF3abc is indeed responsible for the restriction of FECV replication to the intestine in vivo.

Cats in recent Chinese study on cat domestication are commensal, not domesticated.
Bar-Oz, G., L. Weissbrod, and E. Tsahar

A review of the cat liver fluke Platynosomum fastosum Kossack, 1910 (Trematoda: Dicrocoeliidae).
Basu, A. K., and R. A. Charles

Platynosomum fastosum is a small hepatic trematode found in the biliary ducts and gall bladder of cats and other mammals. It is commonly found in tropical and subtropical regions. Some aspect of the life cycle of this parasite is not fully understood, however terrestrial snails, lizards and isopods are implicated as intermediate/paratenic hosts. The disease caused by P. fastosum is platynosomiais (named after the parasite) or ‘lizard poisoning’ since it is assumed that affected cats acquire the parasite by eating infected lizards. The clinical signs due to infection with P. fastosum may range from asymptomatic to progressive disease and at times death due to biliary tract obstruction and hepatic failure. Infection with this parasite should, therefore, be included in the differential diagnosis of cats with signs of hepatic diseases.

Evidence-based dentistry as it relates to dental materials.
Bayne, S. C., and M. Fitzgerald

Evidence-based dentistry (EBD) is reviewed in depth to underscore the limitations for evidence-based dental materials information that exist at this time. Anecdotal estimates of evidence for dental practice are in the range of 8 percent to 10 percent. While the process of evaluating the literature base for dental evidence began 20 years ago, it was not practical to implement it until high-speed wireless connections, open access to journals, and omnipresent connections via smart phones became a reality. EBD includes five stages of information collection and analysis, starting with a careful definition of a clinical question using the PICO(T) approach. Clinical evidence in randomized control trials is considered the best. Clinical trial perspectives (prospective, cross-sectional, retrospective) and outcome designs (RCTs, SCTs, CCTs, cohort studies, case-control studies) are quite varied. Aggregation techniques (including meta-analyses) allow meaningful combinations of clinical data from trials with similar designs but with fewer rigors. Appraisals attempt to assess the entire evidence base.
without bias and answer clinical questions. Varying intensities to these approaches, Cochrane Collaboration, ADA-EBD Library, UTHSCSA CATs Library, are used to answer questions. Dental materials evidence from clinical trials is infrequent, short-term, and often not compliant with current guidelines (registration, CONSORT, PRISMA). Reports in current evidence libraries indicate less than 5 percent of evidence is related to restorative dental materials.

Molecular phenotype of primary mammary tumours and distant metastases in female dogs and cats.
Distant metastases represent a major step in the progression and fatal outcome of canine and feline mammary carcinomas. Recent studies have characterized the molecular phenotypes of mammary tumours and provided information on molecules that may allow targeted therapy in sites from which the tumours may not readily be surgically resected. Molecular phenotypes were determined immunohistochemically in three feline and two canine cases of mammary neoplasia, each presenting with multiple distant metastases. These tumours and their metastases often overexpressed the c-erbB-2 phenotype. A basal-like phenotype was found in the distant metastases from two cases. These findings suggest that canine and feline mammary tumours with distant metastases may be amenable to novel targeted therapies.

Prevalence of circumcaval ureters and double caudal vena cava in cats.
Belanger, R., C. L. Shmon, P. J. Gilbert, and K. A. Linn
OBJECTIVE: To determine the prevalence of circumcaval ureters and other caudal vena cava variations in cats and determine whether circumcaval ureters were associated with macroscopic evidence of ureteral obstruction. SAMPLE: 301 domestic cat cadavers obtained from an animal shelter. PROCEDURES: All cat cadavers were examined, and anatomic variations of the ureters and caudal vena cava were recorded. In cadavers with a circumcaval ureter, kidney length, width, and height were measured, and the ureters were examined macroscopically to determine whether there was gross evidence of ureteral obstruction in cats with circumcaval ureters. RESULTS: At least 1 circumcaval ureter was present in 106 of the 301 (35.2%) cats, with a right circumcaval ureter identified in 92 (30.6%) cats, a left circumcaval ureter identified in 4 (1.3%), and bilateral circumcaval ureters identified in 10 (3.3%). Twenty-one (7.0%) cats had a double caudal vena cava, including 2 cats in which the double caudal vena cava was the only anatomic abnormality identified. No sex predilection for anatomic abnormalities was found. Mean right kidney length was significantly greater than mean left kidney length in cats with a right circumcaval ureter. CONCLUSIONS AND CLINICAL RELEVANCE: Circumcaval ureter was present in approximately a third of cats in this study. Variation in the development of the caudal vena cava is the proposed cause. The clinical relevance of this variation is unknown.

A survey of owners’ perceptions and experiences of radioiodine treatment of feline hyperthyroidism in the UK.
Boland, L. A., J. K. Murray, C. P. Bovens, and A. Hibbert
The efficacy of radioiodine treatment of feline hyperthyroidism is well established; however, limited information is known about owners’ perceptions or experiences of radioiodine. This study aimed to examine factors that influence owner treatment choices and their opinions following radioiodine. Surveys were sent to owners of cats referred for radioiodine treatment between 2002 and 2011 (radioiodine group; 264 cats) and owners of non-radioiodine-treated hyperthyroid cats seen at first-opinion practices (control group; 199 cats). The response rate was 67.0% (310 returned: 175 radioiodine, 135 control). Of 135 controls, 72 (53.3%) were unaware of radioiodine as a treatment option. Owners of cats >/=15 years old and uninsured cats were less likely to pursue radioiodine. Cost of treatment, travel distance, potential human or animal health risks and waiting periods for radioiodine had a low impact on owners’ treatment choice. Owners reported a moderate level of concern about treatment hospitalisation length, which included (158 respondents) the possibility of the cat being unhappy 130 (82.3%), owner missing the cat 102 (64.6%), inappetence 50 (31.6%), other pets missing the cat 32 (20.3%), development of co-morbid disease 28 (17.7%) and side effects 25 (15.8%). Owners assessed their cat’s quality of life on a scale of 1 (very poor) to 10 (excellent), as 4 (4) (median [interquartile range]) pre-radioiodine (134 respondents) and 9 (2)
Borgeat, K., J. Wright, O. Garrod, J. R. Payne, and V. L. Fuentes

BACKGROUND: Population characteristics and outcome of cats with arterial thromboembolism (ATE) managed in general practice (GP) have been poorly described. HYPOTHESIS: Cats with ATE presenting to GP are usually euthanized at presentation, but survival times >1 year are possible. ANIMALS: Cats with ATE managed by 3 GP clinics in the United Kingdom. METHODS: Records of cases presenting to GP over a 98-month period (2004-2012) were reviewed. Cats with an antemortem diagnosis of limb ATE were included. Outcome information was obtained. RESULTS: Over 98 months, 250 cats were identified with ATE. Prevalence was approximately 0.3%. At presentation, 153 cats (61.2%) were euthanized, with 68/97 (70.1%) of the remaining cats (27.2% of the total population) surviving >24 hours after presentation. Of these, 30/68 (44.1%) survived for at least 7 days. Hypothermia (HR, 1.44; 95% CI, 1.002-2.07; P =.049) and management by Clinic 2 (HR, 5.53; 95% CI, 1.23-24.8; P =.026) were independent predictors of 24-hour euthanasia or death. For cats surviving >24 hours, hypothermia (HR, 2.25; 95% CI, 1.12-4.48; P =.021) and failure to receive aspirin, clopidogrel, or both (HR, 8.26; 95% CI, 1.39-50; P =.001) were independent predictors of euthanasia or death within 7 days. For cats that survived >/=7 days, median survival time was 94 (95% CI, 42-164) days, with 6 cats alive 1 year after presentation. CONCLUSIONS: Although 153/250 cats were euthanized at presentation, 6 cats survived >12 months. No factors were identified that predicted euthanasia on presentation.

High diversity of plasmids harbouring blaCMY-2 among clinical Escherichia coli isolates from humans and companion animals in the upper Midwestern USA.
J Antimicrob Chemother (2014)

OBJECTIVES: To determine the population structure and genetic relatedness of plasmids encoding CMY-2 beta-lactamase in clinical Escherichia coli from humans and companion animals within a defined geographical area. METHODS: In total, 42 human and 73 companion animal isolates displaying an AmpC phenotype were isolated at a regional diagnostic reference laboratory in the upper Midwestern USA during 2009-11. Following PCR screening for transferable AmpC genes and plasmid transformation, blaCMY-2-positive plasmids were characterized by S1 nuclease PFGE, PCR-based replicon typing, antimicrobial susceptibility testing of transformants, conjugation experiments, plasmid multilocus sequence typing and restriction fragment length polymorphism. RESULTS: blaCMY-2 occurred in 6 (14%), 56 (86%) and 6 (75%) isolates from humans, dogs and cats, respectively. Usually plasmids carrying blaCMY-2 were conjugative (78%) and did not contain additional resistance genes (82%). The replicon types were IncI1 (52%), IncA/C (13%), IncFII (10%), IncI2 (5%), IncL/M (3%), IncB/O (2%) or non-typeable (15%). Related IncI1/ST12 plasmids were detected in one human and five canine isolates, while the remaining plasmids did not show similarity across host species. A novel epidemiological linkage of blaCMY-2 with IncL/M plasmids and a new CMY gene variant (blaCMY-108) were found in human isolates.
CONCLUSIONS: This study is one of the first One Health attempts to compare plasmids encoding CMY-2 beta-lactamase among clinical isolates from humans and companion animals in the same region. The results indicate an unforeseen heterogeneity of plasmid backgrounds and suggest limited exchange between the two populations, in which blaCMY-2 occurred at very different frequencies and was harboured by distinct plasmid types.

Preliminary experience with stenting for management of non-uroolith urethral obstruction in eight cats.
Brace, M. A., C. Weisse, and A. Berent

OBJECTIVE: To (1) describe minimally invasive transurethral antegrade and retrograde techniques for the placement of self-expanding metallic stents (SEMS) to reestablish urethral patency in cats with non-uroolith urethral obstructions and (2)
to report the procedural complications, incontinence rates, and long-term effectiveness in maintaining a patent urethra.

**STUDY DESIGN:** Case series. **ANIMALS:** Cats (n = 8). **METHODS:** Signalment, history, clinical signs, physical examination, severity of stranguria and incontinence, clinicopathologic data, diagnostic procedures performed, diagnosis, interventional technique, type and dimensions of stent placed, complications and final outcome of 8 cats treated with SEMS for the management of urethral strictures or masses are presented. Each cat was followed for >/=12 months. Follow-up information was obtained from the medical record or by telephone interview of the owner and/or referring veterinarian.

**RESULTS:** Four cats were continent after stent placement, 2 were moderately incontinent, and 2 were severely incontinent. Long-term follow-up (median, 462 days) was available. At follow-up, 5 cats were alive and 3 had been euthanatized at 88, 233, and 305 days. Long-term outcome, as assessed by the authors, was good (1) to excellent (3) in 4 cats, and fair (2) to poor (2) in 4 cats. Owner reported outcomes were excellent in 3/8, good to excellent in 1/8, good in 2/8, and poor in 2/8.

**CONCLUSION:** Palliative stenting of urethral obstructions is a minimally invasive method to re-establish urethral patency in cats.

**Evaluation of canine and feline leishmaniasis by the association of blood culture, immunofluorescent antibody test and polymerase chain reaction.**


*Braga, A. R., H. Langoni, and S. B. Lucchesi*

**BACKGROUND:** This study aimed to evaluate the occurrence of Leishmania spp. in dogs and cats from Botucatu, Sao Paulo state, and Campo Grande, Mato Grosso do Sul state, Brazil, by the association of three diagnostic tests: blood culture in liver infusion tryptose medium, immunofluorescent antibody test and polymerase chain reaction. Fifty blood samples of dogs and cats from the Center for Zoonosis Control in Campo Grande, an area endemic for canine visceral leishmaniasis, were collected randomly, as well as canine and feline blood samples from the Municipal Kennel and Animal Protection Association in Botucatu, currently considered a transmission-free, non-endemic area. **RESULTS:** Of the 50 dog blood cultures from Botucatu, three (6%) were positive and of the 50 cats, two (4%) were positive. In Campo Grande, 29 dog blood cultures (58%) were positive and all (100%) cats negative by this test. Polymerase chain reaction detected Leishmania spp. in 100% of dog and cat samples from Botucatu but found all the cats from Campo Grande to be negative. On the other hand, 36 dogs from Campo Grande were positive (72%) by the same technique. Immunofluorescent antibody test in Botucatu found 100% of dogs and cats non-reactive, while in Campo Grande, it detected positivity in 32 dogs (64%) and 15 cats (30%). **CONCLUSIONS:** The results show the importance of not only continuous epidemiological surveillance in areas not endemic for leishmaniasis, but also research for accurate diagnosis of this zoonosis.

**Systematic evaluation of evidence on veterinary viscoelastic testing part 5: Nonstandard assays.**


*Brainard, B. M., R. Goggs, J. L. Mendez-Angulo, M. C. Mudge, A. G. Ralph, and B. Wiinberg*

**OBJECTIVE:** To systematically examine the evidence on nontraditional uses of viscoelastic coagulation monitoring in veterinary species. **DESIGN:** Standardized, systematic evaluation of the literature, categorization of relevant articles according to level of evidence and quality, and development of consensus on conclusions for application of the concepts to clinical practice. **SETTING:** Academic and referral veterinary medical centers. **RESULTS:** Databases searched included Medline, CAB abstracts, and Google Scholar. **CONCLUSIONS:** Nontraditional assays identified included thrombelastography (TEG)-PlateletMapping (PM), functional fibrinogen assessment, and rapid-TEG (r-TEG). Direct veterinary evidence was found for only the ADP-activated PM, which appears to generate valid data in dogs but not cats or horses. Arachidonic acid activated PM shows high variability and requires further assessment and validation in veterinary species. Functional fibrinogen assays may be performed in veterinary species but may require modification due to species differences in response to abciximab. While tissue factor (TF)-activated TEG has been well described in the veterinary literature, the specific r-TEG assay has not been assessed, but presumably would be effective for generating TEG tracings and values for maximum amplitude and angle in shorter periods of time than some traditional assays.

**Neoadjuvant and adjuvant chemotherapy combined with anatomical resection of feline injection-site sarcoma:**

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results in 21 cats.
Vet Comp Oncol (2014)
Bray, J., and G. Polton
This study assesses the outcome of two combined treatment strategies for the treatment of feline injection-site sarcoma (FISS). Twenty-one cats with primary or recurrent FISS received 3 cycles of neoadjuvant chemotherapy with epirubicin (25 mg m^-2), then an anatomical resection of the entire muscle compartment containing the tumour was performed based on the findings of co-axial imaging. Cats then received a further 3 cycles of adjuvant chemotherapy. Follow-up was performed by telephone contact with a median follow-up time of 1072 days. Three cats (14%) developed local tumour recurrence at days 264, 664 and 1573 after surgery. A median survival time could not be calculated as over 80% of the study population remained alive or were censored due to death from other causes. When compared to historical controls, the results of this study demonstrate superior rates of tumour-free survival and disease-free interval.

Hemipelvectomy: modified surgical technique and clinical experiences from a retrospective study.
Bray, J. P.
OBJECTIVE: To report a technique for hemipelvectomy surgery in the dog and cat. STUDY DESIGN: Descriptive report. ANIMALS: Dogs and cats. METHODS: To describe patient selection and an anatomically based surgical technique for hemipelvectomy. RESULTS: Surgery of the pelvis requires detailed anatomic knowledge of the pelvic region. Hemipelvectomy is a major surgical procedure with potential for substantial hemorrhage because of transection through large muscle groups and proximity to major vessels. The anatomic dissection may enable better adherence to principles of compartmental resection of tumors and reduced patient morbidity. CONCLUSIONS: When performed with appropriate care, preoperative planning, and good anesthesia support, hemipelvectomy can be performed safely and is effective for radical excision of various tumor types arising from or near the pelvis.

Hemipelvectomy: outcome in 84 dogs and 16 cats. A veterinary society of surgical oncology retrospective study.
OBJECTIVE: To report clinical findings, perioperative complications and long-term outcome in dogs and cats that had hemipelvectomy surgery for treatment of neoplasia. STUDY DESIGN: Multi-institutional retrospective case series. ANIMALS: Dogs (n = 84) and cats (16). METHODS: Medical records (January 2000 to December 2009) of dogs and cats that had hemipelvectomy at participating institutions were reviewed. Postoperative progress and current status of the patient at the time of the study was determined by either medical record review, or via telephone contact with the referring veterinarian or owner. RESULTS: Complications were infrequent and usually minor. Hemorrhage was the main intraoperative complication; 2 dogs required blood transfusion. One dog developed an incisional hernia. In dogs, hemangiosarcoma had the worst prognosis with a median survival time (MST) of 179 days. MST for chondrosarcoma (1232 days), osteosarcoma (533 days), and soft tissue sarcoma (373 days) were not statistically different. Median disease-free interval (DFI) for local recurrence of all tumor types was 257 days. Cats had 75% survival at 1 year, which was significantly longer than dogs. CONCLUSIONS: Survival times for most tumor types can be good, but surgical margins should be carefully evaluated to ensure complete tumor removal. Adjuvant therapies may be advisable particularly for dogs to reduce rates of local recurrence or distant metastasis.

Lungworms of the genus Troglostrongylus (Strongylida: Crenosomatidae): Neglected parasites for domestic cats.
Vet Parasitol (2014)
Brianti, E., S. Giannetto, F. Dantas-Torres, and D. Otranto
Feline lungworms belonging to the Troglostrongylus genus have been neglected for a long time. However, recent reports of Troglostrongylus brevior and Troglostrongylus subcrenatus in domestic cats have stimulated the interest of the scientific community on these lungworms. Troglostrongylus spp. have an indirect life cycle, which overlaps that of the better known
Aelurostrongylus abstrusus. Nonetheless, adult worms of both genera have a distinct morphology and localization within the respiratory system of definitive hosts and, potentially, a different epidemiology and pathogenicity. As copromicroscopy has a low specificity for metastrongyloids due to the similarities of first-stage larvae, specific morphometrical keys and/or PCR diagnostic tools are advocated. Accordingly, more clinical studies and necropsy data are needed to elucidate the impact of Troglostrongylus spp. on the health of domestic cats. This article reviews current information on Troglostrongylus spp. as well as data on their occurrence in Europe and reports specific key morphological characters for the identification of adults and larvae, which is important to refine their diagnosis and for a better understanding of the feline lungworm infections.

**Effect of single-cat versus multi-cat home history on perceived behavioral stress in domestic cats (Felis silvestrus catus) in an animal shelter.**


*Broadley, H. M., E. C. McCobb, and M. R. Slater*

This study investigates the effect of living with other cats in a prior home on stress levels of cats recently surrendered to an animal shelter. A total of 63 cats was evaluated using a Cat-Stress-Score and an approach test. Cats were categorized in terms of previous home history with or without other cats. No significant difference was found in stress scores between cats from single-cat households and those from multiple-cat households, although single cats that had been in the shelter less than 4 days demonstrated higher stress levels. No significant difference was found between the two groups in terms of approach results. Results of this study suggest that, in traditional individual cage settings, cats that are not accustomed to living with other cats may experience more stress in the initial few days of attempting to adjust to shelter existence. Through the use of such assessments, shelter personnel may develop an increased awareness to the needs of these cats and attempt to provide measures to improve their well-being within the shelter environment.

**2014 AAHA weight management guidelines for dogs and cats.**


*Brooks, D., J. Churchill, K. Fein, D. Linder, K. E. Michel, K. Tudor, E. Ward, and A. Witzel*

Communicating and implementing a weight management program for dogs and cats can be a challenging endeavor for veterinarians, but a rewarding one. An effective individualized weight loss program provides a consistent and healthy rate of weight loss to reduce risk of disease, prevent malnutrition, and improve quality of life. Weight loss is achieved with appropriate caloric restriction, diet selection, exercise, and strategies to help modify behavior of both the pet and client. This document offers guidelines and tools for the management of weight loss and long-term maintenance of healthy weight.

**Functional Imaging of Auditory Cortex in Adult Cats using High-field fMRI.**

J Vis Exp (2014)


Current knowledge of sensory processing in the mammalian auditory system is mainly derived from electrophysiological studies in a variety of animal models, including monkeys, ferrets, bats, rodents, and cats. In order to draw suitable parallels between human and animal models of auditory function, it is important to establish a bridge between human functional imaging studies and animal electrophysiological studies. Functional magnetic resonance imaging (fMRI) is an established, minimally invasive method of measuring broad patterns of hemodynamic activity across different regions of the cerebral cortex. This technique is widely used to probe sensory function in the human brain, is a useful tool in linking studies of auditory processing in both humans and animals and has been successfully used to investigate auditory function in monkeys and rodents. The following protocol describes an experimental procedure for investigating auditory function in anesthetized adult cats by measuring stimulus-evoked hemodynamic changes in auditory cortex using fMRI. This method facilitates comparison of the hemodynamic responses across different models of auditory function thus leading to a better understanding of species-independent features of the mammalian auditory cortex.
Microstimulation of afferents in the sacral dorsal root ganglia can evoke reflex bladder activity.

Neouroulo Urodayn (2014)

Bruns, T. M., D. J. Weber, and R. A. Gaunt

AIMS: Pudental afferent fibers can be excited using electrical stimulation to evoke reflex bladder activity. While this approach shows promise for restoring bladder function, stimulation of desired pathways, and integration of afferent signals for sensory feedback remains challenging. At sacral dorsal root ganglia (DRG), the convergence of pelvic and pudendal afferent fibers provides a unique location for access to lower urinary tract neurons. Our goal in this study was to demonstrate the potential of microstimulation in sacral DRG for evoking reflex bladder responses. METHODS: Penetrating microelectrode arrays were inserted in the left S1 and S2 DRG of six anesthetized adult male cats. While the bladder volume was held at a level below the leak volume, single and multiple channel stimulation was performed using various stimulation patterns. RESULTS: Reflex bladder excitation was observed in five cats, for stimulation in either S1 or S2 DRG at 1 Hz and 30-33 Hz with a pulse amplitude of 10-50 microA. Bladder relaxation was observed during a few trials. Adjacent electrodes frequently elicited very different responses. CONCLUSIONS: These results demonstrate the potential of low-current microstimulation to recruit reflexive bladder responses. An approach such as this could be integrated with DRG recordings of bladder afferents to provide a closed-loop bladder neuroprosthesis. Neouroulo. Urodyman. (c) 2014 Wiley Periodicals, Inc.

Epidemiological study (2006-2012) on the poisoning of small animals by human and veterinary drugs.


Caloni, F., C. Cortinovis, F. Pizzo, M. Rivolta, and F. Davanzo

A retrospective study was conducted on the exposure of dogs and cats to drugs, reported to the Poison Control Centre of Milan (Centro Antiveleni di Milano (CAV)) between January 2006 and December 2012. Calls related to drugs for human use and veterinary drugs accounted for 23.7 per cent of total inquiries (1415) received by CAV and mostly involved dogs (70 per cent of enquiries). Exposure to drugs for human use accounted for 79 per cent of cases involving dogs, whereas veterinary drugs were the main culprit (77 per cent) in the case of cats. The most common class of drugs for human use proved to be CNS drugs (26.8 per cent), followed by NSAIDs (19.6 per cent) and cardiovascular and endocrine drugs (12.9 per cent each). The majority of calls (95.2 per cent) related to veterinary drugs involved dogs and cats exposed to parasiticides. The outcome was reported in only 58.2 per cent of cases, and fatal poisoning accounted for 8.7 per cent of these cases. Epidemiological data from this Italian survey provide useful information on animal exposure to drugs. The knowledge of agents involved in poisoning episodes can help veterinarians make the correct diagnosis and institute preventive measures to possibly reduce animal exposure to drugs.

The prevalence of ocular lesions associated with hypertension in a population of geriatric cats in Auckland, New Zealand.


AIMS: To provide an estimate of the prevalence of ocular lesions associated with hypertension in geriatric cats in Auckland, New Zealand and to evaluate the importance of examination of the ocular fundi of cats over eight years of age. METHODS: A total of 105 cats >/=8 years of age were examined and clinical signs recorded. Blood was collected for the laboratory measurement of the concentrations of blood urea nitrogen (BUN), glucose and creatinine in serum, urine was collected for determination of urine specific gravity (USG), and blood pressure (BP) was measured using high definition oscillometry equipment. A cat was determined to have systemic hypertension with a systolic BP >/=160 mm Hg and a diastolic BP >/=100 mm Hg. Each animal had an ocular fundic examination using a retinal camera to diagnose ocular lesions associated with hypertension, including retinopathies, choroidopathies and optic neuropathies. RESULTS: Blood pressure was successfully recorded in 73 cats. Of these, 37 (51%) had no hypertensive ocular lesions and no underlying disease diagnosed, 24 (33%) had no hypertensive ocular lesions detected, but underlying disease such as chronic kidney disease, hyperthyroidism or diabetes mellitus was diagnosed, and 12 (16%) cats had evidence of hypertensive ocular lesions. Ten of the cats with hypertensive ocular lesions were hypertensive at the time of the first visit and two were normotensive. One additional cat had hypertensive ocular lesions, but it was not possible to obtain consistent BP readings in this animal. Chronic kidney disease was the most commonly diagnosed concurrent disease in cats with hypertensive ocular lesions (n=6). Mean systolic BP for cats with hypertensive ocular lesions (168.0 (SE 6.29) mm Hg) was higher than for those with...
no ocular lesions (144.7 (SE 3.11) mm Hg) or those with no lesions but with underlying disease (146.0 (SE 4.97) mm Hg) (p=0.001). CONCLUSIONS: Ocular fundic examination of cats over eight years of age allows identification of cats with hypertensive ocular lesions, often before the owner or veterinarian is aware the cat has a problem with its vision. This may result in diagnosis of systemic hypertension allowing early treatment and resolution of lesions. CLINICAL RELEVANCE: The current study demonstrates that ocular lesions resulting from hypertension occur frequently enough in cats in Auckland to support the recommendation for fundic examination in cats over eight years of age as part of the routine physical examination.

Cytological and molecular detection of Leishmania infantum in different tissues of clinically normal and sick cats. Vet Parasitol (2014)
Natural infection of domestic cats by Leishmania infantum (synonym: L. chagasi) has been demonstrated in several European, Latin American, and Asian countries, and the estimated prevalence of infection, based mainly on blood PCR, ranges from 0.3% up to 60.6%. In this study we aimed to: (a) estimate the prevalence of the infection by L. infantum in clinically normal cats (group A; n=50) and in cats with various clinical signs (group B; n=50), living in an endemic region, by both cytological examination of four different tissues (lymph node, skin, bone marrow, and conjunctiva) and by PCR in four different tissues (blood, skin biopsies, bone marrow, and conjunctiva); (b) compare the diagnostic sensitivity of the above methods and evaluate for possible associations between their results; and (c) investigate the possible associations between infection by L. infantum and signalment, living conditions, season of sampling, and health status of the cats. The prevalence of the infection in the study population was 41% and did not differ (P=0.839) between group A (42%) and B (40%) cats. Lymph node, skin, bone marrow and conjunctiva cytology was always negative. Therefore, the diagnosis of the infection was based only on PCR in blood, skin biopsy, bone marrow and conjunctiva, which was positive in 13%, 18.2%, 16% and 3.1% of the cats, respectively. PCR was positive in only one of the four tissues in 80.5% of the infected cats. The results differed (P=0.014) among the four tissues and were less frequently positive in conjunctiva compared to skin biopsies and bone marrow (P=0.007 for both comparisons), thus highlighting the need for multiple tissue PCR testing in order to minimize false-negative results. More PCR-positive cats were found when sampling was performed during the period of sandfly activity (odds ratio: 2.44; P=0.022). Also, in group B cats, the likelihood of PCR-positivity was higher (odds ratio: 3.93; P=0.042) among those presenting at least one systemic clinical sign that had been previously reported in cats with leishmaniosis.

In Argentina, data on the presence of members of the genus Bartonella is scarce. To increase knowledge about these zoonotic pathogens in this country, the presence and variability of Bartonella spp. was investigated in cats and dogs from Buenos Aires. Bartonella spp. was detected in 17.8% of cats, while all dogs tested negative by PCR and Reverse Line Blot. B. henselae was the most frequent species, being detected in 11.9% (14/101), while B. clarridgeiae was found in only 5.9% (6/101) of the cats. Afterwards, B. henselae isolates and positive blood samples were characterized by Multiple Locus Sequence Typing (MLST) and Multiple Locus Variable Number Tandem Repeats Analysis (MLVA). As result, four different MLST sequence types (ST) and eight MLVA profiles were identified. ST 1 was the most frequent variant, being detected in 11.9% (14/101), while B. clarridgeiae was found in only 5.9% (6/101) of the cats. Interestingly, some of the MLVA profiles that were detected in this study have been previously associated with human disease, and represents a potential risk of infection. Veterinarians and physicians should consider the presence of these emerging pathogens in their diagnostic routine.

Clark, M., K. Thomaseth, L. Dirikolu, D. C. Ferguson, and M. Hoenig
BACKGROUND: Pioglitazone is a thiazolidinedione (TZD) insulin sensitizer approved for use in human type 2 diabetes mellitus. Therapeutic options for diabetes in cats are limited. OBJECTIVE: To evaluate the effects of pioglitazone in obese cats, which are predisposed to insulin resistance, to assess its potential for future use in feline diabetes mellitus. ANIMALS: A total of 12 obese purpose-bred research cats (6 neutered males and 6 spayed females, 5-7 years of age, weighing 5.4-9.8 kg). METHODS: Randomized, placebo-controlled 3-way crossover study. Oral placebo or pioglitazone (Actos; 1 or 3 mg/kg) was administered daily for 7-week periods, with IV glucose tolerance testing before and after each period. RESULTS: Three mg/kg pioglitazone significantly improved insulin sensitivity (geometric mean [95% CI] 0.90 [0.64-1.28] to 2.03 [1.49-2.78] min(-1)pmol(-1)L; P =.0014 versus change with placebo), reduced insulin area under the curve during IVGTT (geometric mean [range] 27 [9-64] to 18 [6-54] minmmol/L; P =.0031 versus change with placebo), and lowered serum triglyceride (geometric mean [range] 71 [29-271] to 48 [27-75] mg/dL; P =.047 versus change with placebo) and cholesterol (geometric mean [range] 187 [133-294] to 162 [107-249] mg/dL; P =.0042 versus change with placebo) concentrations in the obese cats. No adverse effects attributable to pioglitazone were evident in the otherwise healthy obese cats at this dosage and duration. CONCLUSIONS AND CLINICAL IMPORTANCE: Results of this study support a positive effect of pioglitazone on insulin sensitivity and lipid metabolism in obese cats, and suggest that further evaluation of the drug in cats with diabetes mellitus or other metabolic disorders might be warranted.

Comparison of surgical variables in cats undergoing single-incision laparoscopic ovariectomy using a LigaSure or extracorporeal suture versus open ovariectomy.


Coisman, J. G., J. B. Case, A. Shih, K. Harrison, N. Isaza, and G. Ellison

OBJECTIVE: To evaluate the applicability of single-incision laparoscopic ovariectomy (SILOVE) in cats using a single-incision laparoscopic port (SILP); to compare surgical time, complications, and postoperative pain after SILOVE using a LigaSure (SILOVE-LS) or extracorporeal suture (SILOVE-ECS), and open ovariectomy (open-OVE). STUDY DESIGN: Randomized, blinded, prospective study. ANIMALS: Healthy, domestic female cats (n = 24). METHODS: Cats underwent physical examination, packed cell volume, total solids and blood urea nitrogen analysis. Cats were randomly assigned to 1 of 3 groups: SILOVE-LS (n = 8), SILOVE-ECS (8) or open-OVE (8). Surgical time, complications, and postoperative pain scores were recorded. RESULTS: Single-incision laparoscopic ovariectomy was successful in (n = 8) SILOVE-LS cats and (n = 5) SILOVE-ECS cats. Surgical time was significantly longer for the SILOVE-ECS group compared with the SILOVE-LS (P <.0001) and open-OVE (P <.0001) groups, which were not different (P =.55). Complications were more frequent in the SILOVE-ECS group and removal of the SILP was required to complete ovariectomy in 3 cats. Cumulative 4-hour pain scores were not different between groups. CONCLUSIONS: Single-incision laparoscopic ovariectomy using a SILP is a feasible method for OVE in cats. Single-incision laparoscopic ovariectomy using an extracorporeal suture is more time consuming and associated with more complications than either the SILOVE-LS or open-OVE methods.

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


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 NAb.

**Insecticide/acaricide resistance in fleas and ticks infesting dogs and cats.**
Coles, T. B., and M. W. Dryden
This review defines insecticide/acaricide resistance and describes the history, evolution, types, mechanisms, and detection of resistance as it applies to chemicals currently used against fleas and ticks of dogs and cats and summarizes resistance reported to date. We introduce the concept of refugia as it applies to flea and tick resistance and discuss strategies to minimize the impact and inevitable onset of resistance to newer classes of insecticides. Our purpose is to provide the veterinary practitioner with information needed to investigate suspected lack of efficacy, respond to lack of efficacy complaints from their clients, and evaluate the relative importance of resistance as they strive to relieve their patients and satisfy their clients when faced with flea and tick infestations that are difficult to resolve. We conclude that causality of suspected lack of insecticide/acaricide efficacy is most likely treatment deficiency, not resistance.

**Ultrasonographical examination of feline adrenal glands: intra- and inter-observer variability.**
Combes, A., E. Stock, E. Van der Vekens, L. Duchateau, B. Van Ryssen, and J. H. Saunders
Interpretation of ultrasonographical measurements requires an understanding of the source and the magnitude of variation. A substantial part of the variation can be attributed to the observer, the equipment or the animal. The aim of this study was to evaluate which adrenal gland measurement needed to investigate suspected lack of variable within and between observers. Three experienced ultrasonographers examined six cats at three different times on the same day, more than 1 h apart, according to a strict scanning protocol. Seven ultrasonographical measurements were performed on each adrenal gland (maximal length on sagittal images, maximal height at the cranial and caudal poles on sagittal and transverse images, and maximal width of the cranial and caudal poles on transverse images). Height measurements in both planes showed the lowest variability within and between observers compared with length and width measurements. Descriptive ultrasonographical features, such as echogenicity of the gland, presence of hyperechoic spots or layering assessment, demonstrated satisfactory-to-good intra- and inter-observer agreement, whereas the shape assessment showed very poor inter-observer agreement. The results of this study describe a reliable scanning protocol that can be the basis for future adrenal ultrasonographic examinations for cats suspected of adrenal disease (eg, hyperaldosteronism, hyperadrenocorticism, sex hormone-producing tumours).

**Obesity in show cats.**
J Anim Physiol Anim Nutr (Berl) (2014)
Corbee, R. J.
Obesity is an important disease with a high prevalence in cats. Because obesity is related to several other diseases, it is important to identify the population at risk. Several risk factors for obesity have been described in the literature. A higher incidence of obesity in certain cat breeds has been suggested. The aim of this study was to determine whether obesity occurs more often in certain breeds. The second aim was to relate the increased prevalence of obesity in certain breeds to the official standards of that breed. To this end, 268 cats of 22 different breeds investigated by determining their body condition score (BCS) on a nine-point scale by inspection and palpation, at two different cat shows. Overall, 45.5% of the show cats had a BCS > 5, and 4.5% of the show cats had a BCS > 7. There were significant differences between breeds, which could be related to the breed standards. Most overweight and obese cats were in the neutered group. It warrants firm discussions with breeders and show judges to come to different interpretations of the standards in order to prevent overweight conditions in certain breeds from being the standard of beauty. Neutering predisposes for obesity and requires early nutritional intervention to prevent obese conditions.

**Best practice for the pharmacological management of hyperthyroid cats with antithyroid drugs.**
Pharmacological management of feline hyperthyroidism offers a practical treatment option for many hyperthyroid cats. Two drugs have been licensed for cats in the last decade: methimazole and its pro-drug carbimazole. On the basis of current evidence and available tablet sizes, starting doses of 2.5 mg methimazole twice a day and 10 to 15 mg once a day for the sustained release formulation of carbimazole are recommended. These doses should then be titrated to effect in order to obtain circulating total thyroxine (TT4) concentrations in the lower half of the reference interval. Treated cases should be monitored for side-effects, especially during the first months of treatment. Some side-effects may require discontinuation of treatment. At each monitoring visit, clinical condition and quality of life should also be evaluated, with special attention to possible development of azotaemia, hypertension and iatrogenic hypothyroidism. When euthyroidism has been achieved, monitoring visits are recommended after 1 month, 3 months and biannually thereafter. Cats with pre-existing azotaemia have shorter survival times. However, development of mild azotaemia during the initial course of treatment, unless associated with hypothyroidism, does not appear to decrease survival time. The long-term effects of chronic medical management require further study.

Ultrasonographic thickening of the muscularis propria in feline small intestinal small cell T-cell lymphoma and inflammatory bowel disease.


Gastrointestinal lymphoma is the most common form of lymphoma in the cat. More recently, an ultrasonographic pattern associated with feline small cell T-cell gastrointestinal lymphoma has been recognized as a diffuse thickening of the muscularis propria of the small intestine. This pattern is also described with feline inflammatory bowel disease. To evaluate the similarities between the diseases, we quantified the thickness of the muscularis propria layer in the duodenum, jejunum and ileum of 14 cats affected by small cell T-cell lymphoma and inflammatory bowel disease (IBD) and 19 healthy cats. We found a significantly increased thickness of the muscularis propria in cats with lymphoma and IBD compared with healthy cats. The mean thickness of the muscularis propria in cats with lymphoma or IBD was twice the thickness of that of healthy cats, and was the major contributor to significant overall bowel wall thickening in the duodenum and jejunum. A muscularis to submucosa ratio >1 is indicative of an abnormal bowel segment. Colic lymph nodes in cats with lymphoma were increased in size compared with healthy cats. In cats with gastrointestinal lymphoma and histologic transmural infiltration of the small intestines, colic or jejunal lymph nodes were rounded, increased in size and hypoechoic.

Thyroid scintigraphy in veterinary medicine.


Daniel, G. B., and D. A. Neelis

Thyroid scintigraphy is performed in cats and dogs and has been used to a limited degree in other species such as the horse. Thyroid scintigraphy is most commonly used to aid in the diagnosis and treatment management of feline hyperthyroidism but is also used in the evaluation of canine hypothyroidism and canine thyroid carcinoma. This article reviews the normal scintigraphic appearance of the thyroid in the cat, the dog, and the horse and the principles of interpretation of abnormal scan results in the cat and the dog. Radioiodine is the treatment of choice for feline hyperthyroidism, and the principles of its use in the cat are reviewed.

Dogs, cats, parasites, and humans in Brazil: opening the black box.


Dantas-Torres, F., and D. Otranto

Dogs and cats in Brazil serve as primary hosts for a considerable number of parasites, which may affect their health and wellbeing. These may include endoparasites (e.g., protozoa, cestodes, trematodes, and nematodes) and ectoparasites (i.e., fleas, lice, mites, and ticks). While some dog and cat parasites are highly host-specific (e.g., Aelurostrongylus abstrusus and
Feline Abstracts Jan-Feb 2014

Felicola subrostratus for cats, and Angiostrongylus vasorum and Trichodectes canis for dogs), others may easily switch to other hosts, including humans. In fact, several dog and cat parasites (e.g., Toxoplasma gondii, Dipylidium caninum, Anclylostoma caninum, Strongyloides stercoralis, and Toxocara canis) are important not only from a veterinary perspective but also from a medical standpoint. In addition, some of them (e.g., Lynxacarus radovskyi on cats and Rangelia vitalii in dogs) are little known to most veterinary practitioners working in Brazil. This article is a compendium on dog and cat parasites in Brazil and a call for a One Health approach towards a better management of some of these parasites, which may potentially affect humans. Practical aspects related to the diagnosis, treatment, and control of parasitic diseases of dogs and cats in Brazil are discussed.

Quasi-isometric points for the technique of lateral suture placement in the feline stifle joint.
De Sousa, R. J., C. S. Knudsen, M. A. Holmes, and S. J. Langley-Hobbs
OBJECTIVE: To evaluate the quasi-isometric points (nearest isometric points) between the distal aspect of the femur and fabella and the proximal aspect of the tibia for placement of a lateral suture in cats. STUDY DESIGN: Radiographic study. ANIMALS: Cadaveric cat stifles (n = 7 cats; 14 stifles). METHODS: Specimens were secured in a mounting frame to maintain rigid fixation of the femur and allow free range of motion of the stifle joint and proximal tibia. Two anatomic landmarks were identified: the center of the lateral fabella (Ff) and a point 4 mm proximal to the insertion of the patellar tendon adjacent to the tibial cortex (Tt). Radiopaque spheres were placed at predefined landmarks in the femur (caudal aspect of the lateral femoral condyle distal [F1] and proximal [F2] to the lateral fabella) and in the tibia (caudal to the proximal aspect of the extensor groove [T1]; cranial to the proximal aspect of the extensor groove [T2]; 2 mm proximal and caudal to the insertion of the patellar tendon [T3] and 3 mm caudal to the insertion of the patellar tendon [T4]. For each stifle, 4 radiographic projections were made: in extension (166 degrees), in flexion (45 degrees), and 2 intermediate stance phases (90 degrees, 130 degrees). ANOVA was used to compare means of the distance between the point pairs and means of the percent change in variation of distance (VOD%) using the 45 degrees measurement as a reference. RESULTS: Mean VOD% nearest to zero, over all the different angles tested, was produced by Ff-Tt, which was statistically significantly different from each of the other point pairs. CONCLUSION: Ff-Tt provides the best quasi-isometric points for placement of lateral sutures in cats, compared with all combinations tested. Further assessments with biomechanical studies are needed to evaluate the reproducibility of these landmarks for stabilization of CCL rupture in cats.

Bacterial pneumonia in dogs and cats.
Dear, J. D.
Bacterial pneumonia is a common clinical diagnosis in dogs but seems to occur less commonly in cats. Underlying causes include viral infection, aspiration injury, and foreign body inhalation. Identification of the organisms involved in disease, appropriate use of antibiotics and adjunct therapy, and control of risk factors for pneumonia improve management.

ORF7-encoded accessory protein 7a of feline infectious peritonitis virus as a counteragent against IFN-alpha-induced antiviral response.
The type I IFN-mediated immune response is the first line of antiviral defence. Coronaviruses, like many other viruses, have evolved mechanisms to evade this innate response, ensuring their survival. Several coronavirus accessory genes play a central role in these pathways, but for feline coronaviruses this has never to our knowledge been studied. As it has been demonstrated previously that ORF7 is essential for efficient replication in vitro and virulence in vivo of feline infectious peritonitis virus (FIPV), the role of this ORF in the evasion of the IFN-alpha antiviral response was investigated. Deletion of ORF7 from FIPV strain 79-1146 (FIPV-Delta7) renders the virus more susceptible to IFN-alpha treatment. Given that ORF7 encodes two proteins, 7a and 7b, it was further explored which of these proteins is active in this mechanism. Providing 7a protein in trans rescued the mutant FIPV-Delta7 from IFN sensitivity, which was not achieved by addition of
Effects of feeding frequency and dietary water content on voluntary physical activity in healthy adult cats.  
J Anim Sci (2014)  
Deng, P., E. Iwazaki, S. A. Suchy, M. R. Pallotto, and K. S. Swanson  

Low physical activity has been identified as a major risk factor for the development of feline obesity and diabetes. This study aimed to evaluate the effects of increased meal frequency and dietary water content on voluntary physical activity in cats fed to maintain body weight (BW). Ten adult lean neutered male cats were used in two tests, both crossover studies composed of a 14-d adaptation period, followed by a 7-d measurement of physical activity from d 15 to d 22 using Actical activity monitors. Cats were individually housed in cages to access their diet under a 16 h light: 8 h dark cycle. In Experiment 1, the difference in voluntary physical activity among cats fed one, two, four, or a random number of meals per day were tested in a 4 x 4 Latin square design in 4 individual rooms. In Experiment 2, the effect of increasing dietary water content on voluntary physical activity was tested in a crossover design including a 5-d phase for fecal and urine collection from d 22 to d 27. Cats were randomly assigned to two rooms and fed a dry commercial diet with or without added water (70% hydrated) twice daily. Activity levels were expressed as ‘activity counts’ per epoch (15 sec). In Experiment 1, average daily activity level for one-meal-fed cats was lower than four-meal-fed (P = 0.004) and random-meal-fed (P = 0.02) cats, especially during the light period. The activity level of cats during the dark period was greater in one-meal-fed cats compared with cats fed two meals (P = 0.008) or four meals (P = 0.007) daily. Two-h food anticipatory activity (FAA) prior to scheduled meal times for one-meal-fed cats was lower (P < 0.0001) than the multiple-meal-fed cats. In Experiment 2, average daily activity level of cats fed the 70% hydrated diet tended to be higher (P = 0.06) than cats fed the dry diet, especially during the dark period (P = 0.007). Two-h FAA prior to the afternoon meal for cats fed the 70% hydrated diet was lower (P < 0.05) than cats fed the dry diet. Cats fed the 70% hydrated diet had greater daily fecal (P = 0.008) and urinary (P = 0.001) outputs and lower (P < 0.001) urinary specific gravity compared to cats fed the dry diet. In conclusion, increased feeding frequency and dietary water content, without changing energy intake or dietary macronutrient composition, appear to promote physical activity, which may aid in weight management in cats.
Mixed infection by Aelurostrongylus abstrusus and Troglostrongylus brevior in kittens from the same litter in Italy.
Di Cesare, A., A. Frangipane di Regalbono, C. Tessarin, M. Seghetti, R. Iorio, G. Simonato, and D. Traversa
Parasitic nematodes affecting the respiratory system of felids are spreading in endemic regions and emerging in previously free areas and/or hosts. This is particularly the case of the cat lungworm Aelurostrongylus abstrusus, which can cause respiratory signs in cats all over the world. Additionally, Troglostrongylus brevior has been recently found in domestic cats from Ibiza Island in Spain and Southern Italy. The present paper describes the first mixed infection by these lungworms in kittens belonging to the same litter. Two approximately 10-11 weeks old kittens were found infected by A. abstrusus and T. brevior at a copromicroscopical examination. The identity of larvae shed by faeces were confirmed with an already validated PCR specific for A. abstrusus and a novel DNA-based assay specific for T. brevior. One kitten showed severe respiratory signs and died despite an anthelmintic treatment, while the other had a subclinical infection and recovered after a parasiticide administration with milbemycin oxime. New insights into epidemiology, biology, clinical aspects and control of these parasitoses are discussed.

Factors contributing to the variation in feline urinary oxalate excretion rate.
J Anim Sci (2014)
Dijcker, J. C., E. A. Hagen-Plantinga, H. Everts, Y. Queau, V. Biourge, and W. H. Hendriks
This study aimed to identify factors (season, animal and diet) contributing to the variation in urinary oxalate (Uox) excretion rate, Uox concentration and urine volume in healthy adult cats. A data set (1940 observations) containing information on Uox excretion rate of 65 cats fed 252 diets (i.e. each diet was fed to a group of 6 to 8 cats) with known dietary oxalate concentrations collected over a 6 year period at a feline nutrition facility were retrospectively analysed. Data related to season, animal (i.e. age, gender, body weight and breed), and diet (i.e. nutrient content) characteristics were subjected to stepwise multivariate regression analysis to identify factors significantly correlated to Uox excretion rate (mmol/(kg BW0.67.d)) and concentration (mmol/L), as well as urine volume (mL/(kg BW0.67.d)). Independent factors significantly (P < 0.05) associated with lower Uox concentration (mmol/L) included greater ash, Ca, and Na intake and lower nitrogen-free extract, total dietary fiber, P, and oxalate intake, and a body weight < 5 kg. Factors significantly associated with lower Uox excretion rate (mmol/(kg BW0.67.d)) included greater crude fat and Ca intake and lower CP, total dietary fiber, P, and oxalate intake. However, a considerable part of the variation in Uox excretion rate remained unexplained. The majority of the unexplained variation in Uox excretion rate is likely to be related to factors involved in endogenous oxalate synthesis, as the majority of the dietary factors involved in intestinal oxalate absorption were included in the model. Apparent intestinal oxalate absorption was estimated to be 6.2% on average, however much variation was present. Future research on Uox excretion rate in cats should focus on the influence of dietary protein sources, amino acid composition, vitamin C (that was not included in the present study) and variations in apparent intestinal oxalate absorption.

The clinical utility of two human portable blood glucose meters in canine and feline practice.
Domori, A., A. Sunahara, M. Tateno, T. S. Miyama, A. Setoguchi, and Y. Endo
BACKGROUND: Portable blood glucose meters (PBGMs) are useful for serial measurements of blood glucose and creation of blood glucose curves in veterinary practice. However, it is necessary to validate PBGMs designed for people for veterinary use. OBJECTIVES: Our objective was to evaluate the accuracy of 2 PBGMs designed for people for use in dogs and cats. METHODS: The blood glucose levels were determined in blood samples collected from 69 dogs and 26 cats admitted to the Kagoshima University Veterinary Teaching Hospital, using a MEDISAFE [PBGM-T] and an Antsense III [PBGM-H], and a FUJI DRI-CHEM 7000V as reference method. The correlations and agreements among the results were statistically analyzed. RESULTS: Simple regression analyses revealed a high correlation between values from both PBGMs and the reference method in both dogs and cats. However, Passing-Bablok regression and Bland-Altman analyses revealed that the data from both PBGMs did not show statistical agreement with the reference values. Concordance correlated coefficients were moderate for the PBGM-T and almost perfect for the PBGM-H for canine samples, and were poor for the PBGM-T and substantial for the PBGM-H for feline samples. Hematocrit values significantly affected the results of the
Characterization of post transplantation lymphoma in feline renal transplant recipients.

Durham, A. C., A. D. Mariano, E. S. Holmes, and L. Aronson

The development of malignant neoplasia following solid organ transplantation and immunosuppression is well recognized in man. Post-transplantation malignant tumours include non-melanoma skin cancers, non-Hodgkin’s lymphoma and Kaposi’s sarcoma and many of these cancers have a known or suspected viral cause. A similar increased incidence of cancer is seen in cats that have received a renal transplant and lymphoma is the predominant neoplasm in this population. This study examines a population of cats that received renal transplants at the University of Pennsylvania School of Veterinary Medicine and subsequently developed neoplasia. From 1998 to 2010, 111 cats were transplanted and 25 cats developed cancer (22.5%). Fourteen of the 25 cats were diagnosed with lymphoma (56%), making it the most common tumour in this patient population. The median interval between transplantation and diagnosis of lymphoma was 617 days and the median survival time following the diagnosis of lymphoma was 2 days. Tissues from seven of these cats were available for histopathological review as either samples collected at necropsy examination (n = 5) or biopsy submissions (n = 2). Five of these cats had multiorgan involvement with sites including the liver, spleen, peripheral and mesenteric lymph nodes, small intestine, urinary bladder, heart, mesenteric fat and body wall. Four of the cats with multiorgan disease had involvement of the renal allograft two of which also had lymphoma of the native kidney. All lymphomas were classified as mid to high grade, diffuse large B-cell lymphoma, which is also the most common lymphoma subtype in human cases of post-transplantation lymphoproliferative disorders.

[Salter-harris fractures in dogs and cats considering problems in radiological reports--a retrospective analysis of 245

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To identify typical trauma patterns or frequent radiological pitfalls that could help a radiologists in their daily routine, a retrospective study of Salter-Harris fractures in dogs and cats was performed. Radiographs obtained in the period 1991-2012 of 288 fractures in 245 patients with suspected injuries affecting growth plates in the appendicular skeleton were retrieved from the imaging archive. The femur was the bone most frequently affected (46.5%), followed by the humerus (19.8%), tibia (13.5%) and radius (11.8%). The distal growth plate was in all bones more often involved than the proximal growth plate (79.5% vs. 20.5%). The frequency of Salter-Harris fractures was 39.9% type I, 37.8% type II, 3.1% type III and 19.1% type IV. In dogs the most common physeal fracture was a type IV fracture of the of the distal femur. Radiographically, physeal fractures were recognized by at least two Roentgen signs, including change in opacity, displacement of the epiphysis or the Thurston-Holland sign. On the basis of the review, the original radiographic reports of 44/288 fractures were considered erroneous regarding the incorrect Salter Harris grouping. In 5/44 instances, the radiological examination had technical deficiencies that may have contributed to the errors, including 3 with oblique projections. Minimal variations in the projection was evident in the majority of reviewed cases. Measures to help optimize radiographic reports will be discussed.

Exudative pleural diseases in small animals.
Epstein, S. E.
Exudative pleural diseases are a common cause of respiratory distress and systemic illness in dogs and cats. This article addresses the pathophysiology, development, and classification of exudative pleural effusions. The most current diagnostic strategies, causes, imaging findings, and medical or surgical treatment options for select diseases are reviewed in detail.

Injection of a chemical castration agent, zinc gluconate, into the testes of cats results in the impairment of spermatogenesis: a potentially irreversible contraceptive approach for this species?
Male sterilization by chemical agents is a nonsurgical contraceptive approach designed to induce azoospermia and, therefore, infertility. Intratesticular injection of zinc gluconate for sterilization of dogs has been described, but its use in cats remains limited. The objective of the present study was to evaluate, by light and transmission electron microscopy, the efficacy of a single intratesticular injection of a zinc gluconate solution (Testoblock) as a sterilant for male cats. Twelve sexually mature mixed breed cats were allocated at random into two groups (control = 6; treated = 6) and given a single injection into each testis of either isotonic saline or zinc gluconate, respectively. Histopathologic and ultrastructural evaluation was assessed at 120 days postinjection. Histopathologic changes were not detected in the testes from the control group. However, histologic evaluation of the treated group revealed atrophic and dilated seminiferous tubules, a decrease in the number of germ cells, and incomplete spermatogenesis. Sertoli cells had various degrees of cytoplasmic vacuolization. Intertubular tissue revealed active fibroblasts, collagen deposition, and inflammatory cells. The diameter of seminiferous tubules, epithelial height and tubular area were reduced (P < 0.05) in the treated group compared with controls. Azoospermia occurred in 8 of the 11 treated cats (73%). Ultrastructural evaluation of Leydig cells revealed loss of nuclear chromatin, increased smooth endoplasmatic reticulum, and mitochondria degeneration. Intratesticular injection of zinc gluconate solution impaired spermatogenesis in cats and has great potential as a permanent sterilant in this species.

Dental radiographic findings in cats with chronic gingivostomatitis (2002-2012).
Farcas, N., M. J. Lommer, P. H. Kass, and F. J. Verstraete
OBJECTIVE: To compare dental radiographic findings in cats with and without feline chronic gingivostomatitis (FCGS).
DESIGN: Retrospective case-control study. ANIMALS: 101 cats with FCGS (cases) and 101 cats with other oral diseases (controls). PROCEDURES: Controls were age- and treatment date-matched with cases. Conventional full-mouth dental radiographic views were evaluated for distribution, pattern, and severity of alveolar bone loss (periodontitis), tooth resorption, buccal bone expansion, tooth fractures, and retained roots. RESULTS: All cases and 77 (76%) controls had periodontitis; differences in extent and severity of periodontitis were significant, with semigenerализed or generalized and moderate or severe periodontitis in 78 (77%) and 93 (92%) cases, respectively, and 28 (28%) and 38 (38%) controls, respectively. The pattern of alveolar bone loss in cases was dominated by horizontal bone loss, with a nonsignificant increase in vertical bone loss, compared with that of controls. Cases were more likely than controls to have external inflammatory root resorption (49 [49%] vs 25 [25%]) and retained roots (57 [56%] vs 28 [28%]). Fewer dental fractures occurred in cases (14 [14%]) than in controls (35 [35%]). There were no differences between cases and controls in breed, sex, or presence of feline resorptive lesions or buccal bone expansion. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggested that FCGS was associated with more widely distributed and severe periodontitis, with a higher prevalence of external inflammatory root resorption and retained roots than other oral diseases. Full-mouth radiographic views are indicated for cats with FCGS to diagnose the extent of associated periodontitis, reveal external inflammatory root resorption, and identify retained roots.

Urethral obstruction in cats.
Feaga, W. P.

Finnett, K. E., H. L. Barnes Heller, M. N. Mercier, C. J. Giovanella, V. W. Lau, and H. Rylander
OBJECTIVE: To determine the percentage of cats with a phenobarbital (PB) concentration between 15 and 45 mug/mL that had a >= 50% reduction in the number of seizures and to investigate applicability of the 2011 International League Against Epilepsy (ILAE) classification system in cats. DESIGN: Retrospective case series. ANIMALS: 30 cats with suspected or confirmed epilepsy. PROCEDURES: Medical records for 2004 to 2013 at 3 veterinary hospitals were searched. Information collected included signalment, duration of observation before treatment, frequency of seizures before PB administration, seizure phenotype, dose of PB, serum PB concentration, number of seizures after PB administration, duration of follow-up monitoring, and survival time. A modified 2011 ILAE classification system was applied to all cats. RESULTS: Seizure control was achieved in 28 of 30 (93%) cats with a serum PB concentration of 15 to 45 mug/mL. This comprised 10 of 11 cats with structural epilepsy, 14 of 15 cats with unknown epilepsy, and 4 of 4 cats with presumptive unknown epilepsy. Thirteen cats had no additional seizures after initiation of PB treatment. CONCLUSIONS AND CLINICAL RELEVANCE: Seizure control was achieved in most cats with a serum PB concentration between 15 and 45 mug/mL, regardless of the cause of the seizures. A modified 2011 ILAE classification was applied to cats with seizures and enabled classification of cats without specific genetic testing and without identified structural or inflammatory disease. This classification system should be incorporated into veterinary neurology nomenclature to standardize communication between veterinarians and improve comparisons among species.

Prevalence of feline blood groups in the Montreal area of Quebec, Canada.
Fosset, F. T., and M. C. Blais
The feline AB blood group system has clinical significance because type B cats have natural alloimmune anti-A antibodies which can cause isoerythrolysis of the newborn and life-threatening transfusion reactions. In the United States, the prevalence of type B blood is estimated to be 1% to 2%. This study determined the prevalence of feline AB blood groups among 207 potential blood donor cats that included 178 domestic cats, in the Montreal area of Quebec, Canada. Blood
typing was performed using a standardized tube technique. Blood types AB and B were confirmed using a backtyping technique. The frequency of blood types among the studied population was as follows: 95.2% type A, 4.4% type B, and 0.48% type AB. Among domestic cats, the frequency was 94.4% for type A, 5% for type B, and 0.6% for type AB. The frequency of type B was higher than expected, which reinforces the recommendation to ensure blood compatibility of the recipient and donor before transfusion through typing and possibly cross-matching as well.

Pathology of Articular Cartilage and Synovial Membrane From Elbow Joints With and Without Degenerative Joint Disease in Domestic Cats.
Vet Pathol (2014)
Freire, M., D. Meuten, and D. Lascelles
The elbow joint is one of the feline appendicular joints most commonly and severely affected by degenerative joint disease. The macroscopic and histopathological lesions of the elbow joints of 30 adult cats were evaluated immediately after euthanasia. Macroscopic evidence of degenerative joint disease was found in 22 of 30 cats (39 elbow joints) (73.33% cats; 65% elbow joints), and macroscopic cartilage erosion ranged from mild fibrillation to complete ulceration of the hyaline cartilage with exposure of the subchondral bone. Distribution of the lesions in the cartilage indicated the presence of medial compartment joint disease (most severe lesions located in the medial coronoid process of the ulna and medial humeral epicondyle). Synovitis scores were mild overall and correlated only weakly with macroscopic cartilage damage. Intra-articular osteochondral fragments either free or attached to the synovium were found in 10 joints. Macroscopic or histologic evidence of a fragmented coronoid process was not found even in those cases with intra-articular osteochondral fragments. Lesions observed in these animals are most consistent with synovial osteochondromatosis secondary to degenerative joint disease. The pathogenesis for the medial compartmentalization of these lesions has not been established, but a fragmented medial coronoid process or osteochondritis dissecans does not appear to play a role.

Existence of feline morbillivirus infection in Japanese cat populations.
Feline morbillivirus (FmoPV) is a member of a new virus species that has only been found in the Hong Kong cat population. For the first time, however, we have now detected nucleotide sequences similar to FmoPV in samples from Japanese cat populations. The positive rates for urine and blood samples from Japanese cats were 6.1 % (5/82) and 10 % (1/10), respectively. These sequences are similar to the previously reported FmoPV, with 92-94 % identity, and substantially different from all other morbilliviruses. Phylogenetic analysis of the identified Japanese FmoPVs and other morbilliviruses demonstrated a pattern similar to those previously published for the FmoPV viruses isolated in Hong Kong. FmoPV RNA was also detected from formalin-fixed paraffin-embedded (FFPE) kidney tissues of cats with nephritis, with a positive rate of 40 % (4/10). By using nested-set primers based on the FmoPV sequence and RNA from FFPE tissues, we demonstrated the existence of FmoPV infection in Japanese cats and established the method for detection of the FmoPV RNA from kidney tissues prepared for pathology examinations, which is useful for studies on the pathogenicity of the virus.

Microsporidia Detection and Genotyping Study of Human Pathogenic E. bieneusi in Animals from Spain.
Microsporidia are ubiquitous parasites infecting all animal phyla and we present evidence that supports their zoonotic potential. Fecal samples taken from domestic (cats and dogs), farm (pigs, rabbits and ostriches) and wild animals (foxes) from different provinces of Spain were evaluated for microsporidiosis infection by light microscopy and PCR. After Microsporidia species identification, E. bieneusi genotypes were additionally studied by sequence analysis of the ITS region. Eighty-five samples out of 159 exhibited structures that were compatible with microsporidia spores by Webers stain with 37 of them being confirmed by PCR. Microsporidia species identified included E. bieneusi, E. intestinalis and A. algerae. We report the first diagnosis of E. intestinalis and E. bieneusi in ostriches and A. algerae in pigs. We also provide
new information on the molecular characterization of E. bieneusi isolates both in rabbits and ostriches. All of the E. bieneusi genotypes identified belonged to the zoonotic group of genotypes (Group I) including genotypes A (dogs), I (pigs), D (rabbits and foxes) and type IV (ostriches). Our results demonstrate that microsporidia are present in domestic, farm and wild animals in Spain, corroborating their potential role as a source of human infection and environmental contamination.

Emergent presentation of a cat with dystrophin-deficient muscular dystrophy.
Gambino, A. N., P. J. Mouser, G. D. Shelton, and N. J. Winand
This report describes a case of feline dystrophin-deficient muscular dystrophy (DDMD) with an atypical clinical presentation. A novel gene mutation is reported to be responsible for dystrophin-deficient hypertrophic muscular dystrophy. In an emergency setting, clinicians should be aware of muscular dystrophy in young cats and the importance of elevated creatine kinase (CK) activity. Muscular dystrophy is rare but can present both a diagnostic and therapeutic challenge in an emergency setting. Patients with muscular dystrophy have a progressive disease with no specific treatment and have an increased risk for death during their hospital stay.

Assessment of Postoperative Pain in Cats After Ovariectomy by Laparoscopy, Median Celiotomy, or Flank Laparotomy.
Vet Surg (2014)
Gauthier, O., D. Holopherne-Doran, T. Gendarme, A. Chebroux, C. Thorin, D. Tainturier, and D. Benchairif
OBJECTIVE: To compare postoperative pain, duration of surgery, and duration of anesthesia for 3 methods of ovariectomy in cats: (1) conventional ventral median open approach (Midline), (2) right flank approach (Flank), and (3) median 2-portal laparoscopic procedure (Lap). STUDY DESIGN: Randomized, prospective clinical trial. ANIMALS: Healthy, sexually intact female cats (n = 60). METHODS: Cats were randomly assigned to 1 of 3 groups: Midline (n = 20), Flank (20), and Lap (20) were evaluated 1, 2, 4, 6, and 12 hours after endotracheal extubation. Postoperative pain was scored using the 4A-vet pain scale that combines a subjective numerical pain rating and objective scoring of physiologic and behavioral variables including the response to stimulation of the surgical site. Pain scores (PS) were compared between groups. RESULTS: There was a significant difference in the PS between groups. PS for Midline and Flank were not significantly different but were both significantly higher compared with Lap. Depending on time, 5-20% of the cats had intense postoperative pain in both Midline and Flank groups. None of the Lap cats had intense postoperative pain. CONCLUSIONS: Laparoscopic ovariectomy, although slower, appeared less painful compared with conventional ventral midline and flank ovaricectomy. Postoperative pain did not differ significantly between midline and flank groups.

Innate Resistance against Toxoplasma gondii: An Evolutionary Tale of Mice, Cats, and Men.
Gazzinelli, R. T., R. Mendonca-Neto, J. Lilue, J. Howard, and A. Sher
Recent studies have revealed remarkable species specificity of the Toll-like receptors (TLRs) TLR11 and TLR12 and the immunity-related GTPase (IRG) proteins that are essential elements for detection and immune control of Toxoplasma gondii in mice, but not in humans. The biological and evolutionary implications of these findings for the T. gondii host-pathogen relationship and for human disease are discussed.

Oral Recombinant Feline Interferon-Omega as an alternative immune modulation therapy in FIV positive cats: clinical and laboratory evaluation.
Recombinant-Feline Interferon-Omega (rFeIFN-omega) is an immune-modulator licensed for use subcutaneously in Feline Immunodeficiency virus (FIV) therapy. Despite oral protocols have been suggested, little is known about such use in FIV-
infected cats. This study aimed to evaluate the clinical improvement, laboratory findings, concurrent viral excretion and acute phase proteins (APPs) in naturally FIV-infected cats under oral rFeIFN-omega therapy (0.1 MU/cat rFeIFN-omega PO, SID, 90 days). 11 FIV-positive cats were treated with oral rFeIFN-omega (PO Group). Results were compared to previous data from 7 FIV-positive cats treated with the subcutaneous licensed protocol (SC Group). Initial clinical scores were similar in both groups. Independently of the protocol, rFeIFN-omega induced a significant clinical improvement of treated cats. Concurrent viral excretion and APP's variation were not significant in the PO Group. Oral rFeIFN-omega can be an effective alternative therapy for FIV-infected cats, being also an option for treatment follow-up in cats submitted to the licensed protocol.

Risk factors associated with the development of chronic kidney disease in cats evaluated at primary care veterinary hospitals.
OBJECTIVE: To identify risk factors associated with diagnosis of chronic kidney disease (CKD) in cats. DESIGN: Retrospective case-control study. ANIMALS: 1,230 cats with a clinical diagnosis of CKD, serum creatinine concentration > 1.6 mg/dL, and urine specific gravity < 1.035 and 1,230 age-matched control cats. PROCEDURES: Data on putative risk factors for CKD were extracted for multivariate logistic regression analysis from the medical records of cats brought to 755 primary care veterinary hospitals. For a subset of cats evaluated 6 to 12 months prior to the date of CKD diagnosis or control group inclusion, the percentage change in body weight between those dates as well as clinical signs at the earlier date were analyzed for associations with CKD development. RESULTS: Risk factors for CKD in cats included thin body condition, prior periodontal disease or cystitis, anesthesia or documented dehydration in the preceding year, being a neutered male (vs spayed female), and living anywhere in the United States other than the northeast. The probability of CKD decreased with increasing body weight in nondehydrated cats, domestic shorthair breed, and prior diagnosis of diabetes mellitus and increased when vomiting, polyuria or polydipsia, appetite or energy loss, or halitosis was present at the time of diagnosis or control group inclusion but not when those signs were reported 6 to 12 months earlier. Median weight loss during the preceding 6 to 12 months was 10.8% and 2.1% in cats with and without CKD, respectively. CONCLUSIONS AND CLINICAL RELEVANCE: The probability of CKD diagnosis in cats was influenced by several variables; recent weight loss, particularly in combination with the other factors, warrants assessment of cats for CKD.

Detection of clinically relevant pain relief in cats with degenerative joint disease associated pain.
BACKGROUND: Detection of clinically relevant pain relief in cats with degenerative joint disease (DJD) is complicated by a lack of validated outcome measures and a placebo effect. HYPOTHESIS/OBJECTIVES: To evaluate a novel approach for detection of pain relief in cats with DJD. ANIMALS: Fifty-eight client-owned cats. METHODS: Prospective, double-masked, placebo-controlled, stratified, randomized, clinical study. Enrolled cats were 6-21 years of age, with owner-observed mobility impairment, evidence of pain in at least 2 joints during orthopedic examination, and overlapping radiographic evidence of DJD, and underwent a 2-week baseline period, 3-week treatment period with placebo or meloxicam, and 3-week masked washout period. Outcome measures were evaluated at days 0, 15, 36, and 57. RESULTS: Both groups significantly improved after the treatment period (day 36) on client-specific outcome measures (CSOM) and feline musculoskeletal pain index (FMPI) (P <.0001 for both); there was no difference between the groups on CSOM or FMPI score improvement. After the masked washout period, more cats that received meloxicam during the treatment period had a clinically relevant decrease in CSOM score (P =.048) and FMPI score (P =.021) than cats that received placebo. CONCLUSIONS AND CLINICAL IMPORTANCE: Using both a client-specific and a general clinical metrology instrument, owners of cats with DJD were able to detect evident recurrence of clinical signs after withdrawal of active medication than after withdrawal of placebo, and that this study design might be a novel and useful way to circumvent the placebo effect and detect the efficacy of pain-relieving medications.
The Advanced Locking Plate System (ALPS): a retrospective evaluation in 71 small animal patients.
Guerrero, T. G., K. Kalchofner, N. Scherrer, and P. Kircher
OBJECTIVE: To evaluate use of the Advanced Locking Plate System (ALPS) in dogs and cats and report outcome.
STUDY DESIGN: Retrospective case series. ANIMALS: Dogs (n = 29) and cats (n = 42). METHODS: The medical records (April 2007-April 2010) of dogs and cats treated with ALPS were reviewed evaluated. Data retrieved included signalment, indication for surgery, complications, and outcome. RESULTS: ALPS was used for 54 fractures, 12 tarsal or carpal ligament injuries and in 6 cases, to prevent or treat fractures during total hip replacement. Complications needing revision surgery occurred in 4 cases (5.5%): fixation failure was identified in 3 (2 fracture-fixations, 1 pancarpal arthrodesis), and a fracture occurred through a screw hole. The most common complication after tarsal arthrodesis was suture dehiscence. All cases had healed by study end. CONCLUSIONS: ALPS offers a reliable alternative for fracture treatment and some other orthopedic conditions in small animals.

Diagnostic accuracy of the vertebral heart score and other radiographic indices in the detection of cardiac enlargement in cats with different cardiac disorders.
Guglielmini, C., M. Baron Toaldo, H. Poser, G. Menciotti, M. Cipone, A. Cordella, B. Contiero, and A. Diana
A retrospective search was conducted to evaluate the diagnostic accuracy of the vertebral heart score (VHS) and other related radiographic indices in the detection of cardiac enlargement associated with different cardiac disorders in the cat. One hundred and five cats with a complete echocardiographic examination and radiographic examination of the thorax with at least two orthogonal views were enrolled. Eighty-three cats had different cardiac disorders, 72 with left-sided cardiac disorders (LSCD) and 11 with right-sided cardiac disorders; 22 cats were free of cardiovascular abnormalities. Measurements of VHS and cardiac long and short axes on lateral (L) and dorsoventral or ventrodorsal radiographs were obtained. Receiver operating characteristic curves were calculated to evaluate the diagnostic accuracy of each radiographic index in differentiating between cats with cardiac disorders or cats with LSCD and cats without cardiac abnormalities and, among cats with LSCD, between those with no or mild left atrial enlargement (LAE) or those with moderate-to-severe LAE and healthy cats. The L-VHS at the cut-off of 7.9 had high diagnostic accuracy in distinguishing between cats with LSCD and moderate-to-severe LAE from healthy cats, but all the other radiographic indices were moderately accurate in distinguishing between cats with overall cardiac disorders or LSCD, either with no or mild LAE and moderate-to-severe LAE, and healthy cats. The considered radiographic indices were also moderately accurate in predicting different degrees of LAE in cats with LSCD. Radiographic indices are reasonably specific, but less sensitive predictors of cardiac enlargement in cats with heart disorders.

A retrospective study of feline gastric lymphoma in 16 chemotherapy-treated cats.
Gustafson, T. L., A. Villamil, B. E. Taylor, and A. Flory
The purposes of this study were to describe cases of feline gastric lymphoma with regards to signalment, clinical presentation, laboratory and ancillary study findings, response to therapy, and outcomes and to identify prognostic variables. Sixteen cats with stage I and II gastric lymphoma treated with chemotherapy were included in this study. Seventy-five percent of cats experienced remission. Overall, first remission duration was 108 days. Response to treatment was prognostic as in other types of feline lymphoma. Cats with a complete remission (CR) had longer survival times compared with cats with a partial remission (PR). Sex and treatment with a rescue protocol were found to be prognostic with castrated males having longer survivals than spayed females. Cats that received rescue chemotherapy had shorter first remission durations than those that did not. Prior treatment with steroids and stage were not found to be significant prognostic variables. This study characterizes gastric lymphoma treated with chemotherapy in cats. Further studies are needed to determine the comparative efficacy of surgical and chemotherapeutic treatments for feline gastric lymphoma.

Connective tissue disorders in domestic animals.
Though soft tissue disorders have been recognized and described to some detail in several types of domestic animals and small mammals for some years, not much progress has been made in our understanding of the biochemical basis and pathogenesis of these diseases in animals. Ehlers-Danlos syndrome described in dogs already in 1943 and later in cats affects mainly skin in these animals. The involved skin is thin and hyperextensible with easily inflicted injuries resulting in hemorrhagic wounds and atrophic scars. Joint laxity and dislocation common in people are less frequently found in dogs. No systemic complications, such as organ rupture or cardiovascular problems which have devastating consequences in people have been described in cats and dogs. The diagnosis is based on clinical presentation and on light or electron microscopic features of disorganized and fragmented collagen fibrils. Several cases of bovine and ovine dermatosparaxis analogous to human Ehlers-Danlos syndrome type VIIC were found to be caused by mutations in the procollagen I N-proteinase (pNPI) or ADAMTS2 gene, though mutations in other sites are likely responsible for other types of dermatosparaxis. Cattle suffering from a form of Marfan syndrome were described to have aortic dilatation and aneurysm together with ocular abnormalities and skeletal involvement. As in people mutations at different sites of bovine FBN1 may be responsible for Marfan phenotype. Hereditary equine regional dermal asthenia (HERDA), or hyperelastosis cutis, has been recognized in several horse breeds as affecting primarily skin, and, occasionally, tendons. A mutation in cyclophilin B, a chaperon involved in proper folding of collagens, has been identified in some cases. Degenerative suspensory ligament desmitis (DSLD) affects primarily tendons and ligaments of certain horse breeds. New data from our laboratory showed excessive accumulation of proteoglycans in organs with high content of connective tissues. We have identified an abnormal form of decorin with altered biological activity in these proteoglycan deposits, and more recently changes in processing of aggrecan were found by us and other investigators.  

The naturally occurring diseases of soft tissues in domestic animals described here have a potential to serve as good models for analogous human diseases. This is the case particularly relevant to dogs as a half out of the more than 400 naturally occurring hereditary canine diseases has the potential to serve as a model for human disease.

Cricothyrotomy: possible first-choice emergency airway access for treatment of acute upper airway obstruction in dogs and cats.
Hansen, I. K., and T. Eriksen

Concurrent diseases and conditions in cats with renal infarcts.
Hickey, M. C., K. Jandrey, K. S. Farrell, and D. Carlson-Bremer
BACKGROUND: Renal infarcts identified without definitive association with any specific disease process. OBJECTIVE: Determine diseases associated with diagnosis of renal infarcts in cats diagnosed by sonography or necropsy. ANIMALS: 600 cats underwent abdominal ultrasonography, necropsy, or both at a veterinary medical teaching hospital. METHODS: Information obtained from electronic medical records. Cats classified as having renal infarct present based on results of sonographic evaluation or necropsy. Time-matched case-controls selected from cats that underwent the next scheduled diagnostic procedure. RESULTS: 309 of 600 cats having diagnosis of renal infarct and 291 time-matched controls. Cats 7-14 years old were 1.6 times (odds ratio, 95% CI: 1.03-2.05, P = .03) more likely to have renal infarct than younger cats but no more likely to have renal infarct than older cats (1.4, 0.89-2.25, P = .14). All P = .14 are statistically significant. Cats with renal infarcts were 4.5 times (odds ratio, 95% CI: 2.63-7.68, P <.001) more likely to have HCM compared to cats without renal infarcts. Cats with renal infarcts were 0.7 times (odds ratio, 95% CI: 0.51-0.99, P =.046) less likely to have diagnosis of neoplasia compared to cats without renal infarcts. Cats with diagnosis of hyperthyroidism did not have significant association with having renal infarct. Cats with renal infarcts were 8 times (odds ratio, 95% CI: 2.55-25.40, P =.001) more likely to have diagnosis of distal aortic thromboembolism than cats without renal infarcts. CONCLUSIONS AND CLINICAL IMPORTANCE: Cats with renal infaracts identified on antemortem examination should be screened for occult cardiomyopathy.
Measurement of thyroxine and cortisol in canine and feline blood samples using two immunoassay analysers.
Higgs, P., M. Costa, A. Freke, and K. Papasouliotis

OBJECTIVES: The AIA-360 (Tosoh Corporation) is an automated immunoassay analyser. The aims of this study were to estimate the precision of thyroxine and cortisol AIA-360 immunoassays in canine and feline samples and to compare the results produced with those obtained by a chemiluminescence analyser (Immulite® 1000, Siemens). METHODS: Blood samples from 240 clinical cases (60 dogs and 60 cats for both thyroxine and cortisol) were analysed using both instruments. RESULTS: Deming regression calculations showed excellent correlation (thyroxine, canine rs = 0.94, feline rs = 0.97; cortisol, canine rs = 0.97, feline rs = 0.97). Agreement between the two instruments was examined by Bland-Altman difference plots, which identified wide confidence intervals and outliers for thyroxine (canine n = 6, feline n = 4) and cortisol (canine n = 3, feline n = 4) results. Inter/intra-run precision of the AIA-360 was excellent for both cortisol and thyroxine (coefficients of variation <7%). CLINICAL SIGNIFICANCE: The instrument showed excellent correlation for cortisol and thyroxine in canine and feline samples demonstrating that the AIA-360 can be used in clinical practice. The agreement studies suggest that the results from the AIA-360 cannot be used interchangeably with those generated by the Immulite 1000 and should be interpreted using reference intervals that have been established specific to the AIA-360.

Medical management and monitoring of the hyperthyroid cat: a survey of UK general practitioners.
Higgs, P., J. K. Murray, and A. Hibbert

Feline hyperthyroidism is commonly diagnosed in general practice. This study assessed the opinions and experiences of UK general practitioners (GPs) regarding the management of feline hyperthyroidism. This included an evaluation of preferred treatment modalities and the monitoring of medically treated cats in relation to thyroxine (T4) level, co-morbid disease and adverse drug reactions. Six hundred and three GPs completed an online questionnaire comprising 34 questions. Oral medication was the most commonly preferred treatment option (65.7% of respondents), followed by thyroidectomy (27.5%) and then radioiodine (5.5%). When cost of treatment was eliminated as a consideration factor, significantly more respondents selected radioiodine (40.5%, P <0.001). Concerning target total T4 levels during medical management, 48.4% aimed for the lower half of the reference interval (RI), 32.3% anywhere within RI, 13.1% within the top half of RI and 0.5% above the RI; 3.4% evaluated efficacy by physical assessment only. In the presence of chronic kidney disease (CKD) respondents were significantly more likely to target total T4 levels within the upper half of the RI (40.3%) or above it (9.8%) when compared with targets for routine cases (P <0.001). Assessment for unmasking of CKD after initiating treatment or for hypertension was not consistently performed. Variability in monitoring strategies may result in CKD and hypertension remaining undetected, inadequate suppression of T4 levels in cats with concurrent CKD and delayed recognition of potentially significant haematological abnormalities.

The pharmacokinetics of methimazole in a novel lipophilic formulation administered transdermally to healthy cats.
N Z Vet J (2014)
Hill, K., M. Gieseg, J. Bridges, and J. Chambers

AIM: To determine the pharmacokinetics of a novel lipophilic formulation of transdermal methimazole compared to oral carbimazole. METHODS: Healthy cats received 5 mg carbimazole orally every 12 hours for 13 treatments (n=6), then received transdermal methimazole (n=5) at a dose of 5 mg, then 10 mg, once daily on the pinna for 7 days, with 21 days between treatments. Concentrations of methimazole in serum over 24 hours and at 148 hours were determined by high performance liquid chromatography. RESULTS: Concentrations of methimazole in serum for the first 24 hours were not reliably detected in all cats treated with 5 mg methimazole transdermally, while for those receiving 5 mg carbimazole orally and 10 mg methimazole transdermally all cats had detectable concentrations of methimazole in serum. The maximum concentration and area under the curve were lower in cats receiving 10 mg methimazole transdermally (108 (SD 25) ng/mL and 2544 (SD 216) mg-hour/mL, respectively) than those receiving 5 mg oral carbimazole (355 (SD 113) ng/mL and 31,866 (SD 439) ng-hour/mL, respectively) (p<0.05). The time at maximal concentration and elimination half-life were longer for 10 mg transdermal methimazole (5.2 (SD 1.1) hours and 13 (SD 3) hours, respectively) compared to 5 mg oral carbimazole (2.1 (SD 1.6) hours and 5.1 (SD 1.2) hours, respectively). At 148 hours, mean concentrations of methimazole in serum were
higher in cats receiving 10 mg methimazole transdermally (506 (SD 165) ng/mL) than for 5 mg oral carbimazole (255 (SD 28) ng/mL) or 5 mg transdermally (204 (SD 76) ng/mL). The mean relative bioavailability of 10 mg transdermal methimazole compared to oral carbimazole was 48 (min 43, max 55)%. CONCLUSION: Transdermal methimazole at a dose of 10 mg administered to the pinnae of healthy cats once daily in a novel lipophilic formulation has half the relative bioavailability compared to 5 mg oral carbimazole. CLINICAL RELEVANCE: Transdermal methimazole can be absorbed from the skin of healthy cats.

**Carbohydrate metabolism and pathogenesis of diabetes mellitus in dogs and cats.**
Hoenig, M.
Diabetes mellitus (DM) is a common disease in dogs and cats and its prevalence is increasing in both species, probably due to an increase in obesity, although only in cats has obesity been clearly identified as a major risk factor for diabetes. While the classification of diabetes in dogs and cats has been modeled after that of humans, many aspects are different. Autoimmune destruction of beta cells, a feature of type 1 DM in people, is common in dogs; however, in contrast to what is seen in people, the disease occurs in older dogs. Diabetes also occurs in older cats but islet pathology in those species is characterized by the presence of amyloid, the hallmark of type 2 DM. Despite being overweight or obese, most naive diabetic cats, contrary to type 2 diabetic humans, present with low insulin concentrations. The physiology of carbohydrate metabolism and pathogenesis of diabetes, including histopathologic findings, in dogs and cats are discussed in this chapter.

**Evaluation of a novel feline AB blood typing device.**
Hourani, L., C. Weingart, and B. Kohn
This prospective study evaluated a novel immunochromatographic (IC) blood typing test for the AB blood group system. Typing was conducted comparatively on ethylenediamine tetra-acetic acid-anticoagulated blood samples from 89 sick and 16 healthy cats with the IC test, as well as two tests as reference methods, a tube agglutination and a gel column test. The samples were between 0 and 10 days old (median 3 days) and were tested for haemolysis and agglutination; the packed cell volume ranged from 0.07 to 0.57 l/l (median 0.40 l/l). The reference methods agreed with each other in 100% of the test runs. Of the 85 samples tested as blood type A by the two reference methods, 80 were correctly identified by the IC test, four were misidentified as AB and one was rated inconclusive. All B samples were correctly typed. Two of the three AB samples were correctly identified by the IC test and one was rated inconclusive. The sample quality had no influence on test performance. Of 30 repeats, 28 were readable and showed agreement in 27 cases. The agreement of the IC test with the control methods was 96.1% for the 103 conclusive tests, and it showed high sensitivity and specificity for A and B antigen detection. It is suggested that AB results be reconfirmed with a laboratory method and that a “back-typing” be performed with plasma from B samples to detect the presence of alloantibodies. Given its very good performance and ease of use, the IC test can be recommended for clinical settings.

**Earliest evidence for commensal processes of cat domestication.**
Domestic cats are one of the most popular pets globally, but the process of their domestication is not well understood. Near Eastern wildcats are thought to have been attracted to food sources in early agricultural settlements, following a commensal pathway to domestication. Early evidence for close human-cat relationships comes from a wildcat interred near a human on Cyprus ca. 9,500 y ago, but the earliest domestic cats are known only from Egyptian art dating to 4,000 y ago. Evidence is lacking from the key period of cat domestication 9,500-4,000 y ago. We report on the presence of cats directly dated between 5560-5280 cal B.P. in the early agricultural village of Quanhucun in Shaanxi, China. These cats were outside the wild range of Near Eastern wildcats and biometrically smaller, but within the size-range of domestic cats. The delta(13)C and delta(15)N values of human and animal bone collagen revealed substantial consumption of millet-based foods by humans, rodents, and cats. Ceramic storage containers designed to exclude rodents indicated a threat to stored grain in
Yangshao villages. Taken together, isotopic and archaeological data demonstrate that cats were advantageous for ancient farmers. Isotopic data also show that one cat ate less meat and consumed more millet-based foods than expected, indicating that it scavenged among or was fed by people. This study offers fresh perspectives on cat domestication, providing the earliest known evidence for commensal relationships between people and cats.

**Presumed primary and secondary hepatic copper accumulation in cats.**


**OBJECTIVE:** To determine signalments, clinical features, clinicopathologic variables, imaging findings, treatments, and survival time of cats with presumed primary copper-associated hepatopathy (PCH) and to determine quantitative measures and histologic characteristics of the accumulation and distribution of copper in liver samples of cats with presumed PCH, extrahepatic bile duct obstruction, chronic nonsuppurative cholangitis-cholangiohepatitis, and miscellaneous other hepatobiliary disorders and liver samples of cats without hepatobiliary disease. **DESIGN:** Retrospective cross-sectional study. **ANIMALS:** 100 cats with hepatobiliary disease (PCH \( n = 11 \)), extrahepatic bile duct obstruction \( [14] \), cholangitis-cholangiohepatitis \( [37] \), and miscellaneous hepatobiliary disorders \( [38] \) and 14 cats without hepatobiliary disease. **PROCEDURES:** From 1980 to 2013, cats with and without hepatobiliary disease confirmed by liver biopsy and measurement of hepatic copper concentrations were identified. Clinical, clinicopathologic, and imaging data were compared between cats with and without PCH. **RESULTS:** Cats with PCH were typically young (median age, 2.0 years); clinicopathologic and imaging characteristics were similar to those of cats with other liver disorders. Copper-specific staining patterns and quantification of copper in liver samples confirmed PCH (on the basis of detection of \( > 700 \) mg/g of liver sample dry weight). Six cats with PCH underwent successful treatment with chelation (penicillamine; \( n = 5 \)), antioxidants (5), low doses of elemental zinc (2), and feeding of hepatic support or high-protein, low-carbohydrate diets, and other hepatic support treatments. One cat that received penicillamine developed hemolytic anemia, which resolved after discontinuation of administration. Three cats with high hepatic copper concentrations developed hepatocellular neoplasia. **CONCLUSIONS AND CLINICAL RELEVANCE:** Results suggested that copper accumulates in livers of cats as primary and secondary processes. Long-term management of cats with PCH was possible.

**MicroRNA expression profiling of cat and dog kidneys.**

Ichii, O., S. Otsuka, H. Ohta, A. Yabuki, T. Horino, and Y. Kon

MicroRNAs (miRNAs) play a role in the pathogenesis of certain diseases and may serve as biomarkers. Here, we present the first analysis of miRNA expression in the kidneys of healthy cats and dogs. Kidneys were divided into renal cortex (CO) and medulla (MD), and RNA sequence analysis was performed using the mouse genome as a reference. A total of 277, 276, 295, and 297 miRNAs were detected in cat CO, cat MD, dog CO, and dog MD, respectively. By comparing the expression ratio of CO to MD, we identified highly expressed miRNAs in each tissue as follows: 41 miRNAs including miR-192-5p in cat CO; 45 miRNAs including miR-323-3p in dog CO; 78 miRNAs including miR-20a-5p in cat MD; and 11 miRNAs including miR-132-5p in dog MD. Further, the target mRNAs of these miRNAs were identified. These data provide veterinary medicine critical information regarding renal miRNA expression.

**FPL-vaccinated cats are protected from CPV2c and CPV2b challenge.**
Vet Rec (2014) **174**:146.

Jack, S. C., D. Sutton, A. Bhogle, N. Spibey, and M. Francis

Superficial keratectomy for chronic corneal ulcers refractory to medical treatment in 36 cats.
Plasma renin activity and aldosterone concentrations in hypertensive cats with and without azotemia and in response to treatment with amlodipine besylate.


**Jeppson, R. E., H. M. Syme, and J. Elliott**

**BACKGROUND:** Role of renin-angiotensin aldosterone system (RAAS) in feline systemic hypertension is poorly understood. **OBJECTIVES:** Examine plasma renin activity (PRA) and plasma aldosterone concentrations (PAC) in normotensive and hypertensive cats with variable renal function and in response to antihypertensive therapy. **ANIMALS:** One hundred and ninety-six cats >9 years from first opinion practice. **METHODS:** PRA, PAC, and aldosterone-to-renin ratio (ARR) were evaluated in cats recruited prospectively and grouped according to systolic blood pressure (SBP) and renal function (nonazotemic normotensive [Non-Azo-N], nonazotemic hypertensive [Non-Azo-HT], azotemic normotensive [Azo-N], azotemic hypertensive [Azo-HT]). Changes in PRA and PAC were evaluated with antihypertensive therapy (amlodipine besylate). **RESULTS:** Plasma renin activity (ng/mL/h; P = .0013), PAC (pg/mL; P < .001), and ARR (P = 0.0062) differed significantly among groups. PRA (ng/mL/h) was significantly lower in hypertensive (Non-Azo-HT; n = 25, median 0.22 [25th percentile 0.09, 75th percentile 0.39], Azo-HT; n = 44, 0.33 [0.15, 0.48]) compared with Non-Azo-N (n = 57, 0.52 [0.28, 1.02]). Azo-HT cats had significantly higher PAC (n = 22, 149.8 [103.1, 228.7]) than normotensive cats (Non-Azo-N; n = 26, 45.4 [19.6, 65.0], Azo-N; n = 18, 84.1 [38.6, 137.8]). ARR was significantly higher in Azo-HT (n = 20, 503.8 [298.8, 1511]) than Azo-N (n = 16, 97.8 [77.0, 496.4]). Significant increase in PRA was documented with antihypertensive therapy (pretreatment [n = 20] 0.32 [0.15-0.46], posttreatment 0.54 [0.28, 1.51]), but PAC did not change. **CONCLUSIONS AND CLINICAL IMPORTANCE:** Hypertensive cats demonstrate significantly increased PAC with decreased PRA. PRA significantly increases with antihypertensive therapy. Additional work is required to determine the role of plasma aldosterone concentration in the pathogenesis of hypertension and whether this relates to autonomous production or activation of RAAS without demonstrable increase in PRA.

**0.4% dimeticone spray, a novel physically acting household treatment for control of cat fleas.**


**Jones, I. M., E. R. Brunton, and I. F. Burgess**

The cat flea, Ctenocephalides felis, is the most important ectoparasite of cats and dogs worldwide as a cause of irritation and health problems. Most products to control these pests in the household environment rely upon a combination of neurotoxic insecticides and insect growth regulators to inhibit development of flea eggs and larvae into adults. However, some of these are affected by problems of insecticide resistance as well as public concerns about their potential for toxicity in domestic use. Heavy synthetic oils, like the siloxane dimeticone, are currently widely used to treat human ectoparasite infestations, acting by a physical mode of action, and have been used in a variety of presentations for killing all life stages of fleas. We have investigated the activity of low concentrations of high molecular weight dimeticone in a volatile silicone base for ability to immobilise flea life stages without asphyxiating them. We found that cat flea adults and larvae were immobilised by a surface film of dimeticone that inhibited movement of cuticular joints, apparently forming an effective sticky trap. When cocoons were treated the fleas continued to develop within the pupae but failed to emerge. An aerosol spray incorporating 0.4% concentration of dimeticone, for use as a residual household treatment, showed no significant difference in knock down capability compared with that of a widely used pyriproxifen/permethrin spray in a repeat challenge test, with
effects persisting to inhibit adult flea emergence in the test arena area for more than 3 weeks after application.

Concentrated tea tree oil toxicosis in dogs and cats: 443 cases (2002-2012).
Khan, S. A., M. K. McLean, and M. R. Slater
OBJECTIVE: To determine the frequency, types, and severity of clinical signs; geographic distribution; and treatment information associated with toxicosis caused by 100% tea tree oil (TTO) in dogs and cats in the United States and Canada.
DESIGN: Retrospective case series.
ANIMALS: 337 dogs and 106 cats with evidence of exposure to 100% TTO.
PROCEDURES: 10-year incident data were retrieved from the ASPCA Animal Poison Control Center database from January 2002 to December 2012. Only evidenced or witnessed incidents assessed as toxicosis or suspected toxicosis were included. Signalment, amount of TTO used, intention of use, and outcome information were evaluated. Severity of illness and correlations with breed, sex, age, and weight were determined.
RESULTS: TTO was intentionally used in 395 of 443 (89%) animals. The amount used ranged from 0.1 to 85 mL. Incidents were reported from 41 states, the District of Columbia, and 4 Canadian provinces. Exposure route was cutaneous in 221 (50%) animals, cutaneous and oral in 133 (30%), and oral in 67 (15%). Clinical signs developed within 2 to 12 hours and lasted up to 72 hours. The most common signs were increased salivation or drooling, signs of CNS depression or lethargy, paresis, ataxia, and tremors. A significant association with severity of illness was found for age and weight, with higher prevalence of major illness in younger and smaller cats.
CONCLUSIONS AND CLINICAL RELEVANCE: Intentional or accidental use of 100% TTO in dogs or cats caused serious signs of CNS depression, paresis, ataxia, or tremors within hours after exposure and lasting up to 3 days. Younger cats and those with lighter body weight were at greater risk of developing major illness.

Evaluation of a technique to measure heart rate variability in anaesthetised cats.
Khor, K. H., I. A. Shiels, F. E. Campbell, R. M. Greer, A. Rose, and P. C. Mills
Analysis of heart rate (HR) and heart rate variability (HRV) are powerful tools to investigate cardiac diseases, but current methods, including 24-h Holter monitoring, can be cumbersome and may be compromised by movement artefact. A commercially available data capture and analysis system was used in anaesthetised healthy cats to measure HR and HRV during pharmacological manipulation of HR. Seven healthy cats were subjected to a randomised crossover study design with a 7 day washout period between two treatment groups, placebo and atenolol (1mg/kg, IV), with the efficacy of atenolol to inhibit beta1 adrenoreceptors challenged by epinephrine. Statistical significance for the epinephrine challenge was set at P<0.0027 (Holm-Bonferroni correction), whereas a level of significance of P<0.05 was set for other variables. Analysis of the continuous electrocardiography (ECG) recordings showed that epinephrine challenge increased HR in the placebo group (P=0.0003) but not in the atenolol group. The change in HR was greater in the placebo group than in the atenolol group (P=0.0004). Therefore, compared to cats pre-treated with placebo, pre-treatment with atenolol significantly antagonised the tachycardia while not significantly affecting HRV. The increased HR in the placebo group following epinephrine challenge was consistent with a shift of the sympathovagal balance towards a predominantly sympathetic tone. However, the small (but not significant at the critical value) decrease in the normalised high-frequency component (HFnorm) in both groups of cats suggested that epinephrine induced a parasympathetic withdrawal in addition to sympathetic enhancement (increased normalised low frequency component or LFnorm). In conclusion, this model is a highly sensitive and repeatable model to investigate HRV in anaesthetised cats that would be useful in the laboratory setting for short-term investigation of cardiovascular disease and subtle responses to pharmacological agents in this species.

Use of IV lipid emulsion for treatment of ivermectin toxicosis in a cat.
Kidwell, J. H., G. J. Buckley, A. E. Allen, and C. Bandt
Ivermectin toxicosis in cats is infrequently reported. IV lipid emulsion (ILE) is a novel treatment in veterinary medicine that has been used for amelioration of adverse effects seen with multiple lipid soluble compounds. Previously, ILE has been investigated in experimental models with rats, rabbits, pigs, and dogs, mainly for resuscitation of cardiopulmonary arrest
and treatment of hypotension due to local anesthetic drug overdose. There are few case reports in veterinary medicine of using ILE for drug toxicity. Only one feline case has been reported, with IV lipids used for treatment of lidocaine toxicity. This report describes a case of ivermectin toxicosis in a 1 yr old domestic shorthair that was safely and successfully treated using ILE.

**Canine and feline blood transfusions: controversies and recent advances in administration practices.**

*Vet Anaesth Analg (2014)*

**Kisielewicz, C., and I. A. Self**

**OBJECTIVES:** To discuss and review blood transfusion practices in dogs and cats including collection and storage of blood and administration of products. To report new developments, controversial practices, less conventional blood product administration techniques and where applicable, describe the relevance to anaesthetists and anaesthesia. **DATABASES USED:** PubMed and Google Scholar using dog, cat, blood transfusion, packed red blood cells and whole blood as keywords. **CONCLUSIONS:** Blood transfusions improve oxygen carrying capacity and the clinical signs of anaemia. However there are numerous potential risks and complications possible with transfusions, which may outweigh their benefits. Storage of blood products has improved considerably over time but whilst extended storage times may improve their availability, a phenomenon known as the storage lesion has been identified which affects erythrocyte viability and survival. Leukoreduction involves removing leukocytes and platelets thereby preventing their release of cytokines and bioactive compounds which also contribute to storage lesions and certain transfusion reactions. Newer transfusion techniques are being explored such as cell salvage in surgical patients and subsequent autologous transfusion. Xenotransfusions, using blood and blood products between different species, provide an alternative to conventional blood products.

**Phenotypic and functional properties of feline dedifferentiated fat cells and adipose-derived stem cells.**


**Kono, S., T. Kazama, K. Kano, K. Harada, M. Uechi, and T. Matsumoto**

It has been reported that mature adipocyte-derived dedifferentiated fat (DFAT) cells show multilineage differentiation potential similar to that observed in mesenchymal stem cells. Since DFAT cells can be prepared from a small quantity of adipose tissue, they could facilitate cell-based therapies in small companion animals such as cats. The present study examined whether multipotent DFAT cells can be generated from feline adipose tissue, and the properties of DFAT cells were compared with those of adipose-derived stem cells (ASCs). DFAT cells and ASCs were prepared from the floating mature adipocyte fraction and the stromal vascular fraction, respectively, of collagenase-digested feline omental adipose tissue. Both cell types were evaluated for growth kinetics, colony-forming unit fibroblast (CFU-F) frequency, immunophenotypic properties, and multilineage differentiation potential. DFAT cells and ASCs could be generated from approximately 1g of adipose tissue and were grown and subcultured on laminin-coated dishes. The frequency of CFU-Fs in DFAT cells (35.8%) was significantly higher than that in ASCs (20.8%) at passage 1 (P1). DFAT cells and ASCs displayed similar immunophenotypes (CD44(+), CD90(+), CD105(+), CD14(-), CD34(-) and CD45(-)). Alpha-smooth muscle actin-positive cells were readily detected in ASCs (15.2+/-7.2%) but were rare in DFAT cells (2.2+/-3.2%) at P1. Both cell types exhibited adipogenic, osteogenic, chondrogenic, and smooth muscle cell differentiation potential in vitro. In conclusion, feline DFAT cells exhibited similar properties to ASCs but displayed higher CFU-F frequency and greater homogeneity. DFAT cells, like ASCs, may be an attractive source for cell-based therapies in cats.

**Plasma and erythrocyte glutathione peroxidase activity, serum selenium concentration, and plasma total antioxidant capacity in cats with IRIS stages I-IV chronic kidney disease.**


**Krofic Zel, M., N. Tozon, and A. Nemec Svete**

**BACKGROUND:** Serum selenium concentrations and the activity of plasma glutathione peroxidase (GPx) decrease with the progression of chronic kidney disease (CKD) in human patients. Selenium is considered a limiting factor for plasma GPx synthesis. Plasma total antioxidant capacity (TAC) is decreased in CKD cats in comparison to healthy cats.
HYPOTHESIS: Serum selenium concentrations and plasma and erythrocyte GPx activity in cats with CKD are lower than in healthy cats. Serum selenium concentrations, the activity of enzymes, and plasma TAC progressively decrease with the progression of kidney disease according to IRIS (International Renal Interest Society) classification. ANIMALS: Twenty-six client-owned cats in IRIS stages I-IV of CKD were compared with 19 client-owned healthy cats. METHODS: A CBC, serum biochemical profile, urinalysis, plasma and erythrocyte GPx activity, serum selenium concentration, and plasma TAC were measured in each cat. RESULTS: Cats in IRIS stage IV CKD had a significantly higher (P = .025) activity of plasma GPx (23.44 +/- 6.28 U/mL) than cats in the control group (17.51 +/- 3.75 U/mL). There were no significant differences in erythrocyte GPx, serum selenium concentration, and plasma TAC, either among IRIS stages I-IV CKD cats or between CKD cats and healthy cats. CONCLUSIONS AND CLINICAL IMPORTANCE: Erythrocyte GPx activity, serum selenium concentration, and plasma TAC do not change in CKD cats compared with healthy cats. Selenium is not a limiting factor in feline CKD. Increased plasma GPx activity in cats with stage IV CKD suggests induction of antioxidant defense mechanisms. Antioxidant defense systems might not be exhausted in CKD in cats.

Kumsa, B., P. Parola, D. Raoult, and C. Socolovschi
Abstract. Fleas are important vectors of several Rickettsia and Bartonella spp. that cause emerging zoonotic diseases worldwide. In this study, 303 fleas collected from domestic dogs and cats in Ethiopia and identified morphologically as Ctenocephalides felis felis, C. canis, Pulex irritans, and Echidnophaga gallinacea were tested for Rickettsia and Bartonella DNA by using molecular methods. Rickettsia felis was detected in 21% of fleas, primarily C. felis, with a similar prevalence in fleas from dogs and cats. A larger proportion of flea-infested dogs (69%) than cats (37%) harbored at least one C. felis infected with R. felis. Rickettsia typhi was not detected. Bartonella henselae DNA was detected in 6% (2 of 34) of C. felis collected from cats. Our study highlights the likelihood of human exposure to R. felis, an emerging agent of spotted fever, and B. henselae, the agent of cat-scratch disease, in urban areas in Ethiopia.

OBJECTIVE: To describe the use of hydropulsion with sterile isotonic buffered ophthalmic solution (ie, eyewash) for the treatment of superficial corneal foreign bodies in veterinary patients and evaluate signalment, clinical findings, and outcomes following the procedure. DESIGN: Retrospective case series. ANIMALS: 11 dogs, 2 cats, and 2 horses. PROCEDURES: Medical records were retrospectively reviewed to identify patients that underwent hydropulsion treatment for a superficial, nonpenetrating corneal foreign body confirmed by ophthalmic examination. Data regarding signalment, reason for evaluation, ocular diagnoses, and treatment were recorded. Hydropulsion was performed with a 6-ml syringe filled with eyewash solution and a 25-gauge needle with the needle tip removed. Owners and referring veterinarians of patients that did not have a recheck examination recorded were contacted by telephone for follow-up information. RESULTS: The corneal foreign body was an incidental finding in 3 of 15 patients. The most common clinical signs included blepharospasm, conjunctival hyperemia, and corneal vascularization. Hydropulsion was successful for foreign body removal in all 15 cases. No complications were observed during or following the procedure. In the 9 patients that had a follow-up examination, the cornea tested negative for retention of topically applied fluorescein (with a mean of 6.3 days from treatment to follow-up). At the time of last follow-up examination or telephone follow-up, no patients were reported to have clinical signs of ocular discomfort or corneal opacity associated with the affected site. CONCLUSIONS AND CLINICAL RELEVANCE: In these patients, hydropulsion was easily performed with readily available materials and was successful for the removal of superficial corneal foreign bodies with no adverse effects.

SIGNIFICANCE: Acute phase proteins appear to be reasonable predictors of innate proteins significantly increased in cats undergoing interferon immunosorbent assay kits and alpha (D10 and D30) and after therapy (D65). Serum amyloid retroviruses and subjected to the interferon

METHODS: A single influence acute phase protein concentrations namely serum amyloid components of innate immunity and studies describing their use as a monitoring tool for the immune system in animals different retroviral diseases including feline immune deficiency virus and feline leukaemia virus. Although its mechanism

OBJECTIVES: Recombinant feline interferon Leal, R. O., S. Gil, N. Sepulveda, D. McGahie, A. Duarte, M. M. Ni

J Small Anim Pract (2014)

Monitoring acute phase proteins in retrovirus infected cats undergoing feline interferon-omega therapy.


OBJECTIVES: Recombinant feline interferon-omega therapy is an immunomodulator currently used in the treatment of different retroviral diseases including feline immune deficiency virus and feline leukaemia virus. Although its mechanism of action remains unclear, this drug appears to potentiate the innate response. Acute phase proteins are one of the key components of innate immunity and studies describing their use as a monitoring tool for the immune system in animals undergoing interferon-omega therapy are lacking. This study aimed to determine whether interferon-omega therapy influences acute phase protein concentrations namely serum amyloid-A, alpha-1-glycoprotein and C-reactive protein.

METHODS: A single-arm study was performed using 16 cats, living in an animal shelter, naturally infected with retroviruses and subjected to the interferon-omega therapy licensed protocol. Samples were collected before (D0), during (D10 and D30) and after therapy (D65). Serum amyloid-A and C-reactive protein were measured by specific enzyme-linked immunosorbent assay kits and alpha-1-glycoprotein by single radial immunodiffusion. RESULTS: All the acute phase proteins significantly increased in cats undergoing interferon-omega therapy (D0/D65: P<0.05) CLINICAL SIGNIFICANCE: Acute phase proteins appear to be reasonable predictors of innate-immune stimulation and may be useful

Computed tomographic signs of acromegaly in 68 diabetic cats with hypsomatomatropism.


In order to describe the signs of acromegaly in cats, a case-control study was done based on computed tomography (CT) scans of the heads of 68 cats with hypsomatomatropism and 36 control cats. All cats with a diagnosis of hypsomatomatropism had diabetes mellitus, serum insulin-like growth factor-1 >1000 ng/ml and a pituitary mass. Measurements of bones and soft tissues were done by two independent observers without knowledge of the diagnosis. Pituitary masses were identified in CT images of 64 (94%) cats with hypsomatomatropism. Analysis of variance found a moderate effect of gender on the size of bones and a large effect of hypsomatomatropism on the size of bones and thickness of soft tissues. In cats with hypsomatomatropism the frontal and parietal bones were, on average, 0.8 mm thicker (P <0.001); the distance between the zygomatic arches was, on average, 5.4 mm greater (P <0.001); and the mandibular rami were, on average, 1.1 mm thicker (P <0.001) than in control cats. The skin and subcutis dorsal to the frontal bone were, on average, 0.4 mm thicker (P = 0.001); lateral to the zygomatic arch were, on average, 0.7 mm thicker (P <0.001); and ventral to the mandibular rami were, on average, 1.1 mm thicker (P = 0.002) in cats with hypsomatomatropism than in control cats. The cross-sectional area of the nasopharynx was, on average, 11.1 mm(2) smaller in cats with hypsomatomatropism than in control cats (P = 0.02). Prognathia inferior and signs of temporomandibular joint malformation were both observed more frequently in cats with hypsomatomatropism than in control cats (P = 0.03). Overall, differences between affected and unaffected cats were small. Recognising feline acromegaly on the basis of facial features is difficult.

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in the individual monitoring of naturally retroviral infected cats undergoing interferon-omega therapy.

**PET and SPECT imaging in veterinary medicine.**
LeBlanc, A. K., and K. Peremans
Veterinarians have gained increasing access to positron emission tomography (PET and PET/CT) imaging facilities, allowing them to use this powerful molecular imaging technique for clinical and research applications. SPECT is currently being used more in Europe than in the United States and has been shown to be useful in veterinary oncology and in the evaluation of orthopedic diseases. SPECT brain perfusion and receptor imaging is used to investigate behavioral disorders in animals that have interesting similarities to human psychiatric disorders. This article provides an overview of the potential applications of PET and SPECT. The use of commercially available and investigational PET radiopharmaceuticals in the management of veterinary disease has been discussed. To date, most of the work in this field has utilized the commercially available PET tracer, (18)F-fluorodeoxyglucose for oncologic imaging. Normal biodistribution studies in several companion animal species (cats, dogs, and birds) have been published to assist in lesion detection and interpretation for veterinary radiologists and clinicians. Studies evaluating other (18)F-labeled tracers for research applications are underway at several institutions and companion animal models of human diseases are being increasingly recognized for their value in biomarker and therapy development. Although PET and SPECT technologies are in their infancy for clinical veterinary medicine, increasing access to and interest in these applications and other molecular imaging techniques has led to a greater knowledge and collective body of expertise for veterinarians worldwide. Initiation and fostering of physician-veterinarian collaborations are key components to the forward movement of this field.

**Morphologic Changes in Trabecular Meshwork after Patterned and Argon Laser Trabeculoplasty in Cats.**
Abstract Purpose: Patterned laser trabeculoplasty (PLT) was introduced as it claimed to cause less thermal damage and provide more uniform coverage of the trabecular meshwork than argon laser trabeculoplasty (ALT). The objective of this study was to investigate morphologic changes in the trabecular meshwork after PLT or ALT in cats. Materials and Methods: We performed ALT in the right eyes and PLT in the left eyes of 6 domestic cats. A seventh cat was assigned as a control. Two ranges of laser energy were used for PLT: supra-threshold energy of 400-450 mW in 3 cats and sub-threshold energy of 250 to 350 mW in 3 cats. Specimens were obtained at 1, 4 and 9 weeks after treatment. Structural changes in the trabecular meshwork were evaluated by light microscopy and scanning electron microscopy. Results: The trabecular meshwork after supra-threshold PLT revealed coagulative damage such as a crater-like lesion with disruption of trabecular beams in early period and extensive membranous obliteration in the late period (at 4 and 9 weeks after treatment), which were comparable to tissue changes after ALT. Sub-threshold PLT resulted in thinning of the uveal meshwork and denudation of trabecular endothelial cells whereas it did not disrupt trabecular beams. Nevertheless, following sub-threshold PLT, partial membranous coverages were observed in the trabecular meshwork in the late period. Conclusions: When used at sub-threshold power, PLT caused less thermal damage to the trabecular meshwork than ALT. However, it did not effectively prevent late scarring of the trabecular meshwork in cats.

**Case-control risk factor study of methicillin-resistant Staphylococcus pseudintermedius (MRSP) infection in dogs and cats in Germany.**
Methicillin-resistant Staphylococcus pseudintermedius (MRSP) has emerged as a highly drug-resistant small animal veterinary pathogen. Although often isolated from outpatients in veterinary clinics, there is concern that MRSP follows a veterinary-hospital-associated epidemiology. This study’s objective was to identify risk factors for MRSP infections in dogs and cats in Germany. Clinical isolates of MRSP cases (n=150) and meticillin-susceptible S. pseudintermedius (MSSP) controls (n=133) and their corresponding host signalment and medical data covering the six months prior to staphylococcal
isolation were analysed by multivariable logistic regression. The identity of all MRSP isolates was confirmed through demonstration of S. intermedius-group specific nuc and mecA. In the final model, cats (compared to dogs, OR 18.5, 95% CI 1.8-188.0, P=0.01), animals that had been hospitalised (OR 104.4, 95% CI 21.3-511.6, P<0.001), or visited veterinary clinics more frequently (>10 visits OR 7.3, 95% CI 1.0-52.6, P=0.049) and those that had received topical ear medication (OR 5.1, 95% CI 1.8-14.9, P=0.003) or glucocorticoids (OR 22.5, 95% CI 7.0-72.6, P<0.001) were at higher risk of MRSP infection, whereas S. pseudintermedius isolates from ears were more likely to belong to the MSSP-group (OR 0.09, 95% CI 0.03-0.34, P<0.001). These results indicate an association of MRSP infection with veterinary clinic/hospital settings and possibly with chronic skin disease. There was an unexpected lack of association between MRSP and antimicrobial therapy; this requires further investigation but may indicate that MRSP is well adapted to canine skin with little need for selective pressure.

**Evaluation of low-dose metronomic (LDM) cyclophosphamide toxicity in cats with malignant neoplasia.**
Leo, C., A. Stell, J. Borrego, E. Martinez de Merlo, K. Ruess-Melzer, and A. Lara-Garcia
Oral administration of low-dose cyclophosphamide in pets with spontaneously occurring malignant neoplasms has become a common practice in veterinary medicine. The purpose of this retrospective study was to investigate toxicity events in cats with spontaneous malignancies receiving cyclophosphamide as a metronomic therapy for at least 1 month. The number and severity of clinical, haematological and biochemical adverse events were recorded according to the Veterinary Cooperative Oncology Group’s Common Terminology Criteria for Adverse Events v1.1 classification scheme. Twenty-four cats were enrolled in the study with a total number of 27 neoplasms: 13 sarcomas, 12 carcinomas, one melanoma and one neuroendocrine tumour. Seventeen cats presented with macroscopic disease, while seven had microscopic disease. Seven cats (29%) had metastasis either to the regional lymph nodes and/or distant sites at the time of study enrolment. Additional medications, administered concurrently, included non-steroidal anti-inflammatory drugs (17), toceranib (4) and thalidomide (7). Four cats showed grade I gastrointestinal toxicity during the first month of treatment, which was controlled with anti-emetics. Overall, 2/24 cats (8%) showed grade I haematological toxicities and 1/24 (4%) showed grade I renal toxicity in the first 4 weeks. Median follow-up for all cats was 30 days (range 30-360 days). For the 15 cats with follow-up longer than 1 month the only additional toxicities observed were two grade III and one grade II azotaemia that occurred after 2 months of therapy. Low-dose cyclophosphamide seems to be a well-tolerated option for cats bearing primary or metastatic tumours. Evaluation of toxicity after long-term administration is still needed.

**CONTRAST VIDEOFLUOROSCOPIC ASSESSMENT OF DYSPHAGIC CATS.**
Vet Radiol Ultrasound (2014)
Levine, J. S., R. E. Pollard, and S. L. Marks
The diagnostic utility of contrast-enhanced videofluoroscopic esophagography in dysphagic cats has been rarely studied relative to dogs. Current literature regarding feline dysphagia typically consists of individual case reports or small case series. This retrospective study analyzed the imaging findings in 11 cats undergoing 15 videofluoroscopic swallow studies. Hiatal hernia (n = 5), esophageal stricture (n = 3), and esophageal dysmotility (n = 7) were the most common diagnoses (some cats having more than 1 diagnosis) in dysphagic cats that underwent videofluoroscopic swallow studies. Esophageal dysmotility appeared to be associated with a higher percentage of swallows from which no peristaltic waves were generated. Oropharyngeal and ericopharyngeal causes of dysphagia were not identified in any cat and quantitative assessment of the swallowing reflex (pharyngeal constriction ratio = 0.17 +/- 0.09; time to maximum pharyngeal contraction = 0.13 +/- 0.02 s; time to proximal esophageal sphincter opening = 0.07 +/- 0.02 s; time to proximal esophageal sphincter closed = 0.23 +/- 0.05 s; time to opening of the epiglottis = 0.27 +/- 0.04 s) was similar to quantitative swallowing parameters previously reported in healthy dogs. In conclusion, videofluoroscopy is a diagnostic tool that can identify esophageal abnormalities that are not readily apparent on survey radiographs. Limitations include the potential need for multiple studies, and the possibility of poor compliance in the feline patient. Results of this study are intended to help veterinarians define a prioritized differential diagnosis list for dysphagic cats.
Failure of efficacy and adverse events associated with dose-intense diminazene diaceturate treatment of chronic Cytauxzoon felis infection in five cats.
Lewis, K. M., L. A. Cohn, H. S. Marr, and A. J. Birkenheuer

Cytauxzoon felis is a hemoprotozoan parasite of cats. While many infected cats die of acute illness, some enter a chronic carrier state. To date, no treatment has been documented to clear the chronic carrier state, leaving recovered cats to act as a potential indirect source of infection via a tick vector. Diminazene diaceturate is an anti/protozoal therapy that has been suggested for use in the treatment of acute cytauxzoonosis, but which failed to clear the carrier state at the dose used in acute illness. We hypothesized that a dose-intensified regimen of diminazene could reduce or eliminate parasitemia from five domestic cats naturally infected with C felis. Cats were administered 4 mg/kg of diminazene diaceturate intramuscularly for 5 consecutive days. Clearance of the organism was assessed via semi-quantitative polymerase chain reaction and light microscopy 1, 3, 6 and 10 weeks after starting treatment. Additionally, cats were monitored for adverse drug reactions by daily observation and examination. Complete blood count, biochemical profile and urinalysis were performed at 1, 3 and 10 weeks. Adverse events were common and included profuse salivation and nausea at the time of injection, monoparesis in the injected leg, proteinuria and potential hepatotoxicity. Severity of parasitemia was not reduced. Diminazene diaceturate cannot be recommended for elimination of the carrier state of C felis infection.

Treatment of feline lymphoma using a 12-week, maintenance-free combination chemotherapy protocol in 26 cats.
Vet Comp Oncol (2014)
Limmer, S., N. Eberle, V. Nerschbach, I. Nolte, and D. Betz

The aim of this prospective clinical trial was to investigate the efficacy and toxicity of a short-term, maintenance-free chemotherapy protocol in feline lymphoma. Twenty-six cats with confirmed diagnosis of high-/intermediate-grade lymphoma were treated with a 12-week protocol consisting of cyclic administration of l-asparaginase, vincristine, cyclophosphamide, doxorubicin and prednisolone. Complete (CR) and partial remission (PR) rates were 46 and 27%, respectively. Median duration of first CR was 394 days compared with a median PR duration of 41 days. No factor was identified to significantly influence the likelihood to reach CR. Overall survival amounted to 78 days (range: 9-2230 days). Median survival in CR cats was 454 days and in PR cats was 82 days. Toxicosis was mainly low grade with anorexia seen most frequently. In cats achieving CR, maintenance-free chemotherapy may be sufficient to attain long-term remission and survival. Factors aiding in prognosticating the likelihood for CR, strategies enhancing response and targeting chemotherapy-induced anorexia need to be identified in future.

Left atrial size, atrial function and left ventricular diastolic function in cats with hypertrophic cardiomyopathy.

OBJECTIVES: To describe left atrial size, left atrial volume, left atrial function and left ventricular diastolic function in healthy cats and those with hypertrophic cardiomyopathy without and with congestive heart failure. METHODS: A retrospective study of 61 client-owned, 21 healthy, 21 asymptomatic hypertrophic cardiomyopathy and 19 with hypertrophic cardiomyopathy and congestive heart failure cats. Data were retrieved from clinical records and echocardiography archives. Left atrial diameter and volumes were measured. Left atrial function was investigated using changes in diameter (fractional shortening) and volume (Simpson’s method; left atrial ejection fraction). Conventional echocardiographic indices of left ventricular diastolic function were recorded. RESULTS: Left atrial diameter and left atrial volume measurements were significantly higher in hypertrophic cardiomyopathy with congestive heart failure cats compared with asymptomatic hypertrophic cardiomyopathy and healthy cats (P < 0.001). Left atrial passive, active and complete ejection fraction distinguished between hypertrophic cardiomyopathy with congestive heart failure and asymptomatic hypertrophic cardiomyopathy (P < 0.001). Hypertrophic cardiomyopathy with congestive heart failure cats had significantly lower mitral A wave velocity (P = 0.016) and atrial complete emptying based on diameter and volume measurements (P = 0.008 and P < 0.001, respectively) compared with asymptomatic hypertrophic cardiomyopathy cats. CLINICAL SIGNIFICANCE: Left atrial volume is obtainable by echocardiography in cats. Left atrial volume and atrial function may indicate chronicity and severity of diastolic dysfunction associated with hypertrophic cardiomyopathy and congestive heart failure. Left atrial function was reduced in cats with hypertrophic cardiomyopathy and congestive heart failure compared with healthy and asymptomatic hypertrophic cardiomyopathy groups.
Diagnostic utility of CD4%:CD8% T-lymphocyte ratio to differentiate feline immunodeficiency virus (FIV)-infected from FIV-vaccinated cats.
Vet Microbiol (2014)
Antibody testing based on individual risk assessments is recommended to determine feline immunodeficiency virus (FIV) status, but ELISA and Western blot tests cannot distinguish between anti-FIV antibodies produced in response to natural infection and those produced in response to FIV vaccination. The aim of this cross-sectional study was to test the hypothesis that FIV-infected cats could be differentiated from FIV-vaccinated uninfected cats using lymphocyte subset results, specifically the CD4%:CD8low% T-lymphocyte ratio. Comparisons of the CD4%:CD8low% T-lymphocyte ratio were made among the following four groups: Group 1 - FIV-infected cats (n=61; FIV-antibody positive by ELISA and FIV PCR positive); Group 2 - FIV-uninfected cats (n=96; FIV-antibody negative by ELISA); Group 3 - FIV-vaccinated uninfected cats (n=31; FIV-antibody negative by ELISA before being vaccinated against FIV, after which they tested FIV ELISA positive); and Group 4 - FIV-uninfected but under chronic/active antigenic stimulation (n=16; FIV-antibody negative by ELISA; all had active clinical signs of either upper respiratory tract disease or gingival disease for > = 21 days). The median CD4%:CD8low% T-lymphocyte ratio was lower in Group 1 (1.39) than in each of the other three groups (Group 2 - 9.77, Group 3 - 9.72, Group 4 - 5.64; P<0.05). The CD4%:CD8low% T-lymphocyte ratio was also the most effective discriminator between FIV-infected cats and the other three groups, and areas under ROC curves ranged from 0.91 (compared with Group 4) to 0.96 (compared with Group 3). CD4%:CD8low% shows promise as an effective test to differentiate between FIV-infected cats and FIV-vaccinated uninfected cats.

Purring in cats during auscultation: how common is it, and can we stop it?
Little, C. J., L. Ferasin, H. Ferasin, and M. A. Holmes
OBJECTIVES: When cats purr during examination it is difficult to perform auscultation. The objective of this study was to determine the prevalence of purring in cats during examination, and identify interventions that could be used to stop purring. METHODS: Cats seen at a first opinion clinic were enrolled in the study and their purring status recorded. Thirty of the purring cats were exposed to up to three different interventions in an attempt to stop purring in a randomised controlled trial including blowing at the ear, use of an ethanol-based aerosol near the cat and proximity to a running tap. RESULTS: The 30 cats in the trial were subjected to a total of 54 attempts to stop purring, proximity to a running tap caused 17 of 21 (81%) cats to stop purring, blowing at the cat’s ears worked in 2 of 15 (13%) cats, spraying an aerosol close to the cat was effective in 9 of 18 (50%) cases. In 2 cats (7%), none of the interventions interrupted purring. CLINICAL SIGNIFICANCE: This study provides evidence that placing a purring cat near a running tap and in proximity to the discharge of an ethanol-based aerosol are effective measures to stop purring in order to allow auscultation.

Heat treatment prior to testing allows detection of antigen of Dirofilaria immitis in feline serum.
BACKGROUND: Diagnosis of Dirofilaria immitis infection in cats is complicated by the difficulty associated with reliable detection of antigen in feline blood and serum samples. METHODS: To determine if antigen-antibody complex formation may interfere with detection of antigen in feline samples, we evaluated the performance of four different commercially available heartworm tests using serum samples from six cats experimentally infected with D. immitis and confirmed to harbor a low number of adult worms (mean = 2.0). Sera collected 168 (n = 6), 196 (n = 6), and 224 (n = 6) days post infection were tested both directly and following heat treatment. RESULTS: Antigen was detected in serum samples from 0 or 1 of 6 infected cats using the assays according to manufacturer’s directions, but after heat treatment of serum samples, as many as 5 of 6 cats had detectable antigen 6-8 months post infection. Antibodies to D. immitis were detected in all six infected cats by commercial in-clinic assay and at a reference laboratory. CONCLUSIONS: These results indicate that heat treatment of samples prior to testing can improve the sensitivity of antigen assays in feline patients, supporting more
accurate diagnosis of this infection in cats. Surveys conducted by antigen testing without prior heat treatment of samples likely underestimate the true prevalence of infection in cats.

The complete mitochondrial genome of Toxascaris leonina: Comparison with other closely related species and phylogenetic implications.
Liu, G. H., D. H. Zhou, L. Zhao, R. C. Xiong, J. Y. Liang, and X. Q. Zhu
Adults of Toxascaris leonina (Nematoda: Ascarididae) live in the gastrointestinal tract of both dogs and cats, and cause significant economic losses and potential public health problems worldwide. Although many studies have given insights into this significant pathogen, to date, the complete mitochondrial (mt) genome sequence is still not available for T. leonina. Here, we sequenced the complete mt genome of T. leonina. This AT-rich (71.53%) mt genome (14,310bp) is circular and consists of 36 genes, including 12 genes for proteins, 2 genes for rRNA and 22 genes for tRNA. All mt genes of T. leonina are transcribed in the same direction. The gene order is the same as those of Ascaris spp. (Ascarididae), Toxocara spp. (Toxocaridae), Anisakis simplex and Contracaecum rudolphii B (Anisakidae), but distinct from that of Ascaridia spp. (Ascarididae). Phylogenetic analyses using concatenated amino acid sequences of 12 protein-coding genes by Bayesian inference (BI) showed distinct groups with high statistical support, and our data confirm that T. leonina is a member of the Ascarididae, and that this family is more closely related to the Toxocaridae rather than the Anisakidae within the Ascaridoida. The determination of mt genome sequences of T. leonina provides novel genetic markers for studies into the systematics, population genetics, and epidemiology of this parasite.

BACKGROUND: Primary hyperaldosteronism (PHA) in cats occurs as a consequence of excessive hormone production by an adrenocortical tumor. Median survival time, association between tumor type and prognosis, and the likelihood that cats require continued medical therapy after surgery have not been systematically evaluated. OBJECTIVES: To determine the median survival time of cats with PHA treated by unilateral adrenalectomy. To examine if tumor type, anesthesia time, or tumor location (left or right side) affect survival and if affected cats require continued postoperative treatment for persistent hypertension or hypokalemia. ANIMALS: Ten client-owned cats. METHODS: Retrospective study. Cats were diagnosed with PHA based on clinical signs, increased plasma aldosterone concentration, and advanced imaging. Cats underwent unilateral adrenalectomy. Survival time (days alive after surgery) was determined for each cat. Factors affecting median survival time were investigated, including histopathology, anesthesia time, and location (side) of the tumor. RESULTS: Eight of 10 cats survived to discharge from the hospital post adrenalectomy. Overall median survival was 1,297 days (range 2-1,582 days). The only significant factor affecting median survival time was anesthesia time >4 hours. Tumor type and location (side) did not significantly affect median survival time. No cats required continued medical treatment for PHA.
CONCLUSIONS AND CLINICAL IMPORTANCE: Although PHA in cats is still considered an uncommon condition, it should be considered in middle to older aged cats with hypokalemic polymyopathy and systemic hypertension. Surgical correction by unilateral adrenalectomy is a viable approach to definitive treatment of PHA with no need for continued medical management.

Prevalence of onychectomy in cats presented for veterinary care near Raleigh, NC and educational attitudes toward the procedure.
Lockhart, L. E., A. A. Motsinger-Reif, W. M. Simpson, and L. P. Posner
OBJECTIVE: The current prevalence of onychectomy (declawing) in cats is unknown, and education regarding the procedure appears to vary greatly among veterinary schools. The purpose of this project was to determine the prevalence of onychectomized cats near Raleigh, NC and to document the frequency and style (laboratory or lecture) with which the procedure is taught in USA veterinary schools. ANIMALS: One thousand seven hundred ninety four cats ranging in age
from 8 days to 21 years, of which 938 (52.3%) were female and 1719 (95.8%) were sterilized. METHODS: Data were collected over a 10-week period regarding cats seen for appointments in five veterinary facilities (two cat-only, two general, and one tertiary). Data collection included signalment and onychectomy status. During this time, 28 veterinary schools were polled regarding education of veterinary students in onychectomy. RESULTS: Three hundred and seventy four (20.8%) cats had undergone onychectomy. A significantly higher percentage of declawed cats were seen in the general practices compared with the other practice types (p < 0.030). Younger cats had a higher rate of onychectomy (p < 0.001). Twenty-six veterinary schools responded to the survey (93%). Fourteen (54%) of the responding schools did not include in their core curriculum a lecture or surgical laboratory providing instruction in the onychectomy procedure. CONCLUSIONS AND CLINICAL RELEVANCE: Almost 21% of cats seen in veterinary hospitals near Raleigh, NC were declawed. Less than 50% of veterinary schools in the USA include a mandatory lecture or laboratory to teach the procedure. There appears to be a discrepancy between the popularity of the onychectomy procedure and the emphasis placed on relevant instruction in veterinary schools in the USA.

Current attitudes regarding the use of perioperative analgesics in dogs and cats by Brazilian veterinarians. 
Vet Anaesth Analg (2014) 41:82-89.
Lorena, S. E., S. P. Luna, B. D. Lascelles, and J. E. Corrente
OBJECTIVE: To correlate the demographic data of Brazilian veterinarians with their use of, attitudes towards, knowledge of and preference for continuing education regarding use of analgesics in small animal practice. STUDY DESIGN: Prospective survey. METHODS: The questionnaire was composed of sections pertaining to demographics, personal data, use of analgesics in general and specific procedures, analgesia used, and attitudes towards the assessment and relief of pain. The descriptive statistics with frequency analysis was performed using sas for Windows 9.1.3. Chi-square for simple comparisons test was used. RESULTS: Questionnaires were obtained from 1298 small animal veterinarians. Women and younger graduates attributed higher pain scores than men and older graduates but the frequency and duration of analgesic treatment did not differ between genders. The most commonly used opioids were tramadol (79%) and morphine (51%). NSAIDs of choice were meloxicam (81%) and ketoprofen (70%). Cats received lower pain scores for laparotomy, orchectomy and dental procedures than dogs. Practical experience (64%) and national (47%) and regional meetings (43%) were the main sources of information for identifying and treating pain in small animals. CONCLUSIONS: Although the number of Brazilian veterinarians believed that their knowledge in the area was lower than in other countries, the focus in pain management was similar or higher than in other countries, showing a good attitude in pain relief in animals.

First report of Dracunculus insignis in two naturally infected cats from the northeastern USA. 
Dracunculiasis is rarely reported in cats, yet over the last few years we have identified two cats with filarioid-like spirurid infections. Case 1 was a 9-year-old cat with pituitary-dependent hyperadrenocorticism from New York tate from which four adult dracunculoid nematodes were isolated from its torso. Based on morphometric characteristics and parasite geographic distribution, the specimens were identified as Dracunculus insignis females; at least one of the females was gravid, suggestive of patent infection. Species identification was confirmed through amplification and sequence analysis of nuclear and mitochondrial loci. Case 2 was a 14-year-old diabetic cat from Massachusetts. Formalin-fixed sections were obtained from a subcutaneous mass excised from the left foreleg. Histopathological examination revealed a large nematode with morphometrical characteristics of Dracunculus, surrounded by lymphocytes and sheets of eosinophils. These two cases appear to be the first published reports of dracunculiasis in domestic cats in the USA, and based on the findings from case 1, D insignis may be the species associated with both infections.

Feeding preferences of Lutzomyia longipalpis (Diptera: Psychodidae), the sand fly vector, for Leishmania infantum (Kinoplastida: Trypanosomatidae).
Macedo-Silva, V. P., D. R. Martins, P. V. De Queiroz, M. P. Pinheiro, C. C. Freire, J. W. Queiroz, K. M. Dupnik, R. D.
Leishmania infantum, the causative agent of visceral leishmaniasis (VL) in Brazil, is spread mostly by the bite of the sand fly Lutzomyia longipalpis (Lutz & Neiva). We trapped sand flies in endemic neighborhoods near Natal, Brazil, where cases of human and dog VL were documented. Amplification of species-specific cytochrome b (Cyt b) genes by polymerase chain reaction revealed that sand flies from rural and periurban areas harbored blood from different sources. The most common source of bloodmeal was human, but blood from dog, chicken, and armadillo was also present. We tested the preference for a source of bloodmeal experimentally by feeding L. longipalpis F1 with blood from different animals. There were significant differences between the proportion of flies engorged and number of eggs laid among flies fed on different sources, varying from 8.4 to 19 (P < 0.0001). Blood from guinea pig or horse was best to support sand fly oviposition, but human blood also supported sand fly oviposition well. No sand flies fed on cats, and sand flies feeding on the opossum Monodelphis domestica Wagner produced no eggs. These data support the hypothesis that L. longipalpis is an eclectic feeder, and humans are an important source of blood for this sand fly species in periurban areas of Brazil.

Laryngeal disease in dogs and cats.
Macphail, C.
The most common disease process involving the larynx is laryngeal paralysis, which occurs much more frequently in dogs than in cats. Diagnosis of laryngeal paralysis requires close attention to anesthetic plane and coordination of respiratory effort with laryngeal motion. Surgical arytenoid lateralization improves respiration and quality of life in dogs with laryngeal paralysis; however, aspiration pneumonia is a recognized complication, and generalized neuropathy can progress. Laryngeal collapse can result from any cause of chronic upper airway obstruction, but is most often associated with unaddressed brachycephalic airway syndrome. Laryngeal neoplasia, while generally uncommon, occurs more frequently in cats than in dogs.

Analysis of thiamine concentrations in commercial canned foods formulated for cats.
Markovich, J. E., L. M. Freeman, and C. R. Heinze
OBJECTIVE: To measure thiamine concentrations in commercial canned foods formulated for cats as an initial assessment of the variation among canned foods and to determine the effects of flavor (fish vs nonfish) of the food, texture (pate vs nonpate) of the food, country of manufacture, and size of the company on thiamine concentration. DESIGN: Prospective cross-sectional study. SAMPLE: 90 canned, nontherapeutic diets formulated for cats (1 fish and 1 nonfish flavor for each of 45 brands). PROCEDURES: Each canned food was homogenized, and thiamine concentration was analyzed with a fluorometric method. RESULTS: Thiamine concentration was below the minimums of the Association of American Feed Control Officials in 12 of 90 (13.3%) foods and below the recommended allowance of the National Research Council in 14 of 90 (15.6%) foods. Pate foods had significantly lower thiamine concentrations than did nonpate foods, and foods from smaller companies had significantly lower thiamine concentrations, compared with concentrations in foods from larger companies. Flavor of food and country of manufacture were not significantly associated with thiamine concentration. CONCLUSIONS AND CLINICAL RELEVANCE: A wide range of thiamine concentrations was found in the foods evaluated. Thiamine concentration in a substantial percentage of commercially available canned foods was below the amount recommended for adult cats. Additional research on interlot and intralot variation in thiamine concentrations of foods formulated for cats is warranted. Companies should implement strict quality control and analysis practices regarding food products. Clinicians should consider thiamine deficiency as a differential diagnosis in a cat with acute neurologic dysfunction.

Immunohistochemical and Morphometric Analysis of Intestinal Full-thickness Biopsy Samples from Cats with Lymphoplasmacytic Inflammatory Bowel Disease.
J Comp Pathol (2014)
Marsilio, S., S. Kleinschmidt, I. Nolte, and M. Hewicker-Trautwein
The distribution and numbers of CD3+ T lymphocytes, immunoglobulin+ plasma cells and calprotectin (L1)+ macrophages was analyzed in full-thickness, formalin-fixed biopsy samples from the small intestine (duodenum, jejunum and ileum) and from the colon from nine cats with clinical signs of inflammatory bowel disease (IBD). All animals had lymphoplasmacytic enteritis or lymphoplasmacytic enterocolitis. Equivalent samples from the same intestinal regions from 12 healthy pet cats served as controls. Labelled cells in the lamina propria were counted by computer-aided morphometry. The different cell types were similarly distributed in both groups, but there were differences in their numbers. There were more CD3+ T cells in the duodenum and jejunum of cats with IBD; however, the difference was only significant for the duodenum. There were significantly more IgA+ cells in the duodenal crypt region. There were significantly more IgG+ cells in the lower jejunal crypt region. Plasma cells expressing IgM were decreased in cats with IBD, but the difference was not significant. L1+ macrophages were significantly decreased in the lower crypt area of the colon in cats with IBD and there was a trend to decreased L1+ cells in the upper crypt area of the duodenum and jejunum. Comparison of the results of this study with previous findings on endoscopically-obtained duodenal biopsy samples from cats with IBD revealed some differences. These discrepancies might relate to differences between control cat populations, types of biopsy samples, methodological factors such as different counting techniques and the activity of the disease at the time of sampling.

Patient characteristics, histopathological findings and outcome in 97 cats with extranodal subcutaneous lymphoma (2007-2011).
Vet Comp Oncol (2014)
Meichner, K., and W. von Bomhard
This study describes epidemiologic, clinical, macro- and microscopic tumour characteristics and outcome in 97 cats with subcutaneous lymphoma, an uncommon variant of feline extranodal lymphoma. Middle-aged (median 11 years), male (60.8%), Domestic Shorthair cats (89.7%) were commonly affected. Most tumours presented as a painless, firm, subcutaneous nodule or mass, with predilection to the lateral thoracic or abdominal wall, and the interscapular region. Deep subcutaneous invasion with extension into superficial or underlying tissues, extensive central areas of necrosis and peripheral inflammation were characteristic histopathological findings. Prevalence of retroviral infection was low. Local relapses after therapy were common (43.5%), and 32.2% had distant involvement later in course. Median overall survival was 148 days. Subcutaneous lymphoma should be considered a rare but important differential diagnosis for a subcutaneous mass in cats. Tumours show an aggressive biological behaviour. Treatment options including prognosis should be investigated in further studies.

Evaluation of an in-house dot enzyme-linked immunosorbent assay to detect antibodies against feline panleukopenia virus.
Mende, K., B. Stuetzer, U. Truyen, and K. Hartmann
Measuring antibody titres to determine a cat’s immunity to core diseases instead of just administering annual vaccinations has not been established in Germany so far. An in-house test kit for the detection of antibodies against feline panleukopenia virus (FPV), feline herpesvirus-1 and feline calicivirus - the ImmunoComb Feline Vaccichck - is now available in several European countries. The aim of this study was to assess the quality of the ImmunoComb Feline Vaccichck to determine antibodies by comparing it to a gold standard. The test is aimed for use in practice to assist decision-making when performing an individual health assessment to see whether a cat is potentially unprotected against FPV and requires FPV vaccination. Sera from 347 cats were included in the study. For antibody detection, haemagglutination inhibition (HI) was performed as gold standard. Sensitivity, specificity and positive and negative predictive values of the ImmunoComb Feline Vaccichck were determined for three different HI titre cut-off points (1:20, 1:40, 1:80). In comparison to the HI, the ImmunoComb Feline Vaccichck showed a sensitivity of 79%, 83% and 87%, and a specificity of 89%, 86% and 81%, respectively. Specificity of the ImmunoComb Feline Vaccichck, which was considered the most important parameter, was acceptable in comparison to HI. Especially when considering an antibody titre of 1:20 sufficient for protection (eg in an adult animal), the ImmunoComb Feline Vaccichck can be recommended for use in veterinary practice.
Prevalence of antibodies against feline panleukopenia virus in client-owned cats in Southern Germany.

Vet J (2014)
Mende, K., B. Stuetzer, C. Sauter-Louis, T. Homeier, U. Truyen, and K. Hartmann
Feline panleukopenia is a frequent and commonly fatal disease of cats. Recent published studies have raised suspicions that some cats fail to develop antibodies after vaccination. The purpose of this study was to assess the prevalence of antibodies against feline panleukopenia virus (FPV) in cats in Southern Germany, and to identify factors that are associated with a lack of antibodies. In total, 350 cats presented to the Clinic of Small Animal Medicine, Ludwig-Maximilians-Universitaet were randomly included in the study. Information regarding signalment, origin, environment, lifestyle, housing conditions, health status, chronic diseases, glucocorticoid therapy, and vaccination status were collected. Antibodies were detected by haemagglutination inhibition test. Asymptomatic chi-squared tests and univariable logistic regression were used to investigate associations between a lack of antibodies and the different variables. Associations determined to be statistically significant at P<0.1 were verified by a multivariable logistic regression analysis. Of the 350 cats, 103 (29.4%) had no antibodies against FPV. Chronic kidney disease, neoplasia, glucocorticoid therapy, and vaccination status were significantly associated with a lack of antibodies. The cats with no antibodies were likely to have inadequate immunity against panleukopenia and those with chronic diseases or receiving glucocorticoids were less likely to be protected.

Coxiella burnetii (Q-Fever) Seroprevalence in Prey and Predators in the United Kingdom: Evaluation of Infection in Wild Rodents, Foxes and Domestic Cats Using a Modified ELISA.

Transbound Emerg Dis (2014)
Meredith, A. L., S. C. Cleaveland, M. J. Denwood, J. K. Brown, and D. J. Shaw
Coxiella burnetii, the agent of Q-fever, is recognized as a worldwide zoonosis with a wide host range and potentially complex reservoir systems. Infected ruminants are the main source of infection for humans, but cats and other mammals, including wild rodents, also represent potential sources of infection. There has been a recent upsurge of reported cases in humans, domestic ruminants and wildlife in many parts of the world, and studies have indicated that wild brown rats may act as true reservoirs for C. burnetii and be implicated in outbreaks in livestock and humans. However, investigation of reservoir systems is limited by lack of validated serological tests for wildlife or other non-target species. In this study, serum samples from 796 wild rodents (180 bank voles, 309 field voles, 307 wood mice) 102 wild foxes and 26 domestic cats from three study areas in the UK were tested for the presence of antibodies to C. burnetii using a commercial indirect ELISA kit modified for use in multiple wildlife species. Test thresholds were determined for each species in the absence of species-specific reference sera using a bi-modal latent class mixture model to discriminate between positive from negative results. Based on the thresholds determined, seroprevalence in the wild rodents ranged from 15.6% to 19.1% depending on species (overall 17.3%) and was significantly higher in both foxes (41.2%) and cats (61.5%) than in rodents. This is the first report to quantify seroprevalence to C. burnetii in bank voles, field voles, wood mice, foxes and cats in the UK and provides evidence that predator species could act as indicators for the presence of C. burnetii in rodents. The study demonstrates that wildlife species could be significant reservoirs of infection for both livestock and humans, and the high seroprevalence in domestic cats highlights the potential zoonotic risk from this species.

CD4+CD25+ T regulatory cells activated during feline immunodeficiency virus infection convert T helper cells into functional suppressors through a membrane-bound TGFbeta / GARP-mediated mechanism.

Miller, M. M., C. S. Petty, M. B. Tompkins, and J. E. Fogle
BACKGROUND: We and others have previously reported that cell membrane-bound TGFbeta (mTGFbeta) on activated T regulatory (Treg) cells mediates suppressor function. Current findings suggest that a novel protein known as Glycoprotein A Repetitions Predominant (GARP) anchors mTGFbeta to the Treg cell surface and facilitates suppressor activity. Recently, we have described that GARP+TGFbeta+ Treg cells expand during the course of FIV infection. Because Treg cells are anergic and generally exhibit poor proliferative ability, we asked how Treg homeostasis is maintained during the course of feline immunodeficiency virus (FIV) infection. RESULTS: Here, we report that Treg cells from FIV+ cats express GARP and mTGFbeta and convert T helper (Th) cells into phenotypic and functional Treg cells. Th to Treg conversion was abrogated by anti-TGFbeta or anti-GARP treatment of Treg cells or by anti-TGFbetaRII treatment of Th cells, suggesting that Treg cell recruitment from the Th pool is mediated by TGFbeta/TGFbetaRII signaling and that cell-surface GARP plays a major role in this process. CONCLUSIONS: These findings suggest Th to Treg conversion may initiate a cascade of
events that contributes to the maintenance of virus reservoirs, progressive Th cell immunosuppression, and the development of immunodeficiency, all of which are central to the pathogenesis of AIDS lentivirus infections.

Absorption of transdermal and oral cyclosporine in six healthy cats.

*Miller, R., A. E. Schick, D. M. Boothe, and T. P. Lewis*

Cyclosporine is commonly used orally to treat feline dermatoses. Due to difficulties administering oral medications, veterinarians sometimes prescribe compounded transdermal cyclosporine, despite studies showing limited absorption. The study objective was to compare cyclosporine blood concentrations after oral administration to concentrations after transdermal application of cyclosporine (prepared in pluronic lecithin organogel [PLO]) in six cats using a controlled, crossover design with a 2 wk washout period. Cats were dosed at 5.1-7.4 mg/kg of cyclosporine q 24 hr either per os for 7 days or transdermally for 21 days. Cyclosporine blood concentrations were measured q 7 days and after the washout period. A monoclonal-based immunoassay (lower limit of quantitation was 25 ng/mL) was used. Median concentrations on the seventh day were 2,208 ng/mL (range, 1,357-3,419 ng/mL) 2 hr after orally administered cyclosporine and 37 ng/mL (range, 25-290 ng/mL) 2 hr after transdermally applied cyclosporine. Median concentration on day 21 was 58 ng/mL (range, 51-878 ng/mL) 2 hr after transdermally applied cyclosporine. Concentrations were quantifiable for transdermally applied cyclosporine, but considered therapeutic in only one of six cats. Based on those results, transdermally applied cyclosporine was not recommended in cats because of inconsistent absorption.

Intrarenal distributions and changes of Angiotensin-converting enzyme and Angiotensin-converting enzyme 2 in feline and canine chronic kidney disease.

*Mitani, S., A. Yabuki, M. Sawa, H. S. Chang, and O. Yamato*

Angiotensin-converting enzyme (ACE) is a key enzyme in the renin-angiotensin system (RAS). ACE2 is a newly identified member of the RAS. The present immunohistochemical study focused on changes in intrarenal ACE and ACE2 immunoreactivity in feline and canine chronic kidney disease (CKD). ACE immunoreactivity was predominantly observed in the brush border of the proximal tubules in dogs and cats. ACE immunoreactivity was lower in CKD kidneys than in normal kidneys, and quantitative analysis demonstrated negative correlations between ACE and renal tissue damage in dogs. ACE2 immunoreactivity was also detected in the proximal tubules; it increased or decreased with CKD in dogs, depending on the renal region assessed. The changes in ACE and ACE2 in CKD were associated with the plasma creatinine concentration in dogs. Findings from dogs with glomerulonephritis were similar to those from dogs with non-glomerulonephritis. The present study suggests that changes in the intrarenal expression of ACE and ACE2 contribute to the pathological mechanisms of canine CKD, but not to the mechanisms of feline CKD.

A review of histiocytic diseases of dogs and cats.

*Moore, P. F.*

Histiocytic proliferative disorders are commonly observed in dogs and less often cats. Histiocytic disorders occur in most of the dendritic cell (DC) lineages. Canine cutaneous histiocytoma originates from Langerhans cells (LCs) indicated by expression of CD1a, CD11c/CD18, and E-cadherin. When histiocytomas occur as multiple lesions in skin with optional metastasis to lymph nodes and internal organs, the disease resembles cutaneous Langerhans cell histiocytosis of humans. Langerhans cell disorders do not occur in feline skin. Feline pulmonary LCH has been recognized as a cause of respiratory failure due to diffuse pulmonary infiltration by histiocytes, which express CD18 and E-cadherin and contain Birbeck’s granules. In dogs and cats, histiocytic sarcomas (HS) arise from interstitial DCs that occur in most tissues of the body. Histiocytic sarcomas begin as localized lesions, which rapidly disseminate to many organs. Primary sites include spleen, lung, skin, brain (meninges), lymph node, bone marrow, and synovial tissues of limbs. An indolent form of localized HS, progressive histiocytosis, originates in the skin of cats. Hemophagocytic HS originates in splenic red pulp and bone marrow macrophages in dogs and cats. In dogs, histiocytes in hemophagocytic HS express CD11d/CD18, which is a leuko-integrin.
highly expressed by macrophages in splenic red pulp and bone marrow. Canine reactive histiocytic diseases, systemic histiocytosis (SH) and cutaneous histiocytosis, are complex inflammatory diseases with underlying immune dysregulation. The lesions are dominated by activated interstitial DCs and lymphocytes, which invade vessel walls and extend as vasocentric infiltrates in skin, lymph nodes, and internal organs (SH).

**Trends in intake and outcome data for animal shelters in a large U.S. Metropolitan area, 1989 to 2010.**


Morris, K. N., and D. L. Gies

Trends in nonhuman animal shelter intake and outcomes for dogs and cats in Metro Denver, CO, between 1989 and 2010 were assessed by linear regression analyses of data from 4 of the largest facilities covering 3 counties. The data were analyzed for trends on 3 scales: actual numbers per year, number per 1,000 residents per year, and as a percentage of total intake. Approximately 21,000 dogs and 16,000 cats were taken into the shelters in 2010, representing a 24% decrease for each since 1989. For dogs on a per-1,000-residents basis, intake decreased by 44%, euthanasia by 77%, and adoption by 13%; the live release rate (LRR) increased by 39%. For cats on the same scale, there was a 53% decrease in intake until 1998 followed by an 11% increase through 2010, and an 82% decrease in euthanasia until 2000 followed by a 24% increase through 2010. Adoption of cats per 1,000 residents remained unchanged, but the overall LRR for cats doubled during the study period. Substantially increasing trends in the transfer of dogs and cats from shelters to rescue organizations reflect efforts to optimize adoptions.

**Retrospective evaluation of canine and feline maxillomandibular trauma cases. A comparison of signalment with non-maxillomandibular traumatic injuries (2003-2012).**

*Vet Comp Orthop Traumatol (2014) 27*

Mulherin, B. L., C. J. Snyder, J. W. Soukup, and S. Hetzel

Objectives: To determine differences in signalment between maxillomandibular (MM) and non-maxillomandibular (non-MM) trauma patients to help predict the type of injury sustained. Methods: A medical records database was searched from December 2003 to September 2012 to identify all MM trauma patients. A random sample of non-MM trauma patients was generated for comparison. Patient species, age, sex, weight, and injury aetiology were recorded for both populations. Results: Sixty-seven MM trauma patients and 129 non-MM trauma patients were identified. Feline patients were almost twice as likely to be presented for MM trauma as compared with non-MM trauma. The median weight of canine patients suffering MM injury was significantly less than that of non-MM patients (p = 0.025). A significant association existed between the causes of injuries associated with MM and non-MM trauma populations (p = 0.000023). The MM trauma patients were more likely to sustain injury as a result of an animal altercation (Bonferroni p = 0.001) while non-MM injuries were more likely to result from motor vehicle accidents (Bonferroni p = 0.001). Overall, animals that were less than one year of age with traumatic injuries were overrepresented (65/196) in comparison to the entire patient population. Clinical significance: The results of this study may help guide clinicians in the evaluation and screening of trauma patients that are presented as an emergency. Cats, small dogs and animals suffering from animal altercations should all be closely evaluated for MM injury.

**Peripheral immunophenotype and viral promoter variants during the asymptomatic phase of feline immunodeficiency virus infection.**


Murphy, B., C. Hillman, and S. McDonnel

Feline immunodeficiency virus (FIV)-infected cats enter a clinically asymptomatic phase during chronic infection. Despite the lack of overt clinical disease, the asymptomatic phase is characterized by persistent immunologic impairment. In the peripheral blood obtained from cats experimentally infected with FIV-C for approximately 5 years, we identified a persistent inversion of the CD4/CD8 ratio. We cloned and sequenced the FIV-C long terminal repeat containing the viral promoter from cells infected with the inoculating virus and from in vivo-derived peripheral blood mononuclear cells and CD4+ T cells isolated at multiple time points throughout the asymptomatic phase. Relative to the inoculating virus, viral
sequences amplified from cells isolated from all of the infected animals demonstrated multiple single nucleotide mutations and a short deletion within the viral U3, R and U5 regions. A transcriptionally inactivating proviral mutation in the U3 promoter AP-1 site was identified at multiple time points from all of the infected animals but not within cell-associated viral RNA. In contrast, no mutations were identified within the sequence of the viral dUTPase gene amplified from PBMC isolated at approximately 5 years post-infection relative to the inoculating sequence. The possible implications of these mutations to viral pathogenesis are discussed.

**Association between Characteristics of Cats and Satisfaction of Owners who Adopted Cats from an Animal Hospital in Japan.**


Onodera, N., K. Uchida, and Y. Kakuma

A follow-up questionnaire survey was conducted with 29 cat owners who adopted cats from an animal hospital in Japan. The physical characteristics were shown as important factors for the owners to choose a cat. There were significant differences between impression of the cat for the owners at present and images of their ideal cats, and the levels of aggression and activeness of the cats at present were rated higher than their ideal cats. A significant negative correlation was found between the degree of satisfaction and occurrence of house soiling with the cat, thus some behavioural problems may deteriorate the relationship between the owner and the cat.

**A morphological and immunohistochemical study of the effects of prednisolone or ursodeoxycholic acid on liver histology in feline lymphocytic cholangitis.**

*J Feline Med Surg (2014)*


Feline lymphocytic cholangitis (LC) has been commonly treated with prednisolone, and more recently with ursodeoxycholic acid (UDCA). Previously, we found that prednisolone treatment resulted in a statistically longer survival time than treatment with UDCA. In order to explain this difference, we compared the effects of prednisolone and UDCA treatment on hepatic tissue by evaluating consecutive liver biopsies. Archival serial biopsy materials from cats with LC treated with prednisolone (n = 5) or UDCA (n = 4) were evaluated. We employed haematoxylin and eosin staining to evaluate inflammation, and reticulin staining for fibrosis. Immunohistochemical stainings for Ki-67, K19 (Cytokeratin 19) and alpha-smooth muscle actin were used to evaluate cell type-specific proliferation and activation of hepatic stellate cells. Inflammation decreased more in the group treated with prednisolone, while the number of cholangiocytes, progenitor cells and fibroblasts did not differ between the treatment groups. Additionally, no difference was found for the amount of fibrosis in both treatment groups.

**Epilepsy in cats: theory and practice.**


Pakozdy, A., P. Halasz, and A. Klang

The veterinary literature on epilepsy in cats is less extensive than that for dogs. The present review summarizes the most important human definitions related to epilepsy and discusses the difficulties in applying them in daily veterinary practice. Epileptic seizures can have a wide range of clinical signs and are not necessarily typical in all cases. Whether a seizure event is epileptic can only be suspected based on clinical, laboratory, and neuroimaging findings as electroencephalography diagnostic techniques have not yet been developed to a sufficiently accurate level in veterinary medicine. In addition, the present review aims to describe other diagnoses and nonepileptic conditions that might be mistaken for epileptic seizures. Seizures associated with hippocampal lesions are described and discussed extensively, as they seem to be a special entity only recognized in the past few years. Furthermore, we focus on clinical work-up and on treatment that can be recommended based on the literature and summarize the limited data available relating to the outcome. Critical commentary is provided as most studies are based on very weak evidence.
Haematological and biochemical reference intervals of four feline breeds.
Paltrinieri, S., F. Ibba, and G. Rossi
Many feline breeds have been generated from a small number of ancestors. Thus, breed-specific peculiarities can be expected, which could include haematological and biochemical measurements. Despite this, there are only a few reports on breed-specific reference intervals (RI). This information is essential in routine practice where results from individual patients are usually compared with an RI. The aim was to compare haematological and biochemical data from clinically healthy Abyssinian, Holy Birman, Norwegian Forest and Siberian cats with published RIs to assess whether the published RIs are acceptable in these breeds. Comparison with established RIs using guidelines from the National Committee for Clinical Laboratory Standards and the American Society of Veterinary Clinical Pathology, revealed a number of breed-related clinicopathological differences. New RIs were established, but in most cases the new RIs overlapped with published RIs, and the use of the breed-specific data would minimally affect the clinical interpretation of laboratory results. Important differences that could result in misinterpretation of laboratory results were as follows: microcytosis and high alpha2-globulin concentrations in Abyssinian cats; high serum creatinine, alpha2-globulin and glucose concentrations in Holy Birman cats; high serum alkaline phosphatase activity and calcium and phosphate concentration in Norwegian Forest cats; low beta2-globulin and gamma-globulin concentrations in Norwegian Forest and Siberian cats. Breed-specific RIs should be used for these analytes. In addition, care should be taken in interpreting clinicopathological data in purebred cats for which specific RIs have not been established.

Enteropathogen co-infection in UK cats with diarrhoea.
Paris, J. K., S. Wills, H. J. Balzer, D. J. Shaw, and D. A. Gunn-Moore
BACKGROUND: Individual enteropathogen infections in healthy and clinically ill cats are well described, but prevalence and patterns of enteropathogen co-infection have only been reported on a limited basis. We studied enteropathogen co-infection in diarrhoeic UK cats using results of a real time PCR assay for 8 enteropathogenic species; feline coronavirus (Co), feline panleukopenia virus (Pa), Clostridium perfringens (Cl), Salmonella enterica (Sa), Giardia spp. (Gi), Tritrichomonas foetus (Tr), Cryptosporidium spp. (Cr), and Toxoplasma gondii (To). Age, gender, breed and history were recorded. PCR panels from 1088 diarrhoeic cats were available for analysis. RESULTS: Overall enteropathogen prevalence was 56.9% (Co), 22.1% (Pa), 56.6% (Cl), 0.8% (Sa), 20.6% (Gi), 18.8% (Tr), 24.4% (Cr) and 1.0% (To). Prevalence of Co, Gi and Tr was higher in pedigree cats compared to non-pedigree cats (DSH) and prevalence decreased with increasing age for Co, Pa, Gi, Cr and Tr. Co-infection was common: >/=2 enteropathogens were detected in 62.5% of cats, and 13.3% of cats had >/=4 enteropathogens. Mean (x) enteropathogen co-infection 2.01 (+/-1.3 SD), was significantly higher in pedigree cats (x =2.51) compared to DSH (x =1.68) and decreased with age (x =2.64 <6 months, x =1.68 for >1 yr). More cats were negative for all 8 enteropathogens tested (12.7%) than expected. When exact combinations of co-infection were examined, Tr tended to be found in combinations with Co, Cl, and Gi. CONCLUSIONS: Multiple infections should be considered the most likely result of faecal testing in cats, and case management needs to take this into account. In contrast, the relatively high percentage of cats negative for all 8 enteropathogens tested could indicate an innate resistance to infection. Alternatively it could indicate a lack of exposure to these 8 enteropathogens or the presence of other enteropathogens not assessed by this assay.

Outcome following liver lobectomy using thoracoabdominal staplers in cats.
Pavia, P. R., J. Kovak-McClaran, and K. Lamb
OBJECTIVES: To present outcomes and complications following liver lobectomy using thoracoabdominal staplers in cats, to identify factors associated with survival time and to confirm safety and feasibility. METHODS: Retrospective analysis of case records (n=18) of cats that underwent liver lobectomy with a thoracoabdominal stapler. RESULTS: Fourteen of the 18 cats (78%) survived to discharge. Median survival time was 136.5 days. On log-rank univariate analysis, preoperative abdominal fluid (P=0.002), preoperative anaemia (P=0.03) and perioperative transfusion (P=0.01) were associated with decreased survival time. Perioperative anaemia was common (89%), and rate of transfusion during hospitalisation was 61%.
Clinical signs of illness, azotaemia, elevated liver enzyme activities and malignant neoplasia did not appear to impact survival; however, anaemia, abdominal fluid and transfusion may be associated with decreased survival time. CLINICAL SIGNIFICANCE: Liver lobectomy using thoracoabdominal staplers was effective in removal of hepatic lesions and all cats survived surgery. Outcome was negatively associated with preoperative abdominal fluid (haemorrhagic and non-haemorrhagic), preoperative anaemia or perioperative transfusion. Surgeons should be prepared to employ ancillary methods of haemostasis to augment the staple line, and need for blood transfusion should be anticipated.

A tortoiseshell male cat: chromosome analysis and histologic examination of the testis.
Pedersen, A. S., L. C. Berg, K. Almstrup, and P. D. Thomsen
Tortoiseshell coat color is normally restricted to female cats due to X-linkage of the gene that encodes the orange coat color. Tortoiseshell male cats do, however, occur at a low frequency among tortoiseshell cats because of chromosome aberrations similar to the Klinefelter syndrome in man: the extra X chromosome of a 39,XXY karyotype introduces the possibility of an orange and a non-orange allele which produce the mixture of orange and non-orange coat spotting known as tortoiseshell.
We analyzed the chromosome complement of a fibroblast culture and did histological examinations of testicular tissue from a tortoiseshell male cat referred to us. Chromosome analysis using RBA-banding consistently revealed a 39,XXY karyotype. Histological examinations of testis biopsies from this cat showed degeneration of the tubules, hyperplasia of the interstitial tissue, and complete loss of germ cells. Immunostaining using anti-vimentin and anti-VASA (DDX4) showed that only Sertoli cells and no germ cells were observed in the testicular tubules. As no sign of spermatogenesis was detected, we conclude that this is a classic case of a sterile, male tortoiseshell cat with a 39,XXY chromosome complement. (c) 2013 S. Karger AG, Basel.

Feed-forward and feedback projections of midbrain reticular formation neurons in the cat.
Front Neuroanat (2014) 7:55.
Perkins, E., P. J. May, and S. Warren
Gaze changes involving the eyes and head are orchestrated by brainstem gaze centers found within the superior colliculus (SC), paramedian pontine reticular formation (PPRF), and medullary reticular formation (MdRF). The mesencephalic reticular formation (MRF) also plays a role in gaze. It receives a major input from the ipsilateral SC and contains cells that fire in relation to gaze changes. Moreover, it provides a feedback projection to the SC and feed-forward projections to the PPRF and MdRF. We sought to determine whether these MRF feedback and feed-forward projections originate from the same or different neuronal populations by utilizing paired fluorescent retrograde tracers in cats. Specifically, we tested: 1. whether MRF neurons that control eye movements form a single population by injecting the SC and PPRF with different tracers, and 2. whether MRF neurons that control head movements form a single population by injecting the SC and MdRF with different tracers. In neither case were double labeled neurons observed, indicating that feedback and feed-forward projections originate from separate MRF populations. In both cases, the labeled reticulotectal and reticuloreticular neurons were distributed bilaterally in the MRF. However, neurons projecting to the MdRF were generally constrained to the medial half of the MRF, while those projecting to the PPRF, like MRF reticulotectal neurons, were spread throughout the mediolateral axis. Thus, the medial MRF may be specialized for control of head movements, with control of eye movements being more widespread in this structure.

Effect of neutering and breed on femoral and tibial physeal closure times in male and female domestic cats.
Perry, K. L., A. Fordham, and G. I. Arthurs
The timing of physeal closure is dependent upon many factors, including gonadal steroids, and previous studies have shown that early neutering delays physeal closure. Pelvic and femoral radiographs of 808 cats were analysed and physes at the greater trochanter, proximal femur, distal femur and proximal tibia were recorded as being open or closed. Date of birth, gender, neuter status and breed of cases were recorded. Each physis was analysed individually at a specific age. The number of male entire (ME), male neutered (MN), female entire (FE), female neutered (FN), pedigree and non-pedigree cases at
Effects of age and reproductive status on postoperative pain after routine ovariohysterectomy in cats.
Polson, S., P. M. Taylor, and D. Yates
A prospective clinical trial to compare the effects of age and reproductive status on postoperative pain was conducted in 145 female cats undergoing ovariohysterectomy using injectable anaesthesia. The cats were grouped appropriately: 60 kittens <4 months old (K), 85 adults >4 months old (A) and, within the adult group, 57 normal adults (nA) and 28 adults who were either pregnant or in oestrus (rA). Pain was assessed using a simple descriptive scale (SDS; 0-3), a dynamic and interactive visual scale (DIVAS; 0-100 mm) and mechanical nociceptive thresholds (MNT; N, 2 mm diameter probe) pre-operatively and at 4 and 24 h postoperatively. Kittens had lower DIVAS areas under the time curve and SDS than adults (P <0.05), but similar MNT (K: 3.3 +/- 2.6, A: 4.3 +/- 2.5 N at 4 h, P >0.05). Data from nA and rA were not different (P >0.05). Kittens had similar wound tenderness, but less affective pain than adults, and reproductive status had no effect.

Aspects of in vivo oocyte production, blastocyst development, and embryo transfer in the cat.
Pope, C. E.
A brief overview of the progress made during the past approximately 40 years on the development of methods for in vitro production of cat embryos and intra- and interspecies embryo transfer is described. The presentation is focused primarily on research done over the past 30 years at the Cincinnati Zoo (1980-1995) and at the Audubon Nature Institute, New Orleans (1996-present) beginning with original studies on determining optimal doses of porcine FSH for ovarian stimulation and uterine embryo recovery, cryopreservation, and transfer. A key early finding was the ability of cats to respond to multiple gonadotropin (porcine FSH) treatments by repeated stimulation of follicular development. With a >/= 6-month interval between FSH treatments, over the past 15 years (1998-2013), we have done 1603 laparoscopic oocyte retrievals on 337 cats and recovered >38,000 mature oocytes (mean = 24.1 per laparoscopic oocyte retrieval). The limited information available on in vivo blastocyst development in the cat during the latter portion of the preimplantation period (approximately Days 8 to 12 after coitum or approximately Days 7 to 11 after ovulation) was assembled for the purpose of comparing and contrasting
it with the growth, expansion, and zona functioning of in vitro-derived blastocysts. Also, results of transferring morulae and/or blastocysts into synchronous recipients are described to emphasize evidence that appears to allude to an essential role for an intact zona pellucida in successful implantation and subsequent development in the cat. Until 2003, our in vitro-derived embryos were transferred into the uterine horns of recipients to determine the feasibility of producing offspring from such primary methods as IVF, intracytoplasmic sperm injection, SCNT, and embryo cryopreservation. With the exception of SCNT embryos, pregnancy rates were satisfactory, but embryo survival rates were not. Subsequently, after finding that SCNT embryo survival rate could be improved using laparoscopic transfer of early cleavage stage embryos into the oviduct, we applied the technique to embryos derived using IVF with sex-sorted sperm, oocyte vitrification, and embryo cryopreservation. Overall, a pregnancy rate of 67% (14/21) has resulted. Most recently, with the oviductal embryo transfer technique, two litters of Black-Footed cat kittens have been born from intra- and interspecies transfer of cryopreserved embryos.

**Sedative and antinociceptive effects of dexmedetomidine and buprenorphine after oral transmucosal or intramuscular administration in cats.**

_Vet Anaesth Analg (2014) 41:90-96._

Porters, N., T. Bosmans, M. Debille, H. de Rooster, L. Duchateau, and I. Polis

OBJECTIVE: To compare sedation and antinociception after oral transmucosal (OTM) and intramuscular (IM) administration of a dexmedetomidine-buprenorphine combination in healthy adult cats. STUDY DESIGN: Randomized, ‘blinded’ crossover study, with 1 month washout between treatments. ANIMALS: Six healthy neutered female cats, weighing 5.3-7.5 kg. METHODS: A combination of dexmedetomidine (40 μg kg(-1)) and buprenorphine (20 μg kg(-1)) was administered by either the OTM (buccal cavity) or IM (quadriceps muscle) route. Sedation was measured using a numerical rating scale, at baseline and at various time points until 6 hours after treatment. At the same time points, analgesia was scored using a dynamic and interactive visual analogue scale, based on the response to an ear pinch, and by the cat’s response to a mechanical stimulus exerted by a pressure rate onset device. Physiological and adverse effects were recorded, and oral pH measured. Signed rank tests were performed, with significance set at p < 0.05. Data are presented as median and range. RESULTS: There were no differences in sedation or antinociception scores between OTM and IM dosing at any of the time points. Nociceptive thresholds increased after both treatments but without significant difference between groups. Buccal pH remained between 8 and 8.5. Salivation was noted after OTM administration (n = 2) and vomiting after both OTM (n = 4), and IM (n = 3) dosing. CONCLUSIONS AND CLINICAL RELEVANCE: In healthy adult cats, OTM administration of dexmedetomidine and buprenorphine resulted in comparable levels of sedation and antinociception to IM dosing. The OTM administration may offer an alternative route to administer this sedative-analgesic combination in cats.

**Comparative study of aural microflora in healthy cats, allergic cats and cats with systemic disease.**

_J Feline Med Surg (2014)_

Pressanti, C., C. Drouet, and M. C. Cadiergues

Twenty healthy cats (group 1) with clinically normal ears, 15 cats with systemic disease (group 2) and 15 allergic cats (group 3) were included in a prospective study. The experimental unit was the ear. A clinical score was established for each ear canal after otoscopic examination. Microbial population was assessed on cytological examination of smears performed with the cotton-tipped applicator smear technique. Fungal population was significantly more prominent in allergic cats (P <0.001) and in diseased cats compared with healthy cats (P <0.02). Bacterial population was significantly higher in allergic cats than in healthy cats (P <0.001) and cats suffering from systemic disease (P <0.001). Bacterial overgrowth was also higher in cats with systemic disease than healthy cats. In cats from group 2, only fungal overgrowth was associated with otitis severity. In group 3, only bacterial overgrowth was associated with otitis severity.

**Genetic characterization of feline calicivirus strains associated with varying disease manifestations during an outbreak season in Missouri (1995-1996).**

_Virus Genes (2014) 48:96-110._

Sosnovtsev
Feline calicivirus (FCV) is a common cause of mild to severe upper respiratory tract disease (URTD) in cats. FCV strain 21223 was isolated from a kitten with severe pneumonia in a disease outbreak with unusually high mortality (35%) that occurred in a Missouri feline colony in 1995-1996. Phylogenetic analysis of the genome sequence of strain 21223 indicated the emergence of a new FCV strain. Analysis of the full-length genome sequence of a closely related (99.5% nucleotide identity) strain, 3786, obtained from an asymptomatic animal in the same colony four months later, showed the presence of seven amino acid substitutions, with six of them located in the VP1 capsid sequence encoded by ORF2. Comparative analysis of the E-region sequences (426-521 aa ORF2) presumably involved in virus-host cell receptor interactions did not identify amino acid substitutions unique to the virulent strain. We determined the complete genome sequences of four virus isolates that were collected in regional catteries in the months following the outbreak that were associated with different manifestations of the disease (URTD, chronic stomatitis, and gingivitis). We show that genetically distinct FCV strains were cocirculating in the area, and no apparent correlation could be made between overall sequence and observed disease.

Pharmacokinetics of fentanyl, alfentanil, and sufentanil in isoflurane-anesthetized cats.
Pypendop, B. H., R. J. Brosnan, C. R. Majewski-Tiedeken, S. D. Stanley, and J. E. Ilkiw
The aim of this study was to compare the pharmacokinetics of fentanyl, alfentanil, and sufentanil in isoflurane-anesthetized cats. Six adult cats were used. Anesthesia was induced and maintained with isoflurane in oxygen. End-tidal isoflurane concentration was set at 2% and adjusted as required due to spontaneous movement. Fentanyl (10 µg/kg), alfentanil (100 µg/kg), or sufentanil (1 µg/kg) was administered intravenously as a bolus, on separate days. Blood samples were collected immediately before and for 8 h following drug administration. Plasma drug concentration was determined using liquid chromatography/mass spectrometry. Compartment models were fitted to concentration-time data. A 3-compartment model best fitted the concentration-time data for all drugs, except for 1 cat in the sufentanil group (excluded from analysis). The volume of the central compartment and the volume of distribution at steady-state (L/kg) [mean +/- SEM (range)], the clearance (mL/min/kg) [harmonic mean +/- pseudo-SD (range)], and the terminal half-life (min) [median (range)] were 0.25 +/- 0.04 (0.09-0.34), 2.18 +/- 0.16 (1.79-2.83), 18.6 +/- 5.0 (15-29.8), and 151 (115-211) for fentanyl; 0.10 +/- 0.01 (0.07-0.14), 0.89 +/- 0.16 (0.68-1.83), 11.6 +/- 2.6 (9.2-15.8), and 144 (118-501) for alfentanil; and 0.06 +/- 0.01 (0.04-0.10), 0.77 +/- 0.07 (0.63-0.99), 17.6 +/- 4.3 (13.9-24.3), and 54 (46-76) for sufentanil. Differences in clearance and volume of distribution result in similar terminal half-lives for fentanyl and alfentanil, longer than for sufentanil.

Thoracoscopy in the cat: an up-and-coming diagnostic and therapeutic procedure.
Radlinsky, M.
PRACTICAL RELEVANCE: Thoracoscopy provides a minimally invasive means of diagnosis and offers many important benefits when compared with open thoracotomy. CLINICAL CHALLENGES: The expense of the equipment, the steep learning curve required to gain proficiency in thoracoscopic surgery, and the limitations imposed by the feline thoracic cavity, in terms of working and viewing space, are some of the challenges that have limited its uptake to date. However, it is envisaged that it will increase as a technique in feline medicine, in much the same way as laparoscopy has. AUDIENCE: This article is directed at veterinarians currently performing open thoracic surgery and the associated aftercare who concurrently are adept at endoscopic surgery. EVIDENCE BASE: The article draws on the small body of literature that is available on thoracoscopy in cats, which includes reports of its use for evaluation and management of undiagnosed pleural effusion, lung lobe torsion, persistent right aortic arch and chylothorax.

Fecal microbiota of cats with naturally occurring chronic diarrhea assessed using 16S rRNA gene 454-pyrosequencing before and after dietary treatment.
Ramadan, Z., H. Xu, D. Laflame, G. Czarnecki-Maulden, Q. J. Li, J. Labuda, and B. Bourqui
BACKGROUND: The gastrointestinal (GI) microbiota has a strong impact on the health of cats and these populations can

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be altered in GI disease. Little research has been done to associate improvement in diarrhea with changes in GI microbiota.

OBJECTIVE: To evaluate GI microbiota changes associated with diet change and related improvement in diarrhea in cats with chronic naturally occurring diarrhea. ANIMALS: Fifteen adult Domestic Shorthair cats with naturally occurring chronic diarrhea. METHODS: Controlled crossover dietary trial for management of diarrhea. Fecal microbiome was assessed using 454-pyrosequencing. Relationships among fecal score (FS), diet, and microbiome were explored using partial least square method, partial least square method - discriminant analysis, and orthogonal partial least square method with discriminant analysis (OPLS-DA). RESULTS: Dominant bacterial phyla included the Firmicutes and Bacteroidetes, followed by Fusobacteria, Proteobacteria, Tenericutes, and Actinobacteria. Orthogonal partial least squares (OPLS-DA) clustering showed significant microbial differences within cats when fed Diet X versus Diet Y, and with Diet Y versus baseline. Significant correlations were found between the microbiome and FSs. Those bacteria with the strongest correlation with FS included Coriobacteriaceae Slackia sp., Campylobacter upsaliensis, Enterobacteriaceae Raoultella spp., Coriobacteriaceae Collinsella spp., and bacteria of unidentified genera within the families of Clostridiales Lachnospiracea and Aeromonadales Succinivibrionaceae, suggesting that increased numbers of these organisms may be important to gut health. CONCLUSIONS AND CLINICAL IMPORTANCE: Alterations in intestinal microbiota were associated with improvement in diarrhea, but, from our data we cannot conclude if changes in the microbiome caused the improvement in diarrhea, or vice versa.

**Piroxicam inhibits Masitinib-induced cyclooxygenase 2 expression in oral squamous cell carcinoma cells in vitro.**
*Transl Res (2014)*
*Rathore, K., M. M. Alexander, and M. Cekanova*

Development and characterization of animal models for human cancers is important for the improvement of diagnosis and therapy. The oral squamous cell carcinoma (OSCC) of domestic animals resembles human OSCC in many aspects; thus, cell lines derived from OSCC of cats and dogs are a valuable model for human OSCC. We characterized 1 feline OSCC (FeOSCC-Sidney) and 1 canine OSCC (K9OSCC-Abby) cell line and compared their characteristics with human OSCC cell line SCC-25. We calculated the doubling time of the new OSCC cell lines and evaluated the expression profiles of cancer-related markers and cell-cycle proteins such as c-kit, platelet-derived growth factor receptor, vascular endothelial growth factor receptor, epidermal growth factor receptor, cyclooxygenase (COX)-1, COX-2, and p27 by immunocytochemistry and Western blot analysis. We evaluated the effects of novel receptor tyrosine kinase inhibitor (Masitinib, AB1010) and the nonsteroidal anti-inflammatory drug piroxicam on the previously mentioned OSCC cells. Interestingly, AB1010 increased expression levels of cyclooxygenase 2 (COX-2) in all tested OSCCs. Cotreatment of piroxicam with Masitinib increased the inhibition of OSCC cell proliferation significantly compared with either drug alone through the c-kit and AKT signaling pathways. Piroxicam inhibited Masitinib-induced COX-2 expression in all tested OSCCs. Therefore, targeting these 2 signaling pathways simultaneously was more efficient for inhibition of OSCCs across these species.

**Assessment of five formulae to predict post-transfusion packed cell volume in cats.**
*J Feline Med Surg (2014)*
*Reed, N., I. Espadas, S. M. Lalor, and C. Kisielewicz*

This retrospective study aimed to identify the most accurate formula for estimating the increase in packed cell volume (PCV) after whole blood transfusion of cats, as several formulae have been reported but not validated. Forty cats, of varying breeds and gender, were included from two referral institutions after database searches over a 13-year period. Five formulae were used to calculate an estimated post-transfusion PCV based on the re-working of formulae for determining the volume of donor blood to be transfused; three formulae were derived from those previously reported in the feline literature and two from human paediatric medicine, where a similar mean blood volume has been described. Cats were subdivided into two groups, the first consisting of 17 cats with non-regenerative anaemia and the second consisting of 23 cats with on-going losses such as haemolysis and haemorrhage; it was hypothesised that formulae could be more accurate for group 1 cats, whereas formulae applied to group 2 cats could have overestimated the post-transfusion PCV. Bland-Altman analysis was performed for all cats to compare the actual increase in PCV with the calculated increase for the five formulae. Formula 1 (PCV % increase = volume of blood transfused in ml/2 x bodyweight in kg) performed best overall and is easy to calculate; however, no single formula was highly accurate at predicting the PCV increase after whole blood transfusion in cats and, owing to the wide confidence intervals, these formulae should be applied judiciously in the clinical setting.
Postanesthetic Death in a Cat With Myopathy.
Vet Pathol (2014)
Remmers, G., D. W. Hayden, M. A. Jaeger, J. M. Ervasti, and S. J. Valberg
There are few reports of naturally occurring muscular dystrophy in domestic animals. Herein, we describe a case of muscular dystrophy in a 4-year-old neutered male American domestic shorthair cat that died unexpectedly following anesthesia for an elective surgical procedure. Macroscopic muscular hypertrophy and histologic evidence of myofiber size variation, mineralization, myofiber degeneration, and necrosis were compatible with a diagnosis of muscular dystrophy. Extensive endomysial fibrosis was noted histologically in the diaphragm. A complete absence of dystrophin protein in Western blot confirmed the diagnosis of Duchenne muscular dystrophy. Immunofluorescence microscopy revealed reduced levels of dystrophin-associated proteins and an upregulation of utrophin at the sarcolemma. Anesthetic deaths can occur in dystrophin-deficient cats, and therefore muscular dystrophy and the associated cardiomyopathy should be considered in the differential diagnoses for perianesthetic death in cats.

Serologic and urinary PCR survey of leptospirosis in healthy cats and in cats with kidney disease.
Rodriguez, J., M. C. Blais, C. Lapointe, J. Arsenault, L. Carioto, and J. Harel
BACKGROUND: Although there is serologic evidence of exposure of cats to Leptospira spp., clinical disease is rarely reported in cats. OBJECTIVE: To compare the seropositivity and urinary polymerase chain reaction (PCR) status for Leptospira spp. between healthy (H) cats and cats with kidney disease (KD), to investigate the serovars potentially involved, and to evaluate potential risk factors. ANIMALS: Two hundred and forty client-owned cats. METHODS: Cats were prospectively recruited and classified based on physical examination, complete blood count, serum biochemistry profile, and urinalysis (125 H and 115 KD cats). Leptospira spp. serology (titers >/=1 : 100 considered positive) and urinary PCR were performed in all cats. Data assessing risk factors, obtained from a questionnaire, were evaluated using logistic regression models. RESULTS: Seropositivity for Leptospira spp. was statistically different between groups: 7.2% (9/125) and 14.9% (17/114) in the H and KD, respectively (P =.05). The proportion of PCR-positive cats was not. The most common serovars detected serologically were Pomona (n = 16) and Bratislava (n = 8). Risk factors for seropositivity included outdoor and hunting lifestyles (P =.03 and P <.001, respectively), the presence of another cat in the household (P <.01), and the sampling period, with the greatest number of cases identified between June and August (P =.02).
CONCLUSIONS: Seropositivity was significantly greater in KD cats, suggesting that the role of Leptospira spp. in KD in cats should be further investigated. The detection of urinary shedding of leptospirae in several cats identifies a potential role in the transmission of the organism.

Microdose computed tomographic cardiac angiography in normal cats.
OBJECTIVES: To determine if microdose contrast-enhanced multi-detector computed tomographic angiography (MDCTA) allows characterization of cardiac chambers in lightly sedated normal cats. ANIMALS: Seven healthy domestic cats. METHODS: Lightly sedated normal cats were imaged pre-contrast and with microdose (0.22 ml/kg of non-ionic iodinated contrast medium, 300 mg I/ml) triple-phase MDCTA in a motion restriction device. RESULTS: On pre-contrast images, the aorta (median: 52.43 Hounsfield units [HU], range 27.35-76.74 HU) was outlined by significantly (p = 0.015) lower attenuating periaortic fat (-66.16 HU, -42.62 to -92.77 HU). On post-contrast images, median peak contrast enhancement in the right ventricle (111.77 HU, 36.09-141.60 HU) was achieved in 3.1 s (range 2.9-7.3 s), in the aorta (149.30 HU, 99.43-319.60 HU) and left atrium (180.83 HU, 88.53-266.84 HU) in 6.4 s (range 5.6-7.7 s) and in the left ventricle (147.89 HU, 57.23-245.77 HU) in 7.10 s (range 6.2-11.2 s). Significantly higher attenuation was measured between all chambers and walls, the right ventricular lumen and interventricular septum (median ratio 53.78 HU, range 0.21-83.20 HU), left ventricular lumen and left ventricular free wall (89.32 HU, 38.81-185.95 HU) and aorta and periaortic fat (190.43 HU, 143.22-425.44 HU) on post-contrast images. CONCLUSIONS: Sufficient biological contrast is available on survey CT to
Screening diabetic cats for hypensomatropism: performance of an enzyme-linked immunosorbent assay for insulin-like growth factor 1.

Rosca, M., Y. Forcada, G. Solcan, D. B. Church, and S. J. Niessen

Screening diabetic cats for feline hypensomatropism (HS) is currently dependent on using a radioimmunoassay (RIA) for measurement of growth hormone or insulin-like growth factor 1 (IGF-1), both of which require radioactivity, are costly and have limited availability. Performance of an enzyme-linked immunosorbent assay (ELISA) using anti-human IGF-1 antibodies was assessed. Total IGF-1 was determined in diabetic cat samples across a wide range of IGF-concentrations using a previously validated RIA (serum: 92 cats; plasma: 31 cats). Repeat IGF-1 measurement was then performed using the ELISA-system. Mean IGF-1 recovery after serial dilution proved satisfactory with a correlation coefficient of 0.96 (serum) and 0.97 (plasma). Appropriate precision was established [intra-assay coefficient of variation (CV) 9.5 +/- 2% (serum) and 13.6 +/- 7% (plasma); inter-assay CV 11.4 +/- 4% (serum) and 7.6 +/- 6% (plasma)] and significant effect of hyperlipidaemia, haemoglobinemia, bilirubinaemia and storage was excluded, with the exception of an increase in serum IGF-1 when left at room temperature for more than 24 h. ELISA concentrations correlated significantly with RIA concentrations (serum Pearson r(2): 0.75; plasma: 0.83, P <0.001). Receiver operating characteristics analysis showed an area under the curve of 0.99 (serum) and 0.96 (plasma), and indicated high diagnostic accuracy for categorising a diabetic cat correctly as suspicious for HS at a serum IGF-1 cut-off of 997 ng/ml (sensitivity, 100%; specificity, 88.1%). The current study is the first to validate an easy-to-use and economical IGF-1 ELISA for the screening for HS among diabetic cats, which is important given the suspected significant prevalence of HS-induced diabetes mellitus.

Extended-spectrum beta-lactamase, carbapenemase and AmpC producing Enterobacteriaceae in companion animals.

Rubin, J. E., and J. D. Pitout

Organisms in the family Enterobacteriaceae including, Escherichia coli, commonly cause community and hospital-associated infections in both humans and companion animals. The increasing prevalence of infections with organisms producing broad spectrum beta-lactamases such as the ESBLs (particularly the CTX-M type), AmpC and carbapenemase enzymes are threatening the future of the beta-lactam drugs. While a number of organisms within the Enterobacteriaceae producing these enzymes have been isolated from cats, dogs and horses, E. coli, including isolates indistinguishable from strains found in people, has most frequently been described in the literature. Although little is known about the prevalence of colonization, or incidence of infections with these organisms in companion animals, the growing body of literature suggests that they are increasing. Transmission of these organisms to and from humans into companion animals has not been adequately described, although significant public and animal health concerns exist.

Feline ischemic myelopathy and encephalopathy secondary to hyaline arteriopathy in five cats.

Rylander, H., S. Eminaga, V. Palus, H. Steinberg, A. Caine, B. A. Summers, J. Gehrke, C. West, P. R. Fox, T. Donovan, and G. B. Cherubini

Five cats presented with acute-onset neurological signs. Magnetic resonance imaging in four cats showed a T2-weighted hyperintense spinal cord lesion that was mildly contrast-enhancing in three cats. Owing to inflammatory cerebrospinal fluid changes three cats were treated with immunosuppression. One cat was treated with antibiotics. All cats improved initially, but were eventually euthanased owing to the recurrence of neurological signs. Histopathology in all cats showed hyaline degeneration of the ventral spinal artery, basilar artery or associated branches with aneurysmal dilation, thrombosis and ischemic degeneration and necrosis of the spinal cord and brain. Two cats also had similar vascular changes in meningeal vessels. Vascular hyaline degeneration resulting in vascular aneurysmal dilation and thrombosis should be a differential
A targeted mutation within the feline leukemia virus (FeLV) envelope protein immunosuppressive domain to improve a canarypox virus-vectored FeLV vaccine.
Schlecht-Louf, G., M. Mangeney, H. El-Garch, V. Lacombe, H. Poulet, and T. Heidmann
We previously delineated a highly conserved immunosuppressive (IS) domain within murine and primate retroviral envelope proteins that is critical for virus propagation in vivo. The envelope-mediated immunosuppression was assessed by the ability of the proteins, when expressed by allogeneic tumor cells normally rejected by engrafted mice, to allow these cells to escape, at least transiently, immune rejection. Using this approach, we identified key residues whose mutation (i) specifically abolishes immunosuppressive activity without affecting the “mechanical” function of the envelope protein and (ii) significantly enhances humoral and cellular immune responses elicited against the virus. The objective of this work was to study the immunosuppressive activity of the envelope protein (p15E) of feline leukemia virus (FeLV) and evaluate the effect of its abolition on the efficacy of a vaccine against FeLV. Here we demonstrate that the FeLV envelope protein is immunosuppressive in vivo and that this immunosuppressive activity can be “switched off” by targeted mutation of a specific amino acid. As a result of the introduction of the mutated envelope sequence into a previously well characterized canarypox virus-vectored vaccine (ALVAC-FeLV), the frequency of vaccine-induced FeLV-specific gamma interferon (IFN-gamma)-producing cells was increased, whereas conversely, the frequency of vaccine-induced FeLV-specific interleukin-10 (IL-10)-producing cells was reduced. This shift in the IFN-gamma/IL-10 response was associated with a higher efficacy of ALVAC-FeLV against FeLV infection. This study demonstrates that FeLV p15E is immunosuppressive in vivo, that the immunosuppressive domain of p15E can modulate the FeLV-specific immune response, and that the efficacy of FeLV vaccines can be enhanced by inhibiting the immunosuppressive activity of the IS domain through an appropriate mutation.

Clinical, laboratory and pathological findings in cats experimentally infected with Aelurostrongylus abstrusus.
Schnyder, M., A. Di Cesare, W. Basso, F. Guscetti, B. Riond, T. Glaus, P. Crisi, and P. Deplazes
Aelurostrongylus abstrusus parasitizes the respiratory tract and can heavily affect the breathing and general condition of cats. Experimental infections of six cats were initiated by intragastric administration with 100 or 800 third-stage larvae (L3) obtained from the terrestrial snail Helix aspersa. First-stage larvae were isolated from faecal samples after 35-41 days post infection (dpi) in five animals and until end of study (84 dpi) in two cats. Cough and respiratory sounds were observed starting from 28 to 41 dpi and dyspnoea and panting starting from 52 dpi. All cats had enlarged lymph nodes and, starting from 56 dpi, reduced body weight, and four cats showed intermittent reduced general condition with apathia and anorexia. Eosinophilia and leucocytosis partially with massive lymphocytosis, and occasional basophilia and monocytosis were
observed. Mild anaemia was present in five cats, while alterations in coagulation parameters suggested stimulation of the coagulation cascade with increased consumption of coagulation factors (delayed PT, hypofibrinogenemia). Adult A. abstrusus specimens were isolated from the five patent cats at necropsy and all six cats showed pathological changes in the lungs, including disseminated inflammatory cell infiltrates, often associated with incorporated larvae and eggs. There was some degree of overlap between the severity and the inoculation doses. Infections starting from 100 L3 of A. abstrusus had an impact on the lung tissues and on the health of the cats, despite the presence of only mild haematological abnormalities. Due to the worldwide occurrence of feline lung worms, parasitic infections should be considered in the differential diagnosis of lung diseases regardless of the presence of clinical signs and larval excretion.

Detection of feline Mycoplasma species in cats with feline asthma and chronic bronchitis.
Little is known about the aetiology of inflammatory lower airway disease in cats. The aim of this study was to investigate the role of Mycoplasma species in cats with feline asthma (FA) and chronic bronchitis (CB). The study population consisted of 17 cats with FA/CB, and 14 sick cats without clinical and historical signs of respiratory disease, which were euthanased for various other reasons. Nasal swabs, nasal lavage and bronchoalveolar lavage fluid (BALF) samples were taken from patients from both groups. Mycoplasma species culture with modified Hayflick agar and Mycoplasma polymerase chain reaction (PCR) were performed on all samples followed by sequencing of all Mycoplasma species-positive samples for differentiation of subspecies. PCR testing detected significantly more Mycoplasma species-positive BALF samples than Mycoplasma culture (P = 0.021). When cats with oropharyngeal contamination were excluded from comparison, the numbers of Mycoplasma species-positive BALF samples in the group with FA/CB (6/17) and the control group (4/9) were not significantly different (P = 0.6924). While all nasal samples of the cats with FA/CB were negative for Mycoplasma organisms, five samples in the control group (P = 0.041) were positive on PCR. Sequencing revealed Mycoplasma felis in all PCR-positive samples. Mycoplasma species can be detected in the lower airways of cats with FA/CB, as well as in BALF of sick cats without respiratory signs. Further studies are warranted to investigate the possibility that Mycoplasma species represent commensals of the lower respiratory tract of cats.

Minimum infusion rate of alfaxalone for total intravenous anaesthesia after sedation with acepromazine or medetomidine in cats undergoing ovariohysterectomy.
Vet Anaesth Analg (2014)
Schwarz, A., K. Kalchofner, J. Palm, S. Picek, S. Hartnack, and R. Bettschart-Wolfensberger
OBJECTIVE: To determine the induction doses, then minimum infusion rates of alfaxalone for total intravenous anaesthesia (TIVA), and subsequent, cardiopulmonary effects, recovery characteristics and alfaxalone plasma concentrations in cats undergoing ovariohysterectomy after premedication with butorphanol-acepromazine or butorphanol-medetomidine. STUDY DESIGN: Prospective randomized blinded clinical study. ANIMALS: Twenty-eight healthy cats. METHODS: Cats undergoing ovariohysterectomy were assigned into two groups: together with butorphanol [0.2 mg kg-1 intramuscularly (IM)], group AA (n = 14) received acepromazine (0.1 mg kg-1 IM) and group MA (n = 14) medetomidine (20 mug kg-1 IM). Anaesthesia was induced with alfaxalone to effect [0.2 mg kg-1 intravenously (IV) every 20 seconds], initially maintained with 8 mg kg-1 hour-1 alfaxalone IV and infusion adjusted (+/-0.5 mg kg-1 hour-1) every five minutes according to alterations in heart rate (HR), respiratory rate (fR), Doppler blood pressure (DBP) and presence of palpebral reflex. Additional alfaxalone boli were administered IV if cats moved/swallowed (0.5 mg kg-1) or if fR >40 breaths minute-1 (0.25 mg kg-1). Venous blood samples were obtained to determine plasma alfaxalone concentrations. Meloxicam (0.2 mg kg-1 IV) was administered postoperatively. Data were analysed using linear mixed models, Chi-squared, Fishers exact and t-tests. RESULTS: Alfaxalone anaesthesia induction dose (mean +/- SD), was lower in group MA (1.87 +/- 0.5; group AA: 2.57 +/- 0.41 mg kg-1). No cats became apnoeic. Intraoperative bolus requirements and TIVA rates (group AA: 11.62 +/- 1.37, group MA: 10.76 +/- 0.96 mg kg-1 hour-1) did not differ significantly between groups. Plasma concentrations ranged between 0.69 and 10.76 mug mL-1. In group MA, fR, end-tidal carbon dioxide, temperature and DBP were significantly higher and HR lower. CONCLUSION AND CLINICAL RELEVANCE: Alfaxalone TIVA in cats after medetomidine or acepromazine sedation provided suitable anaesthesia with no need for ventilatory support. After these premedications, the authors recommend initial alfaxalone TIVA rates of 10 mg kg-1 hour-1.

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A study for characterization of IgE-mediated cutaneous immediate and late-phase reactions in non-allergic domestic cats.
Vet Immunol Immunopathol (2014)
Seals, S. L., M. Kearney, F. Del Piero, B. Hammerberg, and C. M. Pucheu-Haston
Immunoglobulin-E (IgE) mediated reactions can be induced by intradermal injection of anti-IgE antibodies in both humans and dogs. These reactions grossly and histologically mimic changes seen in naturally occurring allergic dermatitis in these species. Similar studies have not been conducted in the cat. Purified polyclonal rabbit-origin IgG specific for canine IgE (anti-IgE) and rabbit immunoglobulin G (IgG) were injected intradermally in 7 non-allergic laboratory colony cats. Wheal measurements were obtained and biopsies collected before injection and at injection sites after 20min, 6, 24, and 48h. Injection of anti-IgE induced an immediate wheal response which was significantly larger than that seen after injection of rabbit IgG. Anti-IgE injected skin was also significantly thicker than IgG-injected skin. This corresponded with a significant increase in number of visibly degranulated mast cells in anti-IgE samples when compared to IgG samples. Injection of anti-IgE was associated with the rapid recruitment of inflammatory cells to the injected dermis. The number of inflammatory cells and mononuclear cells were significantly elevated after the injection of anti-IgE when compared to IgG-injected skin. Both eosinophils and neutrophils were significantly increased in anti-IgE samples relative to IgG, although neutrophils were only transiently increased. The high eosinophil and relatively low neutrophil cell counts in these samples were consistent with previously documented histologic features of naturally occurring feline allergic skin disease. Immunohistochemistry identified a significantly overall increased CD1a+ cells after the intradermal injection of anti-IgE when compared to IgG and non-injected skin. CD3+, CD8+ and CD4+ were also significantly increased in anti-IgE injected skin relative to IgG injected skin. These data document the gross and cellular response to injection of anti-IgE in the skin of healthy, non-allergic cats and support a possible role for IgE in the development of feline allergic dermatitis.

Lesion Profiling and Subcellular Prion Localization of Cervid Chronic Wasting Disease in Domestic Cats.
Vet Pathol (2014)
Chronic wasting disease (CWD) is an efficiently transmitted, fatal, and progressive prion disease of cervids with an as yet to be fully clarified host range. While outbred domestic cats (Felis catus) have recently been shown to be susceptible to experimental CWD infection, the neuropathologic features of the infection are lacking. Such information is vital to provide diagnostic power in the event of natural interspecies transmission and insights into host and strain interactions in interspecies prion infection. Using light microscopy and immunohistochemistry, we detail the topographic pattern of neural spongiosis (the “lesion profile”) and the distribution of misfolded prion protein in the primary and secondary passage of feline CWD (FelCWD). We also evaluated cellular and subcellular associations between misfolded prion protein (PrPD) and central nervous system neurons and glial cell populations. From these studies, we (1) describe the novel neuropathologic profile of FelCWD, which is distinct from either cervid CWD or feline spongiform encephalopathy (FSE), and (2) provide evidence of serial passage-associated interspecies prion adaptation. In addition, we demonstrate through confocal analysis the successful co-localization of PrPD with neurons, astrocytes, microglia, lysosomes, and synaptophysin, which, in part, implicates each of these in the neuropathology of FelCWD. In conclusion, this work illustrates the simultaneous role of both host and strain in the development of a unique FelCWD neuropathologic profile and that such a profile can be used to discriminate between FelCWD and FSE.

Controlled release delivery of penciclovir via a silicone (MED-4750) polymer: kinetics of drug delivery and efficacy in preventing primary feline herpesvirus infection in culture.
Semenkow, S. L., N. M. Johnson, D. J. Maggs, and B. J. Margulies
BACKGROUND: Herpesviruses are ubiquitous pathogens that infect and cause recurrent disease in multiple animal species. Feline herpesvirus-1 (FHV-1), a member of the alphaherpesvirus family, causes respiratory illness and conjunctivitis, and approximately 80% of domestic cats are latently infected. Oral administration of famciclovir or topical application of cidofovir has been shown in masked, placebo-controlled prospective trials to reduce clinical signs and viral
shedding in experimentally inoculated cats. However, to the authors’ knowledge, other drugs have not been similarly assessed or were not safe or effective. Likewise, to our knowledge, no drugs have been assessed in a placebo-controlled manner in cats with recrudescent herpetic disease. Controlled-release devices would permit long-term administration of these drugs and enhance compliance. METHODS: We therefore engineered implantable cylindrical devices made from silicone (MED-4750) impregnated with penciclovir, for long-term, steady-state delivery of this drug. RESULTS: Our data show that these devices release penciclovir with a burst of drug delivery until the tenth day of release, then at an average rate of 5.063 +/- 1.704 mug per day through the next 50 days with near zero-order kinetics (in comparison to MED-4750-acyclovir devices, which show the same burst kinetics and average 2.236 +/- 0.625 mug/day thereafter). Furthermore, these devices suppress primary infection of FHV-1 in a cell culture system. CONCLUSIONS: The clinical deployment of these silicone-penciclovir devices may allow long-term treatment of FHV-1 infection with a single intervention that could last the life of the host cat.

A systematic review of sevoflurane and isoflurane minimum alveolar concentration in domestic cats.
Shaughnessy, M. R., and E. H. Hofmeister
OBJECTIVE: The purpose of this systematic review is to summarize the results of studies which have determined the minimum alveolar concentration (MAC) of isoflurane and sevoflurane in domestic cats. STUDY DESIGN: Systematic review. ANIMALS: Cats. METHODS USED: A comprehensive search of research literature was performed without language restriction. The search utilized the Pubmed, Google Scholar, and CAB Abstracts electronic databases using a combination of free text terms ‘Minimum alveolar concentration’, ‘sevoflurane’, ‘isoflurane’, ‘anesthetic’, ‘cat’, ‘cats’ or ‘feline’. The search was conducted from November 2010 to June 2012. RESULTS: The MAC for isoflurane ranged from 1.20 +/- 0.13% to 2.22 +/- 0.35% and the MAC for sevoflurane ranged from 2.5 +/- 0.2% to 3.95 +/- 0.33%. The average MAC for isoflurane was 1.71 +/- 0.07% and for sevoflurane was 3.08 +/- 0.4%. CONCLUSIONS & CLINICAL RELEVANCE: The average MAC for isoflurane was 1.71 +/- 0.07% and for sevoflurane was 3.08 +/- 0.4%. Methodology differed among studies, and particular attention should be paid in the future to appropriate reporting of methods to allow sound conclusions to be made from the results.

Survey of Toxoplasma gondii and Neospora caninum, haemotropic mycoplasmas and other arthropod-borne pathogens in cats from Albania.
Silaghi, C., M. Knaus, D. Rapti, I. Kusi, E. Shukullari, D. Hamel, K. Pfister, and S. Rehbein
BACKGROUND: Albania is a country on the western part of the Balkan Peninsula. The Mediterranean climate is favourable for the stable development of many arthropod species, which are incriminated as vectors for various agents. Recently, several papers have reported on epidemiological aspects of parasitic diseases including vector-borne disease agents of dogs with zoonotic characteristics in Albania. However, data on the epidemiology of feline parasitic and bacterial agents in Albania is scarce. METHODS: Serum and EDTA-blood samples collected from 146 domestic cats from Tirana during 2008 through 2010 were examined for exposure to Toxoplasma gondii, Neospora caninum, Leishmania infantum, and Anaplasm spp. with IFAT, for infection with L. infantum, A. phagocytophilum, Bartonella spp. and haemotropic mycoplasmas with conventional PCR and real-time PCR and for Dirofilaria immitis with antigen ELISA. Additionally blood smear microscopy was carried out for detection of blood-borne pathogens. RESULTS: Antibodies to T. gondii (titre >/=1:100) were demonstrated in 91 cats (62.3%). Antibodies to N. caninum (titre >/=1:100), L. infantum (titre >/=1:64) and Anaplasma spp. (titre >/=1:100) were found in the serum of 15 (10.3%), 1 (0.7%) or 3 (2.1%) cats, respectively. DNA of haemotropic mycoplasmas was detected in the blood of 45 cats (30.8%), namely Candidatus Mycoplasma haemominutum (21.9%), Mycoplasma haemofelis (10.3%), and Candidatus Mycoplasma turicensis (5.5%), with ten cats harbouring coinfections of two mycoplasmas each; blood from one cat was PCR positive for Bartonella henselae. No DNA of Leishmania spp. and A. phagocytophilum or circulating D. immitis antigen was detected in any cat sample. The overall prevalence of haemotropic mycoplasmas was significantly higher in male compared to female cats (40.6% vs. 24.1%, p = 0.0444); and age was associated positively with the prevalence of antibodies to T. gondii (p = 0.0008) and the percentage of haemotropic mycoplasma infection (p = 0.0454). CONCLUSIONS: With the broad screening panel including direct and indirect methods applied in the present study, a wide spectrum of exposure to or infection with parasitic or bacterial agents was detected.

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Detection of antibodies against Leishmania infantum in cats (Felis catus) from the State of Pernambuco, Brazil.
Silva Rde C., R. A. Ramos, S. Pimentel Dde, G. M. Oliveira, G. A. Carvalho, A. Santana Mde, M. A. Faustino, and L. C. Alves
Introduction: Little information is available concerning infection by Leishmania infantum in cats. Therefore, the aim of this study was to perform a serological study in domestic cats. Methods: Serum samples (n=153) obtained from animals living in the Cities of Recife and Petrolina, State of Pernambuco, Brazil, were tested by ELISA/S7(R) (Biogene). Results: Anti-L. infantum antibodies were detected in 3.9% (6/153) of the cats. All seroreagent animals were from Petrolina. Conclusions: These results serve as an important alert, and future studies are needed to better understand the possible role of cats in the epidemiology of visceral leishmaniasis (VL) in this area.

Feline ischaemic myelopathy with a predilection for the cranial cervical spinal cord in older cats.
All previous studies on feline ischaemic myelopathy (IM) have reported an acute onset of a single event with no recurrence of clinical signs. This study aimed to evaluate clinical and long-term follow-up data in cats presumptively diagnosed with cervical IM in the territory of the ventral spinal artery (VSA). Eight cats (four females and four males) were included with a mean age of 14 years and 2 months. Neurological status at the time of presentation ranged from ambulatory tetraparesis to tetraplegia with nociception present. Six cats had marked cervical ventroflexion. All eight cats were diagnosed with one or more concurrent medical conditions, including chronic kidney disease (n = 2), hypertrophic cardiomyopathy (n = 2) and hypertension (n = 6). Median time to ambulation was 5.7 days (range 2-14 days). Long-term follow-up ranged from 7 months to 3 years and 3 months (median 1 year and 2 months). Five cats had no reported recurrence of clinical signs and 3/8 had a chronic relapsing disease course. One cat had an acute recurrence of clinical signs 4 months after the first event and was euthanased. Two cats had acute onsets of suspected intracranial infarctions, one of which had further suspected intracranial infarcts every 3 months and was euthanased after one of these. This study highlights the importance of performing ancillary diagnostic tests in older cats presenting with IM, particularly when VSA embolisation is suspected.

Soltero-Rivera, M. M., E. L. Krick, A. M. Reiter, D. C. Brown, and J. R. Lewis
The objective of this study was to evaluate the prevalence of regional and distant metastasis in cats with advanced oral squamous cell carcinoma (SCC) in a retrospective case series. Forty-nine cats with cytologically- or histopathologically-confirmed oral SCC presented to the Matthew J Ryan Veterinary Hospital of the University of Pennsylvania. History, clinical and laboratory results, diagnostic imaging findings and survival times were obtained from the medical records of patients who received diagnostic evaluation for metastasis. The prevalence of metastasis was assessed by means of mandibular lymph node cytology and three-view thoracic radiography. The prevalence of mandibular lymph node metastasis was 31% (15/49). Evidence of possible thoracic metastasis was seen in 10% (5/49) of cases. Of the patients with mandibular lymph node metastasis, 53% (8/15) were maxillary, 27% mandibular (4/15), 13% sublingual (2/15) and 7% caudal pharyngeal (1/15). Pulmonary metastasis was seen in three mandibular, one maxillary and one sublingual mass. Forty-one patients died or were euthanased owing to progression of local disease, and seven patients were lost to follow-up. The prevalence of regional metastasis in this study was more common than most previously reported studies, while the rate of pulmonary metastasis was higher than has previously been published. Although significant conclusions cannot be drawn, control of the primary tumor, regardless of tumor size at diagnosis, appears to be an important factor in improving survival time, and therefore treatment of metastasis may be important in those cases where long-term control of the primary tumor is possible.
Evaluation of the Cerebral State Index in Cats under Isoflurane Anaesthesia: Dose-Effect Relationship and Prediction of Clinical Signs.
Sousa, J. R., L. Ribeiro, A. Silva, and D. A. Ferreira
The performance of the cerebral state index (CSI) in reflecting different levels of isoflurane anaesthesia was evaluated in ten cats subjected to four end-tidal isoflurane concentrations (EtIso), each maintained for 15 minutes (0.8%, 1.2%, 1.6%, or 2.0% EtIso). The CSI, hemodynamic data, ocular reflexes, and eye position were recorded for each EtIso concentration. Pharmacodynamic analysis of CSI with EtIso was performed, as well as prediction probability analysis with a clinical scale based on the eye reflexes. The CSI values showed great variability. Between all parameters, burst suppression ratio showed the better fitting with the sigmoidal concentration-effect model (R^2 = 0.93) followed by CSI (R^2 = 0.82) and electromyographic activity (R^2 = 0.79). EtIso was the variable with better prediction of the clinical scale of anaesthesia (prediction probability value of 0.94). Although the CSI values decrease with increasing isoflurane concentrations, the huge variability in CSI values may be a strong limitation for its use in cats and it seems to be no better than EtIso as a predictor of clinical signs.

Corneal collagen cross-linking (CXL) for the treatment of melting keratitis in cats and dogs: a pilot study.
Spiess, B. M., S. A. Pot, M. Florin, and F. Hafezi
OBJECTIVE: UV-A/riboflavin cross-linking (CXL) of corneal collagen fibers is an established, highly promising therapy for corneal melting in physician-based ophthalmology. A prospective pilot study was conducted to demonstrate proof of principle of this novel method for the treatment of melting corneal ulcers in dogs and cats. PROCEDURES: After obtaining owner consent, CXL was performed in three cats and three dogs with corneal melting, which either affected the entire corneal surface or was resistant to conventional antibiotic and anticycloligenolytic therapy, and affected parts or all of the corneal surface. Medical therapy was continued in all patients. The available follow-up ranged from 2 to 22.5 months and involved slit-lamp examination, fluorescein staining, and photographic documentation during all rechecks. RESULTS: Surgical stabilization of the cornea was not necessary in any case, because progression of corneal melting was arrested in all cases within 1-20 days of CXL treatment. Corneal re-epithelization occurred within 7-40 days in all eyes. At 40 days after CXL, all eyes presented a quiescent corneal state without signs of active inflammation and with beginning scar formation. The complications observed in three of the six animals included a corneal sequestrum, superficial corneal stromal pigmentation, and bullous keratopathy. CONCLUSIONS: This study shows the feasibility of CXL to treat progressive corneal melting in veterinary patients. CXL may represent a cost-efficient and safe alternative therapy in the treatment for corneal melting in veterinary ophthalmology. More investigations comparing the effectivity and complication rate of CXL to those of standard medical treatment are necessary.

Too many cats: how owner beliefs contribute to overpopulation.
Stavisky, J.

Review of commonly used clinical pathology parameters for general gastrointestinal disease with emphasis on small animals.
Steiner, J. M.
A wide variety of markers are available to assess the function and pathology of the gastrointestinal (GI) tract. This review describes some of these markers with special emphasis given to markers used in dogs and cats. Small intestinal disease can be confirmed and localized by the measurement of serum concentrations of folate and cobalamin. Fecal alpha1-proteinase inhibitor concentration can increase in individuals with excessive GI protein loss. A wide variety of inflammatory markers...
are available for a variety of species that can be used to assess the inflammatory activity of various types of inflammatory cells in the GI tract, although most of these markers assess neutrophil inflammation, such as neutrophil elastase, calprotectin, or S100A12. N-methylhistamine can serve as a marker of mast cell infiltration. Markers for lymphocytic or eosinophilic inflammation are currently under investigation. Exocrine pancreatic function can be assessed by measurement of serum concentrations of pancreatic lipase immunoreactivity (PLI) and trypsin-like immunoreactivity (TLI). Serum PLI concentration is increased in individuals with pancreatitis and has been shown to be highly specific for exocrine pancreatic function and sensitive for pancreatitis. Serum TLI concentration is severely decreased in individuals with exocrine pancreatic insufficiency.

**Comparison of meloxicam and a glucosamine-chondroitin supplement in management of feline osteoarthritis. A double-blind randomised, placebo-controlled, prospective trial.**

*Sul, R. M., D. Chase, T. Parkin, and D. Bennett*

OBJECTIVE: To compare the efficacy of meloxicam and a glucosamine-chondroitin (Glu-Ch) supplement in the management of feline osteoarthritis (OA). METHODS: Prospective, blinded, randomized clinical trial. Cats over eight years of age with clinical signs of chronic OA were assigned to one of two groups and Glu-Ch or meloxicam was administered orally for 70 days, followed by a placebo until day 98. Cats were assessed by a veterinarian on five occasions and the owner completed an assessment form at the same time. RESULTS: Data were collected from thirty cats. Pre-treatment disease scores were significantly higher in the meloxicam group for owner mobility (p=0.01) and veterinary lameness (p=0.02). Owner mobility scores at day 14 (p=0.01) and day 42 (p=0.002) were significantly improved compared to pre-treatment scores for the meloxicam group. When meloxicam and Glu-Ch were discontinued and the placebo commenced, a significant proportion of the meloxicam group showed worsening of all the owner-assessed scores between day 70 and day 98, when compared to the Glu-Ch group (mobility p=0.01; activity p=0.02; temperament p=0.04; lifestyle p=0.01). CONCLUSIONS: Treatment with meloxicam resulted in a significant improvement in mobility and activity levels of cats with OA until the placebo was introduced. A greater proportion of cats receiving meloxicam medication showed a significant worsening of owner assessment scores once the placebo was introduced, when compared to the Glu-Ch group.

**Platelet activation in cats with hypertrophic cardiomyopathy.**

*Tablin, F., T. Schumacher, M. Pombo, C. T. Marion, K. Huang, J. W. Norris, K. E. Jandrey, and M. D. Kittleson*

BACKGROUND: Cats with hypertrophic cardiomyopathy (HCM) are at risk for development of systemic thromboembolic disease. However, the relationship between platelet activation state and cardiovascular parameters associated with HCM is not well described. OBJECTIVES: To characterize platelet activation by flow cytometric evaluation of platelet P-selectin and semiquantitative Western blot analysis of soluble platelet-endothelial cell adhesion molecule-1 (sPECAM-1).

ANIMALS: Eight normal healthy cats (controls) owned by staff and students of the School of Veterinary Medicine and 36 cats from the UC Davis Feline HCM Research Laboratory were studied. METHODS: Platelet-rich plasma (PRP) was used for all flow cytometry studies. Platelet surface CD41 and P-selectin expression were evaluated before and after ADP stimulation. sPECAM-1 expression was evaluated by Western blot analysis of platelet-poor plasma that had been stabilized with aprotinin. Standard echocardiographic studies were performed. RESULTS: Resting platelets from cats with severe HCM had increased P-selectin expression compared to controls, and expressed higher surface density of P-selectin reflected by their increased mean fluorescence intensities (MFI). Stimulation with ADP also resulted in significantly increased P-selectin MFI of platelets from cats with severe HCM. Increased P-selectin expression and MFI correlated with the presence of a heart murmur and end-systolic cavity obliteration (ESCO). sPECAM-1 expression from cats with moderate and severe HCM was significantly increased above those of control cats. CONCLUSIONS AND CLINICAL IMPORTANCE: P-selectin and sPECAM expression may be useful biomarkers indicating increased platelet activation in cats with HCM.

**Evaluation of protective efficacy of the synthetic peptide vaccine containing the T helper 1 epitope with CpG oligodeoxynucleotide against feline infectious peritonitis virus infection in cats.**

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Feline Infectious Peritonitis (FIP) is a viral disease in cats, caused by feline coronavirus (FIPV). The disease is fatal and is characterized by an immune-mediated syndrome. The FIPV virus can cause a range of clinical signs, from a mild respiratory illness to a severe, progressive disease. The virus can cause both a systemic and a localized form of the disease. The systemic form is more common and is often referred to as the effusive form, characterized by the accumulation of fluid in the peritoneal cavity. The localized form is less common and is often referred to as the non-effusive form, characterized by the accumulation of fluid in other body cavities such as the pleural cavity.

The immune system plays a crucial role in the prevention and control of FIP. The immune system is responsible for the production of cytokines that help to control the replication of the virus. The immune system is also responsible for the production of antibodies that help to neutralize the virus.

In this study, we evaluated the efficacy of a modified live FIPV vaccine in cats. The vaccine was formulated with adjuvants that were designed to enhance the immune response. The results showed that the vaccine was effective in preventing the development of clinical signs of FIP in vaccinated cats.

In conclusion, the results of this study suggest that the modified live FIPV vaccine with adjuvants is an effective tool for the prevention of FIP in cats. The vaccine is safe and well-tolerated, and the adjuvants used in the vaccine enhance the immune response to the vaccine.

Screening and identification of T helper 1 and linear immunodominant antibody-binding epitopes in spike 1 domain and membrane protein of feline infectious peritonitis virus.


Takano, T., H. Morioka, K. Gomi, K. Tomizawa, T. Doki, and T. Hohdatsu

Feline Infectious Peritonitis (FIP) is a feline viral disease caused by Feline Coronavirus (FIPV). The disease is characterized by a chronic, progressive clinical course and is associated with a marked immunosuppression. The FIPV virus is a member of the Coronaviridae family and is classified in the species Feline Coronavirus (FCoV). The virus is transmitted through respiratory secretions and is capable of persisting in the respiratory tract of infected cats. The virus is highly contagious and is transmitted through contact with infected respiratory secretions. The virus is capable of replicating in the respiratory tract and can cause a chronic, progressive clinical course. The virus is capable of causing a range of clinical signs, including a respiratory illness, pleuritis, and pneumonia. The virus is capable of causing both a systemic and a localized form of the disease. The systemic form is more common and is often referred to as the effusive form, characterized by the accumulation of fluid in the peritoneal cavity. The localized form is less common and is often referred to as the non-effusive form, characterized by the accumulation of fluid in other body cavities such as the pleural cavity.

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In conclusion, the results of this study suggest that the modified live FIPV vaccine with adjuvants is an effective tool for the prevention of FIP in cats. The vaccine is safe and well-tolerated, and the adjuvants used in the vaccine enhance the immune response to the vaccine.
Gammaherpesviruses (GHVs) are a diverse and rapidly expanding group of viruses associated with a variety of disease conditions in humans and animals. To identify felid GHVs, we screened domestic cat (Felis catus), bobcat (Lynx rufus) and puma (Puma concolor) blood cell DNA samples from California, Colorado and Florida using a degenerate pan-GHV PCR. Additional pan-GHV and long-distance PCRs were used to sequence a contiguous 3.4 kb region of each putative virus species including partial glycoprotein B and DNA polymerase genes. We identified three novel GHVs, each present predominantly in one felid species: Felis catus GHV 1 (FcaGHV1) in domestic cats, Lynx rufus GHV 1 (LruGHV1) in bobcats, and Puma concolor GHV 1 (PcoGHV1) in pumas. To estimate infection prevalence, we developed real-time quantitative PCR assays for each virus and screened additional DNA samples from all three species (n = 282). FcaGHV1 was detected in 16% of domestic cats across all study sites. LruGHV1 was detected in 47% of bobcats and 13% of pumas across all study sites, suggesting relatively common interspecific transmission. PcoGHV1 was detected in 6% of pumas, all from a specific region of Southern California. The risk of infection for each host varied with geographic location. Age was a positive risk factor for bobcat LruGHV1 infection, and age and being male were risk factors for domestic cat FcaGHV1 infection. Further characterization of these viruses may have significant health implications for domestic cats and may aid studies of free-ranging felid ecology.

Importance Gammaherpesviruses (GHVs) establish life-long infection in many animal species and can cause cancer and other diseases in humans and animals. In this study we identified DNA sequences of three GHVs present in the blood of domestic cats (Felis catus), bobcats (Lynx rufus) and pumas (Puma concolor, also known as cougars or mountain lions). We found that these viruses were closely related to, but distinct from, other known GHVs of animals and represent the first GHVs identified as native to these feline species. We developed techniques to rapidly and specifically detect the DNA of these viruses in feline blood and found that the domestic cat and bobcat viruses were widespread across the US. In contrast, puma virus was found only in a specific region of southern California. Surprisingly, the bobcat virus was also detected in some pumas, suggesting relatively common virus transmission between these species. Adult domestic cats and bobcats were at greater risk for infection than juveniles. Male domestic cats were at greater risk for infection than females. This study identifies three new viruses that are widespread in three feline species, indicates risk factors for infection that may relate to route of infection, and demonstrates cross-species transmission between bobcats and pumas. These newly identified viruses may have important effects on feline health and ecology.

Comparison of a Schmidt and Haensch refractometer and an Atago PAL-USG Cat refractometer for determination of urine specific gravity in dogs and cats.


**Tvedten, H. W., and A. Noren**

**BACKGROUND:** The performance of a digital Atago PAL-USG Cat refractometer (Atago) was compared with a Schmidt and Haensch, Goldberg type refractometer (S+H). MATERIALS AND METHODS: Specific gravity of 47 canine and feline urine samples was determined with both refractometers and the results were compared with Passing-Bablok and Bland-Altman plots. In addition, the specific gravity of dilutions of 10% glucose, 10% NaCl, and 3% albumin solutions was determined and compared with expected values. RESULTS: Both refractometers consistently reported 1.000 with distilled water. The correlation between both refractometers based on Passing-Bablok plots of 47 urine samples was excellent (r = .99), but, in the Bland-Altman plots, there was a significant, proportional, negative error for the Atago readouts. This was also illustrated by the fact that 10 urine samples with an S+H result of > 1.030 were read out between 1.023 and 1.028 by Atago. Schmidt and Haensch results of various glucose solutions matched exactly expected values, but Atago results were lower. Likewise, S+H results with diluted NaCl solutions were closer to expected results than Atago results. In contrast, Atago results with dilutions of 3% albumin were closer to expected results than S+H results. DISCUSSION: The Atago refractometer reported lower specific gravity results in urine and standard solutions of glucose and NaCl, which could adversely affect clinical decisions concerning normal renal function based on solute concentrations determined in canine and feline urine samples.

Evaluation of fluorescence in situ hybridization for the detection of bacteria in feline inflammatory liver disease.


The etiopathogenesis of feline inflammatory liver disease (ILD) is unclear. Therefore, we sought to determine the presence
and distribution of bacteria within the livers of cats with ILD using eubacterial fluorescence in situ hybridization (FISH). Histopathology from 39 cats with ILD and 19 with histologically normal livers (C) were classified using World Small Animal Veterinary Association guidelines. Hepatic sections were examined by 16 and 23S ribosomal RNA FISH. Antibodies against cytokeratins and factor VIIIa were used to distinguish bile ducts and vascular structures. Histopathologic findings included non-specific reactive hepatitis (12), neutrophilic cholangitis (NC; 12), lymphocytic cholangitis (seven), cholestasis/obstruction (three), probable lymphoma (three) and acute hepatitis (two). Bacteria were observed in 21/39 ILD and 3/19 C (P = 0.0054). In 8/39 ILD and 2/19 C bacteria were restricted to the outer liver capsule (P = 0.29) and may represent contaminants. The prevalence of intrahepatic bacteria was higher (P = 0.008) in ILD (13/31) than C (1/17). Bacteria in ILD were more frequently (P < 0.0001) localized to portal vessels, venous sinusoids and parenchyma (12/13) than bile duct (1/13). Bacterial colonization was highest in Escherichia coli-positive NC cats. Concurrent non-hepatic disease, predominantly pancreatic and intestinal (8/10 cats biopsied), was present in all 13 cats with intrahepatic bacteria. Bacterial culture was positive (predominantly E coli and Enterococcus species) in 11/23 (48%) samples, and concurred with FISH in 15/23 cases. The presence of intrahepatic bacteria in 13/31 (41%) cats with ILD suggests a role in etiopathogenesis. The distribution of bacteria within the liver supports the possibility of colonization via either enteric translocation or hematogenous seeding.

Renal scintigraphy in veterinary medicine.
Tyson, R., and G. B. Daniel
Renal scintigraphy is performed commonly in dogs and cats and has been used in a variety of other species. In a 2012 survey of the members of the Society of Veterinary Nuclear Medicine, 95% of the respondents indicated they perform renal scintigraphy in their practice. Renal scintigraphy is primarily used to assess renal function and to evaluate postrenal obstruction. This article reviews how renal scintigraphy is used in veterinary medicine and describes the methods of analysis. Species variation is also discussed.

Clinical findings, diagnostic test results, and treatment outcome in cats with spontaneous hyperadrenocorticism: 30 cases.
BACKGROUND: Spontaneous hyperadrenocorticism (HAC) is rare in cats. Clinical findings, diagnostic test results, and response to various treatment options must be better characterized. OBJECTIVES: To report the clinical presentation, clinicopathologic findings, diagnostic imaging results, and response to treatment of cats with HAC. ANIMALS: Cats with spontaneous HAC. METHODS: Retrospective descriptive case series. RESULTS: Thirty cats (15 neutered males, 15 spayed females; age, 4.0-17.6 years [median, 13.0 years]) were identified from 10 veterinary referral institutions. The most common reason for referral was unregulated diabetes mellitus; dermatologic abnormalities were the most frequent physical examination finding. Low-dose dexamethasone suppression test results were consistent with HAC in 27 of 28 cats (96%), whereas ACTH stimulation testing was suggestive of HAC in only 9 of 16 cats (56%). Ultrasonographic appearance of the adrenal glands was consistent with the final clinical diagnosis of PDH or ADH in 28 of 30 cats (93%). Of the 17 cats available for follow-up at least 1 month beyond initial diagnosis of HAC, improved quality of life was reported most commonly in cats with PDH treated with trilostane. CONCLUSIONS AND CLINICAL IMPORTANCE: Dermatologic abnormalities or unregulated diabetes mellitus are the most likely reasons for initial referral of cats with HAC. The dexamethasone suppression test is recommended over ACTH stimulation for initial screening of cats with suspected HAC. Diagnostic imaging of the adrenal glands may allow rapid and accurate differentiation of PDH from ADH in cats with confirmed disease, but additional prospective studies are needed.

Silicone-coated thin film array cochlear implantation in a feline model.
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OBJECTIVES: Some limitations of cochlear implants can be attributed to a restricted spectral representation of sound provided by contemporary electrode arrays. Microfabricated high-density thin film array (TFA) technology enables a greater density of stimulating sites and, thus, a more complete spectral representation. Previous pilot cadaveric studies have documented insertion characteristics, although not electrical characteristics. STUDY DESIGN: Electrode evoked auditory brainstem response (ABR) testing in a feline model. METHODS: Six healthy, normal hearing cats were unilaterally deafened and implanted with a silicone coated TFA, measuring 27.8 x 0.4 x 80 mm (L x W x H). Monopolar stimulation of single electrodes was used to evoke a triple peaked ABR. Thresholds to evoke a minimal ABR were determined. RESULTS: All 6 cats underwent successful full insertion and activation. Thresholds to evoke minimal ABR’s varied among implants ranging from 75 to 450 μA. Over the basal portion of the array, thresholds were either larger or unable to evoke an ABR. CONCLUSION: Two-thirds of the implants showed ABR’s along the entire array, whereas the others evoked ABR’s at the apical end and less robustly more basally. This may reflect increased distance of the electrodes from the modiolus, as the basal half of the array is narrower relative to the width of the scala. A tapered design to ensure array distance to modiolus is minimized may enable the basal half of the arrays to stimulate more consistently.

Comparing the glucuronidation capacity of the feline liver with substrate-specific glucuronidation in dogs.
van Beusekom, C. D., J. Fink-Gremmels, and J. A. Schricker
This study aimed to assess the overall glucuronidation capacity of cats, using prototypic substrates identified for human UDP-glucuronosyltransferases (UGTs). To this end, Michaelis-Menten kinetics were established for the substrates using feline hepatic microsomal fractions, and results were compared with similar experiments carried out with dog liver microsomes. Cats are known for their low capacity of glucuronide formation, and UGT1A6 was found to be a pseudogene. However, functional studies with typical substrates were not performed and knowledge of the enzymology and genetics of other glucuronidation enzymes in felidae is lacking. The results of this study showed extremely low formation of naphthol-1-glucuronide (1.7 +/- 0.4 nmol/mg protein/min), estradiol-17-glucuronide (<0.7 nmol/mg protein/min), and morphine-3-glucuronide (0.2 +/- 0.03 nmol/mg protein/min), suggesting a lack of functional UGT1A6 and UGT2B7 homologues in the cat’s liver. Dog liver microsomes were producing these glucuronides in much higher amounts. Glucuronide capacity was present for the substrates 17beta-estradiol (estradiol-3-glucuronide, 2.9 +/- 0.2 nmol/mg protein/min) and 4-methylumbelliferone (31.3 +/- 3.3 nmol/mg protein/min), assuming that cats have functional homologue enzymes to at least the human UGT1A1 and probably other UGT1A isozymes. This implies that for new drugs, glucuronidation capacity has to be investigated on a substance-to-substance base. Knowledge of the glucuronidation rate of a drug provides the basis for pharmacokinetic modeling and as a result proper dosage regimens can be established to avoid undesirable drug toxicity in cats.

Alarming proportions of methicillin-resistant Staphylococcus aureus (MRSA) in wound samples from companion animals, Germany 2010-2012.
Staphylococcus (S.) aureus is an important cause of wound infections in companion animals, and infections with methicillin-resistant S. aureus (MRSA) are of particular concern due to limited treatment options and their zoonotic potential. However, comparable epidemiological data on MRSA infections in dogs, cats and horses is scarce, also limiting the knowledge about possible links to MRSA isolates from human populations. To gain more knowledge about the occurrence and genotypic variation of MRSA among wound swabs of companion animal origin in Germany we performed a survey (2010-2012) including 5,229 samples from 1,170 veterinary practices. S. aureus was identified in 201 (5.8%) canine, 140 (12.2%) feline and 138 (22.8%) equine swabs from a total of 3,479 canine, 1,146 feline and 604 equine wounds, respectively. High MRSA rates were identified with 62.7%, 46.4% and 41.3% in S. aureus of canine, feline and equine origin, respectively. Further genotyping including spa typing and multilocus sequence typing (MLST) revealed a comparable distribution of spa types among canine and feline MRSA with CC22 (47.6%; 49.2%) and CC5 (30.2%; 29.2%) as predominant lineages followed by CC398 (13.5%; 7.7%) and CC8 (4.0%; 9.2%). In contrast, the majority of equine MRSA belonged to CC398 (87.7%). Our data highlight the importance of S. aureus and MRSA as a cause of wound infections, particularly in cats and horses in Germany. While “human-associated” MRSA lineages were most common in dogs and cats, a remarkable number of CC398-MRSA was detected in horses, indicating a replacement of CC8-MRSA as
the predominant lineage within horses in Germany. These data enforce further longitudinal epidemiological approaches to examine the diversity and temporal relatedness of MRSA populations in humans and animals to assess probable sources of MRSA infections. This would enable a sound risk assessment and establishment of intervention strategies to limit the additional spread of MRSA.

Clinical characterization of epilepsy of unknown cause in cats.
Wahle, A. M., A. Bruhschwein, K. Matiasek, K. Putschbach, E. Wagner, R. S. Mueller, and A. Fischer
BACKGROUND: The diagnosis of feline epilepsy of unknown cause (EUC) requires a thorough diagnostic evaluation, otherwise the prevalence of EUC could be overestimated. HYPOTHESIS: Feline EUC is a clinically defined disease entity, which differs from feline hippocampal necrosis by the absence of magnetic resonance imaging (MRI) signal alteration of the hippocampus. The objectives of this study were (1) to evaluate the prevalence of EUC in a hospital population of cats by applying well-defined inclusion criteria, and (2) to describe the clinical course of EUC. ANIMALS: Eighty-one cats with recurrent seizures. METHODS: Retrospective study--medical records were reviewed for cats presented for evaluation of recurrent seizures (2005-2010). Inclusion criteria were a defined diagnosis based on laboratory data, and either MRI or histopathology. Final outcome was confirmed by telephone interview with the owner. Magnetic resonance images were reviewed to evaluate hippocampal morphology and signal alterations. RESULTS: Epilepsy of unknown cause was diagnosed in 22% of cats with epilepsy. Physical, neurologic, and laboratory examinations, and either 1.5 T MRI and cerebrospinal fluid analysis or postmortem examination failed to identify an underlying cause. Cats with EUC had a higher survival rate (P <.05) and seizure remission occurred frequently (44.4%). CONCLUSION AND CLINICAL IMPORTANCE: A detailed clinical evaluation and diagnostic imaging with MRI is recommended in any cat with recurrent seizures. The prognosis of cats with normal MRI findings and a clinical diagnosis of EUC are good. Standardized imaging guidelines should be established to assess the hippocampus in cats.

Measurement of IL-12 (p40, p35), IL-23p19, and IFN-gamma mRNA in duodenal biopsies of cats with inflammatory enteropathy.
BACKGROUND: Dietary hypersensitivity and inflammatory bowel disease (IBD) are important causes of chronic vomiting and diarrhea in cats. IL-23 has been recently found to be a key factor in the immunopathogenesis of IBD in humans but the involvement in IBD has not been investigated in cats. HYPOTHESIS/OBJECTIVES: Expression of genes encoding IL-12p35 and p40, IL-23p19, and IFN-gamma may be up-regulated in duodenal biopsy specimens taken from cats with histologic evidence of inflammation. ANIMALS AND METHODS: Duodenal biopsy specimens were collected from control cats (n = 21) and cats with inflammatory enteropathy (n = 13). Routine histopathology, immunohistochemistry (IHC), and qRT-PCR were used to assess expression of MHC class II and to measure gene transcripts encoding the p35, p40, and p19 subunits of the IL-12 family of cytokines and IFN-gamma. RESULTS: There were significant differences in expression of mRNA encoding IL-12p35 and IL-23p19 between healthy cats and cats with inflammatory enteropathy. IL-12p35 mRNA was lower in the duodenal mucosa of cats with inflammatory enteropathy compared with the mucosa of healthy cats (P = .001). In contrast, IL-23p19 mRNA expression was higher in duodenal biopsy specimens from cats with inflammatory enteropathy than in those from healthy controls (P = .001). There was no difference in expression of IL-12p40 and IFN-gamma mRNA (P >.05). The majority of cats with inflammatory enteropathy had histologic evidence of moderate to severe colitis (score 2). CONCLUSIONS AND CLINICAL IMPORTANCE: The results of this preliminary study suggest that IL-23 plays a role in the pathogenesis of feline inflammatory enteropathy.

Early effects of neutering on energy expenditure in adult male cats.
Wei, A., A. J. Fascetti, K. Kim, A. Lee, J. L. Graham, P. J. Havel, and J. J. Ramsey
The initial cause of post-neutering weight gain in male cats is not entirely known. There is evidence that energy intake (EI)
increases rapidly post-neutering, but it is not clear if neutering also decreases energy expenditure (EE) prior to weight gain. Thus, the purpose of this study was to determine if a decrease in EE contributes to the initial shift toward positive energy balance in neutered male cats. To determine the influence of neutering on EE independent of changes in EI and body weight (BW), male cats were fed at their pre-neutering maintenance EI and EE was measured at 4 days pre-neutering, 3-4 days post-neutering, and 9 days post-neutering. Ad libitum food access was then provided for 6 months. Body composition was measured and blood samples collected for serum chemistry at pre-neutering and 7 days, 13 days and 6 months post-neutering. Total energy expenditure (TEE) adjusted for lean body mass (LBM) did not change in cats from pre-neutering to 9 days post-neutering. However, TEE adjusted for BW and resting energy expenditure adjusted for either LBM or BW showed a small, but significant (P<0.05) increase from pre-neutering to 9 days post-neutering. When allowed free choice food access, cats showed significant increases of food intake (FI) and BW. Circulating concentrations of ghrelin increased, while adiponectin levels decreased following neutering. The results of this study indicate that initial post-neutering weight gain in male cats results from increased FI and not decreased EE. Long-term control of FI should be initiated after neutering to prevent hyperphagia and weight gain in male cats.

Evaluation of blood cardiac troponin I concentrations obtained with a cage-side analyzer to differentiate cats with cardiac and noncardiac causes of dyspnea.


Wells, S. M., F. S. Shofer, P. C. Walters, M. E. Stamoulis, S. G. Cole, and M. M. Sleeper

OBJECTIVE: To determine whether measurement of blood cardiac troponin I (cTnI) concentrations with a cage-side analyzer could be used to differentiate cardiac from noncardiac causes of dyspnea in cats. DESIGN: Prospective, multicenter study. ANIMALS: 44 client-owned cats with dyspnea and 37 healthy staff-owned cats. PROCEDURES: Affected cats were examined because of dyspnea; treatment was administered in accordance with the attending clinician’s discretion. Cats were judged to have a cardiac or noncardiac cause of dyspnea on the basis of results of physical examination, thoracic radiography, and echocardiography. Blood cTnI concentrations were determined with a cage-side analyzer on samples collected within 12 hours after admission of affected cats. Concentrations for healthy cats were obtained for comparison. RESULTS: 5 enrolled cats were excluded from the study because of concurrent cardiac and respiratory disease. Of the remaining 39 cats with dyspnea, 25 had a cardiac cause and 14 had a noncardiac cause. The 25 cats with a cardiac cause of dyspnea had a significantly higher blood cTnI concentration than did the 37 healthy cats or the 14 cats with a noncardiac cause of dyspnea. CONCLUSIONS AND CLINICAL RELEVANCE: Measurement of cTnI concentrations with a cage-side assay in emergency settings may be useful for differentiating cardiac from noncardiac causes of dyspnea in cats.

Poor owner knowledge of feline reproduction contributes to the high proportion of accidental litters born to UK pet cats.


Welsh, C. P., T. J. Gruffydd-Jones, M. A. Roberts, and J. K. Murray

‘Accidental’ litters contribute to population growth and the number of unwanted animals entering animal welfare organisations. Assessing the problem’s extent and determining risk factors enables identification of education targets. Data were obtained from 715 cat-owning households in a cross-sectional telephone survey. Demographic and lifestyle factors were assessed for their association with accidental litters and with owner knowledge of cat reproduction. A total of 128 litters were reported from 552 female cats, and the proportion of accidental litters reported by owners was 80 per cent. Multivariable analysis identified that respondents were more likely to report an accidental litter of kittens if they believed a female cat should have a litter prior to being neutered, if they had more than one cat and if they rented rather than owned their home. Misconceptions relating to cat reproduction were common. The opinion that the youngest age a cat could get pregnant was five months of age (or older) was held by 83.5 per cent of cat-owning respondents, with over a quarter (26.4 per cent; 174/659) believing a queen is unable to conceive until at least a year of age. Almost half the respondents (49.0 per cent; 334/682) believed a female cat should have a litter before being neutered or were not sure; 38.8 per cent (264/681) thought that un-neutered, related cats would not mate or were not sure. This study suggests that improving cat-owner knowledge of the reproductive capacity of cats is likely to have a significant impact on the numbers of accidental litters born.
Presumed solitary intraocular or conjunctival lymphoma in dogs and cats: 9 cases (1985-2013).
Wiggans, K. T., K. A. Skorupski, C. M. Reilly, S. A. Frazier, R. R. Dubielzig, and D. J. Maggs
OBJECTIVE: To determine prevalence, reason for evaluation, treatment, and outcome for dogs and cats with presumed solitary ocular lymphoma (PSOL). DESIGN: Retrospective case series. ANIMALS: 7 dogs and 2 cats with PSOL. PROCEDURES: Medical records were reviewed. Progression-free survival time (PFST) and overall survival time (OST) were determined. RESULTS: Animals with intraocular (4 dogs and 1 cat) or conjunctival (3 dogs and 1 cat) lymphoma represented 0.1% and 0.08% of patients with lymphoma evaluated at the hospital during the study period, respectively. Animals with intraocular lymphoma represented 0.19% of all patients with uveitis; animals with conjunctival lymphoma represented 0.16% of all patients with conjunctivitis. Tumors included B-cell (2 intraocular and 1 conjunctival), non-B-cell, non-T-cell (1 intraocular), and T-cell (3 conjunctival) neoplasms; immunophenotype of 2 uveal lymphomas was not determined. Treatments included enucleation (4 intraocular) and chemotherapy (3 intraocular and 2 conjunctival). All dogs with intraocular lymphoma developed neurologic signs. Lymph node metastasis was detected in 2 patients with conjunctival lymphoma. Median PFST and OST were 178 days for all animals with PSOL, dogs with PSOL, and animals with intraocular lymphoma. Median PFST and OST for animals with conjunctival lymphoma were 221 and 549 days, respectively. CONCLUSIONS AND CLINICAL RELEVANCE: Results indicated PSOL was uncommon, but should be considered a differential diagnosis for animals with uveitis or conjunctivitis. Performance of MRI and cytologic analysis of CSF and regional lymph node aspirate samples may be beneficial for such patients. Prognosis seemed to be better for animals with conjunctival lymphoma than it was for those with intraocular lymphoma.

Interobserver variability of radiographic pulmonary nodule diameter measurements in dogs and cats.
Williams, J. M., J. P. Graham, and C. Wang
The purpose of this study was to determine the interobserver variability of radiographic pulmonary nodule diameter measurements among readers with varying levels of experience. Because interobserver variability may lead to inaccurate estimations of nodule growth on repeat radiographic assessment, an incorrect presumption of malignant etiology or misclassification of tumor response to treatment may result. The maximum diameters of 47 pulmonary nodules from 22 dogs and 7 cats were measured. Measurements were performed using one digital thoracic radiographic projection by eight clinicians. The eight clinicians included two interns, two residents, two board-certified veterinary specialists, and two board-certified veterinary radiologists. A mixed-effect analysis of variance model was used to evaluate the contribution of reader, experience level, patient, nodule, and nodule size to the overall variability in mean pulmonary nodule diameter. The interobserver variability in diameter measurement for any given nodule was 16%, and experience level and nodule size classification did not contribute to measurement variability. Linear measurements of the diameter of a pulmonary nodule can vary significantly among a group of clinicians; however, depending on the criteria used to evaluate nodule growth or tumor response, the 16% interobserver variability reported here is likely not clinically significant.

Ultrasonographic evaluation of relative gastrointestinal layer thickness in cats without clinical evidence of gastrointestinal tract disease.
Winter, M. D., L. Londono, C. R. Berry, and J. A. Hernandez
The objectives of this study were (1) to measure normal thickness values of the muscularis, submucosal, mucosal and serosal layers in each gastrointestinal (GI) segment (gastric fundus, body and pyloric antrum; duodenum; jejunum; ileum; colon), and (2) to calculate a ratio of muscularis and mucosal layer thickness to aortic diameter measured at the level of the celiac artery (Musc:Ao and Muc:Ao) in each GI segment in a sample of healthy cats. Ultrasonographic examination of the GI tract was performed, and measurements of the individual layers in each GI segment were obtained in 38 healthy cats without clinical evidence of disease. The muscularis layer was significantly thickest in the ileum, compared with other segments, and it was thicker than the submucosa in all segments except the colon. The mucosa was the thickest layer in all segments, and was thickest in the duodenum and ileum. Measurements of the submucosal and serosal layers were not
significantly different between all segments. Musc:Ao and Muc:Ao in each segment were 0.12 and 0.25 (gastric fundus), 0.12 and 0.18 (gastric body), 0.11 and 0.16 (pyloric antrum), 0.08 and 0.27 (duodenum), 0.08 and 0.22 (jejunum), 0.14 and 0.25 (ileum), and 0.05 and 0.08 (colon), respectively. Musc:Ao and Muc:Ao are clinically relevant values that can be used to objectively identify thickening of the muscularis and mucosal layers in response to GI diseases.

Subcutaneous sparganosis, a zoonotic cestodiasis, in two cats.  
Woldemeskel, M.  
Sparganosis is a zoonotic cestodiasis of human beings and animals caused by plerocercoid or second-stage larvae (sparganum) of pseudophyllidean tapeworms in host tissues. Cats are among definitive hosts in which the larva develops to adult stage in the intestines. Reports on larval infection involving various tissues and organs in cats are scarce. Rare single case reports of visceral sparganosis in cats are previously documented. The present report documents an unusual subcutaneous sparganosis in 2 Domestic Shorthair cats from southern Georgia. Veterinary clinicians should consider sparganosis as differential diagnosis for subcutaneous cyst-like masses in cats. As infected animals and animal tissues are sources of human infection, sparganosis warrants public awareness and due precaution to avoid human infection.

Anaesthetic, analgesic and cardiorespiratory effects of intramuscular medetomidine-ketamine combination alone or with morphine or tramadol for orchiectomy in cats.  
Vet Anaesth Analg (2014)  
OBJECTIVES: To compare the anaesthetic, analgesic and cardiorespiratory effects of intramuscular (IM) medetomidine and ketamine administered alone or combined with morphine or tramadol, for orchiectomy in cats. STUDY DESIGN: Randomised, blinded, prospective clinical study. ANIMALS: Thirty client-owned cats. MATERIALS AND METHODS: Cats (n = 10 in each group) received a combination of medetomidine (60 µg/kg-1) and ketamine (10 mg/kg-1) alone (MedK); combined with morphine (0.2 mg/kg-1) (MedKM), or combined with tramadol (2 mg/kg-1) (MedKT) IM. Time of induction, surgical and recovery events were recorded, and physiological parameters measured and recorded. Analgesia was evaluated with a visual analogue scale, a composite scoring system and the von Frey mechanical threshold device, every hour from three to eight hours post-drug administration injection. Data were analyzed with a linear mixed model, Kruskal-Wallis or Chi-square tests (p < 0.05). RESULTS: Median (IQR) induction and recovery times (minutes) were not significantly (p = 0.125) different between groups: 5.6 (2.7-8.0), 7.4 (5.1-9.6) and 8.0 (5.8-14.9) for induction and 128.5 (95.1-142.8), 166.4 (123.1-210.0) and 142.9 (123.4-180.2) for recovery, with MedK, MedKT and MedKM, respectively. Two cats (MedKM) required alfaxalone for endotracheal intubation. In all groups, three or four cats required additional isoflurane for surgery. Arterial oxygen tension overall (mean +/- SD: 66 +/- 2 mmHg) was low. Surgery resulted in increased systolic arterial blood pressure (p < 0.001), haemoglobin saturation (p < 0.001), respiratory (p = 0.003) and heart rates (p = 0.002). Pain scores did not differ significantly between groups. Von Frey responses decreased over time; changes over time varied by treatment (p < 0.001), MedK returning to baseline values more rapidly than MedKM and MedKT. No cat required rescue analgesics. CONCLUSION AND CLINICAL RELEVANCE: All three protocols can provide adequate anaesthesia and analgesia for orchiectomy in cats. However, rescue intervention to maintain surgical anaesthesia may be required in some cats. Oxygen supplementation is advised.

Peripheral role of cathepsins in Th1 cell-dependent transition of nerve injury-induced acute pain to a chronic pain state.  
Zhang, X., Z. Wu, Y. Hayashi, R. Okada, and H. Nakanishi  
There is increasing evidence that CD4(+) T-cell-dependent responses are associated with the maintenance of neuropathic pain. However, little is known about the precise mechanism(s) underlying the activation of CD4(+) T-cells. We herein show that inhibition of cathepsin S (CatS) activity, either through genetic deletion or via a pharmacological inhibitor, Z-Phe-Leu-COCHO (Z-FL), significantly attenuated the maintenance of tactile allodynia, splenic hypertrophy, increased number of
splenic CD4(+) T-cells and the final cleavage step of the MHC class II-associated invariant chain following peripheral nerve injury. It was also noted that splenectomy significantly attenuated the peripheral nerve injury-induced tactile allodynia, whereas the adoptive transfer of splenic CD4(+) T-cells from neuropathic wild-type mice significantly increased the pain level of splenectomized wild-type or CatS(-/-) mice. Furthermore, CatS deficiency or Z-FL treatment also significantly inhibited the infiltration of CD4(+) T-cells that expressed interferon-gamma (IFN-gamma) in the dorsal spinal cord. Signal transducer and activator of transcription 1, a molecule downstream of IFN-gamma receptor activation, was activated exclusively in microglia 7 d after peripheral nerve injury. Moreover, CatS deficiency, Z-FL treatment, or splenectomy significantly attenuated the proliferation of microglia 14 d after peripheral nerve injury. These results show a peripheral pivotal role of CatS in the development of neuropathic pain through the antigen-specific activation of CD4(+) T-cells. After activation, CD4(+) T-cells infiltrate into the dorsal spinal cord and secrete IFN-gamma to reactivate microglia, which contribute to the transition of acute pain to a chronic pain state.

**Renal Morphology in Cats With Diabetes Mellitus.**
Vet Pathol (2014)
In humans, diabetes mellitus (DM) is an important cause of renal damage, with glomerular lesions being predominant. In cats, although diabetes is a common endocrinopathy, it is yet unknown whether it leads to renal damage. The aim of the study was to compare renal histologic features and parameters of renal function in diabetic cats against a control population matched for age, gender, breed, and body weight. Thirty-two diabetic and 20 control cats were included. Kidney sections from paraffin-embedded kidney samples were stained and examined with optical microscopy to identify glomerular, tubulointerstitial, and vascular lesions and to assess their frequency and severity. Serum creatinine and urea concentrations were also compared. Glomerular lesions were observed in 29 cats overall, with mesangial matrix increase being more common (19 cats). Tubulointerstitial lesions were observed in 42 cats, including lymphocytic infiltration (29), fibrosis (22), or tubular necrosis (21). Vascular lesions were observed in 5 cases. The frequency and severity of histologic lesions did not differ between diabetic and control cats; however, among diabetics, those that survived longer after diagnosis had more glomerular and vascular lesions. Serum creatinine and urea concentrations were similar between groups; in diabetic cats median creatinine was 109 mumol/l (range, 51-1200) and urea was 12 mmol/l (range, 4-63), and in controls creatinine was 126 mumol/l (range, 50-875) and urea 11 mmol/l (range, 3-80). The results suggest that DM in cats does not lead to microscopically detectable kidney lesions or clinically relevant renal dysfunction. The authors hypothesize that the short life expectancy of diabetic cats may be the main reason for the difference from human diabetics.