Small Animal Article Summaries – FELINE MEDICINE & SURGERY

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The International Society of Feline Medicine (ISFM) and the American Association of Feline Practitioners (AAFP) publish the Journal of Feline Medicine and Surgery.
Molecular Detection of Rickettsia felis in Humans, Cats, and Cat Fleas in Bangladesh, 2013-2014.
Ahmed R, Paul SK, Hossain MA et al.
High prevalence of Rickettsia felis in patients with fever of unknown origin was revealed in the north-central Bangladesh from 2012 to 2013. Subsequently, in this study, prevalence of R. felis in cats and cat fleas (Ctenocephalides felis), together with febrile patients, was studied by PCR detection of 17 kDa antigen gene and DNA sequencing. R. felis was detected in 28% (28/100) and 21% (14/68) of cat blood and cat flea samples, respectively, whereas 42% (21/50) of patients were positive for R. felis. R. felis-positive cat fleas were detected at significantly higher rate on R. felis-positive cats. The results suggested a potential role of cats and cat fleas for transmission of R. felis to humans in Bangladesh.

[ Molecular Epidemiology of Bartonella henselae in Stray and Sheltered Cats of Zaragoza, Spain].
OBJECTIVE: Bartonella henselae is responsible for the Cat Scratch Disease in humans, being it underdiagnosed. This study aims to detect and quantify the load of B. henselae DNA in oral and whole blood samples from stray and sheltered cats from Zaragoza (Spain), and analyze associations with epidemiological and clinical factors. METHODS: 47 cats entered in the study. Real time PCR was used to detect B. henselae DNA in blood and oral samples. The SPSS software was applied to the statistical analysis of positivity of paired samples and its relationship with variables as age, sex, origin, month of sampling and fleas/ticks observation in fur and clinical factors (health status and observation of oral lesions). To know the relationship between the presence in blood and oral cavity a logistic regression analysis was performed. RESULTS: A 23.40% of blood samples and the 27.65% of the oral swabs carried the B. henselae DNA. A fair agreement between paired samples was observed (kappa value = 0.33, p less than 0.05). Bacterial DNA detected in oral and blood samples were not significantly associated to any of the epidemiological and clinical factors. Positive cats having oral lesions carried higher loads (3,12/1x1,000,000 cells) of bacterial DNA in their oral cavity than those without lesions (2,58/1x1,000,000 cells) being p=0.032. CONCLUSIONS: Carriage of the B. henselae DNA in the blood samples appears not to be related with carriage of the DNA of the bacteria in mouth and vice versa. Positive cats having oral lesions carry a higher load of B. henselae DNA and may suppose a higher risk of transmission to people handling them. Abstract available from the publisher.

First report of Cytauxzoon sp. infection in a domestic cat from Portugal.
Alho AM, Silva J, Fonseca MJ et al.
Parasit Vectors (2016) 9:220
BACKGROUND: Cytauxzoonosis is an emerging and life-threatening tick-borne feline disease caused by haemoprotezoan parasites of the genus Cytauxzoon. Information regarding epidemiological and clinical presentation of infections by species other than Cytauxzoon felis is scant. A case of Cytauxzoon sp. infection is described in a 2-year-old mixed breed male domestic cat from Portugal, presenting a history of acute lethargy, anorexia and pyrexia. RESULTS: Complete blood count revealed a severe anaemia, leucocytosis and thrombocytopenia. A pleural effusion was noticed on thoracic radiograph, and marked splenomegaly and free abdominal fluid were visualized by ultrasound. A molecular screening for the detection of causative agents of infectious anaemia was performed, and a positive result for Piroplasmoridia was obtained. DNA sequencing of a 743 bp amplicon of the 18S rRNA gene (GenBank accession no. KU710344) revealed 99.9 % identity with Cytauxzoon manul. CONCLUSIONS: This is the first report of Cytauxzoon sp. (clustering together with C. manul) in a
felid from Portugal. Clinical manifestations along with molecular analysis suggest the hypothesis that domestic cats might be infected with and serve as a reservoir host for C. manul.

**Trichomonas foetus infection in cats with diarrhea from densely housed origins.**
Arranz-Solís D, Pedraza-Díaz S, Miró G et al.
*Vet Parasitol* (2016) 221:118-122

Trichomonas foetus is a protozoan parasite that has been recently identified as a causative agent of chronic diarrhea in domestic cats. Transmission of infection occurs by the fecal-oral route through direct contact among animals. Consequently, feline trichomonosis (FT) is more likely to be present in multi-cat environments. The objective of this work was to study the presence of T. foetus and some associated risk factors in cats from densely housed origins and with a reported history of chronic diarrhea. Animals enrolled in this study were family cats (n=15) acquired from pet shops, shelters or breeding centers and cattery cats belonging to one breeding center (n=28) and two cat shelters (A and B, n=25 each). In the catteries, a follow-up analysis for a period of up to 2 months was also performed to determine the parasite shedding pattern in feces and the incidence of infection. Fecal samples were analyzed using in vitro culture and a PCR technique. T. foetus was detected in a total of 38.7% (36/93) of the cats with chronic diarrhea. Parasite infection was similarly detected in family cats and cattery animals (40% versus 38.4%). In the catteries, the parasite was detected in 50%, 44% and 20% of the animals from the breeding center and shelters A and B, respectively. The follow-up analysis showed that 58.3% of infected cats intermittently shed trophozoites in their feces, with an incidence of 23.1%. Investigation of potential risk factors showed that cats ≤1 year old were more likely to be infected than older cats (57.1% versus 27.3%; P<0.05). No significant differences were found when sex and breed factors were studied. These results confirm the importance of FT as a cause of chronic diarrhea in cats and highlight the relevance of close contact conditions for T. foetus transmission.

**Development of anemia, phlebotomy practices, and blood transfusion requirements in 45 critically ill cats (2009-2011).**
Balakrishnan A, Drobatz KJ, Reineke EL

OBJECTIVE: To describe the incidence of the development of anemia, the number of phlebotomies performed daily, the approximate volume of blood withdrawn, the transfusion requirements and their association with duration of hospitalization and survival to discharge in critically ill cats. DESIGN: Retrospective study from January 2009 to January 2011. SETTING: University teaching hospital. ANIMALS: Cats hospitalized in the intensive care unit (ICU) for >48 hours. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Medical records of cats hospitalized for >48 hours in the ICU were examined. Of the 45 cats included, 60% (27/45) were not anemic upon admission to the ICU. Of these, 74.1% (20/27) developed anemia during their ICU stay. Development of anemia was associated with a longer duration of hospitalization (P = 0.002) but not with survival (P = 0.46). Fourteen cats (31.1%; 14/45) received one or more packed red blood cell transfusions and had significantly longer ICU stays (P < 0.001). Transfusion requirements were not associated with survival (P = 0.66). The median number of phlebotomies per day for all cats in the ICU was 3 (range 1-6). This was significantly associated with the development of anemia (P = 0.001) and higher transfusion requirements (P = 0.16) in the 14 cats that received a transfusion. The estimated volume phlebotomized was significantly (P < 0.001) greater in cats that required a transfusion (median volume 3.32 mL/kg/ICU stay) compared to cats that did not require a transfusion (median volume 1.11 mL/kg/ICU stay) but was not associated with survival to discharge (P = 0.84). CONCLUSIONS: Development of anemia necessitating blood transfusions is common in critically ill cats and leads to significantly longer
duration of ICU hospitalization. Iatrogenic anemia from frequent phlebotomies is an important cause for increased transfusion requirement. Fewer phlebotomies and other blood conserving strategies in these patients may help reduce the incidence of anemia and decrease transfusion requirements, as well as result in shorter hospital stays.

**Borrelia persica infection in dogs and cats: clinical manifestations, clinicopathological findings and genetic characterization.**


**BACKGROUND:** Relapsing fever (RF) is an acute infectious disease caused by arthropod-borne spirochetes of the genus Borrelia. The disease is characterized by recurrent episodes of fever that concur with spirochetemia. The RF borrelioses include louse-borne RF caused by *Borrelia recurrentis* and tick-borne endemic RF transmitted by argasid soft ticks and caused by several *Borrelia* spp. such as *B. crocidurae, B. coriaceae, B. duttoni, B. hermsii, B. hispanica* and *B. persica*. Human infection with *B. persica* is transmitted by the soft tick *Ornithodoros tholozani* and has been reported from Iran, Israel, Egypt, India, and Central Asia. **METHODS:** During 2003-2015, five cats and five dogs from northern, central and southern Israel were presented for veterinary care and detected with borrelia spirochetemia by blood smear microscopy. The causative infective agent in these animals was identified and characterized by PCR from blood and sequencing of parts of the flagellin (flaB), 16S rRNA and glycerophosphodiester phosphodiesterase (GlpQ) genes. **RESULTS:** All animals were infected with *B. persica* genetically identical to the causative agent of human RF. Phylogenetic analysis indicated that DNA sequences from these pet carnivores clustered together with *B. persica* genotypes I and II from humans and *O. tholozani* ticks and distinctly from other RF *Borrelia* spp. The main clinical findings in cats included lethargy, anorexia, anemia in 5/5 cats and thrombocytopenia in 4/5. All dogs were lethargic and anorectic, 4/5 were febrile and anemic and 3/5 were thrombocytopenic. Three dogs were co-infected with *Babesia* spp. The animals were all treated with antibiotics and the survival rate of both dogs and cats was 80%. The cat and dog that succumbed to disease died one day after the initiation of antibiotic treatment, while survival in the others was followed by the rapid disappearance of spirochetemia. **CONCLUSIONS:** This is the first report of disease due to *B. persica* infection in cats and the first case series in dogs. Infection was associated with anemia and thrombocytopenia. Fever was more frequently observed in dogs than cats. Domestic canines and felines suffer from clinical disease due to *B. persica* infection and may also serve as sentinels for human infection.

**Commutability and interchangeability of commercial quality control materials with feline plasma for common biochemical analytes.**

Baral RM, Dhand NK, Freeman KP


**BACKGROUND:** Species-specific plasma or serum pools are considered the ideal standard material for quality control materials (QCM) instead of commercially available human QCM. However, using plasma or serum pools is limited by volume restrictions, degradation over time, and a narrow range of analyte concentrations. Concentrations of QCM analytes should be consistent or commutable with those from species-specific plasma/serum samples, and the precision from plasma pools should be comparable or interchangeable with commercial human QCM. **OBJECTIVES:** The aims of this study were to determine the commutability and interchangeability of 2 levels of commercial QCM (MAS chemTRAK-H [CT]) with feline plasma pools (PP) from normal and renal disease cats measured using a commercial laboratory analyzer and a veterinary in-house analyzer. **METHODS:** Agreement between the 2 analyzers was assessed for 16 analytes by correlation and Passing-Bablok regression analyses of
feline plasma samples. The difference between each CT data point and the regression line (residuals) was determined and standardized, and CT were considered ‘commutable’ with PP if the standardized residual was within a range of -3 to 3. Coefficients of variation (CVs) for CT and PP for 16 analytes on 2 analyzers were compared by bootstrap analysis to determine interchangeability. RESULTS: Most CT analytes were within the range of patient plasma sample analytes, thus commutable. Only 2 analytes had equivalent precision for both levels of CT and both levels of PP, and 5 additional analytes had similar precision for at least one level of CT compared to at least one level of PP. CONCLUSIONS: The QCM assessed is commutable to feline PP within the tested ranges for 2 particular analyzers. Commutability does not grant interchangeability.


Severe anemia in cats with urethral obstruction: 17 cases (2002-2011).
Beer KS, Drobatz KJ
OBJECTIVE: To characterize clinical parameters of cats with severe anemia due to suspected urinary bladder hemorrhage associated with urethral obstruction. DESIGN: Retrospective case-control study. SETTING: University teaching hospital. ANIMALS: Seventeen cats with urethral obstruction and severe anemia (group “UO-A”) that required transfusion were identified via medical record database search. Thirty cats with urethral obstruction and mild or no anemia (group “UO”) were included as controls. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: The median PCV of all cases at presentation was 28% (range, 9%-47%). Seven cats had PCV ≤20% at presentation, and all transfused cats had PCV ≤20% at the time of transfusion. Three cats did not receive a transfusion despite PCV ≤18%. Cats in the UO-A group had a significantly longer duration of clinical signs (P = 0.001), and were more likely to have a history of previous urethral obstruction (P = 0.011), have a heart murmur (P = 0.002), have a gallop rhythm (P = 0.005), and have lower blood pressure (P = 0.007) compared to those in the UO group. Additionally, UO-A cats had significantly lower pH, more negative base excess, higher BUN, and higher creatinine compared to UO cats. Duration of urinary catheterization was significantly (P = 0.016) longer in UO-A cats. All UO cats survived to discharge, whereas 4/17 (23.5%) UO-A cats were euthanized (P = 0.013). CONCLUSIONS: A history of previous urethral obstruction and longer duration of clinical signs may be important risk factors for severe anemia in UO cats. Additionally, UO-A cats appeared to be more severely affected, as evidenced by lower blood pressure, more severe metabolic acidosis, higher BUN and creatinine, and worse outcome.

Evidence of selection signatures that shape the Persian cat breed.
Bertolini F, Gandolfi B, Kim ES, Haase B, Lyons LA, Rothschild MF
Mamm Genome (2016) 27:144-155
The Persian cat is mainly characterized by an extremely brachycephalic face as part of the standard body conformation. Despite the popularity, world-wide distribution, and economic importance of the Persian cat as a fancy breed, little is known about the genetics of their hallmark morphology, brachycephaly. Over 800 cats from different breeds including Persian, non-Persian breeds (Abyssinian, Cornish Rex, Bengal, La Perm, Norwegian Forest, Maine Coon, Manx, Oriental, and Siamese), and Persian-derived breeds (British Shorthair, Scottish Fold, Selkirk Rex) were genotyped with the Illumina 63 K feline DNA array. The experimental strategy was composed of three main steps: (i) the Persian dataset was screened for runs of homozygosity to find and select highly homozygous regions; (ii) selected Persian homozygous regions were evaluated for the difference of homozygosity between
Persians and those considered non-Persian breeds, and, (iii) the Persian homozygous regions most divergent from the non-Persian breeds were investigated by haplotype analysis in the Persian-derived breeds. Four regions with high homozygosity (H > 0.7) were detected, each with an average length of 1 Mb. Three regions can be considered unique to the Persian breed, with a less conservative haplotype pattern in the Persian-derived breeds. Moreover, two genes, CHL1 and CNTN6 known to determine face shape modification in humans, reside in one of the identified regions and therefore are positional candidates for the brachycephalic face in Persians. In total, the homozygous regions contained several neuronal genes that could be involved in the Persian cat behavior and can provide new insights into cat domestication.

Evaluation of thyroid to background ratios and comparison of various scintigraphic measurements and their correlation to serum T4 in hyperthyroid cats.
Bettencourt A, Daniel GB, Panciera D, Larson M, Werre SR
*Vet Radiol Ultrasound* (2016) 57:290-298
Thyroid-to-salivary ratio and percent dose uptake are the most widely recognized scintigraphic measurements. Recently, the thyroid-to-background ratio has been proposed as an alternate method. However, this method has not been validated. The purpose of this observational, cross-sectional, prospective study was to determine the location of a background region of interest (ROI) that is most reflective of blood pool activity. We also hypothesized that the thyroid-to-background ratio using this background ROI would be a better predictor of thyroid function. Fifty-six cats presented to the Virginia-Maryland College of Veterinary Medicine seeking radioiodine therapy for hyperthyroidism were enrolled in this cross-sectional study to evaluating thyroid-to-background ratio. A blood sample for measuring plasma radioactivity was collected at the time of scintigraphy. The plasma radioactivity was compared to the background ROIs in eight anatomic regions. Scintigraphic measures of thyroid-to-background and thyroid-to-salivary ratios, and percent dose were then compared to serum T4. The heart ROI was most closely correlated with plasma pertechnetate activity (r = 0.70). Percent dose uptake was most closely correlated with serum T4 (r = 0.74), followed by thyroid-to-salivary ratio (r = 0.66) and thyroid-to-background ratio using the heart ROI (r = 0.59). Thyroid-to-background ratio using the heart background ROI is a good predictor T4 but percent dose uptake and thyroid-to-salivary ratio proved to be better predictors of T4 than any of the thyroid-to-background ratios.

Is the Colonisation of Staphylococcus aureus in Pets Associated with Their Close Contact with Owners.
Bierowiec K, Płoneczka-Janeczko K, Rypuła K
In human beings and animals, staphylococci constitute part of the normal microbial population. Staphylococcus aureus could be classified as an opportunistic pathogen because the bacteria are noted in clinically healthy individuals, but when the immune system becomes compromised, they can also cause a wide range of infections. The objective of this study was to test the hypothesis that cats who are in close contact with their owners are at the greatest risk of being colonised with S. aureus. Two groups of cats were investigated: single, pet (domestic) cats that do not have outdoor access; and a local population of feral cats living in urban areas. The prevalence of S. aureus in domestic cats was 19.17%, while it’s prevalence in the feral cat population was only 8.3%; which was statistically significant. Analysis of antibiotic resistance, at the genotypic as well as phenotypic level, showed that S. aureus isolates from pet cats were more likely to harbour antibiotic resistant determinants. The prevalence of methicillin-resistant Staphylococcus aureus (MRSA) in households was 10.21%, while in feral cats it was only 1.4%. In conclusion, this study has revealed a correlation between close contact with humans
and a higher risk of the cats being colonised with S. aureus and harbouring the antibiotic resistant determinants.

Molecular detection of tick-borne protozoan parasites in a population of domestic cats in midwestern Brazil.

Braga ÍA, de Souza Ramos DG, Marcili A et al.
Ticks Tick Borne Dis (2016) 7:1004-1009
Some tick-borne pathogens that infect domestic cats have been considered emergent in veterinary medicine. Occurrences of Hepatozoon spp., Babesia spp. and Cytauxzoon spp. have been described in several regions of Brazil. This paper offers a comprehensive analysis of the 18S rRNA gene of a Hepatozoon sp. strain detected in domestic cats in the metropolitan area of Cuiabá, in Midwestern Brazil. Based on a molecular analysis, we detected the presence of Hepatozoon species circulating among cats in this region. The aforementioned strain is closely related to other isolates of H. felis detected in wild felids. Moreover, a phylogenetic analysis indicates that this genotype is grouped into a clade of 18S rRNA sequences previously described for the genus Hepatozoon in wild felids around the world. Hepatozoon felis strains detected in cats from Spain and Israel showed, respectively, 98% and 97% identity to our sequence and are clustered on a separate branch of the phylogenetic tree. This finding suggests a high diversity of Hepatozoon genotypes occurring in cats in Europe and South America. None of the analyzed cats were positive for Babesia spp. or Cytauxzoon spp. by PCR analysis.

Cat serum contamination by phthalates, PCBs, and PBDEs versus food and indoor air.

Braouezec C, Enriquez B, Blanchard M, Chevreuil M, Teil MJ
A wide variety of endocrine disrupting compounds (EDCs) with semi-volatile properties are emitted to indoor air and, thus, humans might get exposed to these compounds. Pet cats spend the major part of their lifetime at home and might integrate indoor contamination so that they could mirror the human exposure. Three classes of EDCs, polybromodiphenyl ethers (PBDEs), polychlorinated biphenyls (PCBs), and phthalates (PAEs), were simultaneously considered and quantified in the serum of cats (Felis silvestris catus) living in the Paris area (France). The main compound concentrations by decreasing importance order were as follows: for PAEs, di-n-butyl phthalate (79,900 ng L(-1)) next di-iso-butyl phthalate (53,200 ng L(-1)), di-iso-nonyl phthalate (43,800 ng L(-1)), and di-ethylhexyl phthalate (32,830 ng L(-1)); for PCBs, CB153 (1378 ng L(-1)) next CB52 (509 ng L(-1)), and CB110 (355 ng L(-1)); and for PBDEs, BDE 153/154 (35 ng L(-1)) next BDE47 (10.7 ng L(-1)). Total serum concentrations as mean ± standard deviation were 107 ± 98 μg L(-1) for ∑9PAEs, 2799 ± 944 ng L(-1) for ∑19PCBs, and 56 ± 21 ng L(-1) for ∑9BDEs. The three chemical groups were found in cat food: 0.088 ng g(-1) for ∑9BDEs, 1.7 ng g(-1) for ∑19PCBs, and 2292 ng g(-1) for ∑9PAEs and in indoor air: 0.063 ng m(-3) for ∑9BDEs, 1.5 ng m(-3) for ∑19PCBs, and 848 ng m(-3) for ∑9PAEs. Contaminant intake by food ingestion was approximately 100-fold higher than that by indoor air inhalation.

SNP Miniplexes for Individual Identification of Random-Bred Domestic Cats.

Brooks A, Creighton EK, Gandolfi B, Khan R, Grahn RA, Lyons LA
Phenotypic and genotypic characteristics of the cat can be obtained from single nucleotide polymorphisms (SNPs) analyses of fur. This study developed miniplexes using SNPs with high discriminating power for random-bred domestic cats, focusing on individual and phenotypic
identification. Seventy-eight SNPs were investigated using a multiplex PCR followed by a fluorescently labeled single base extension (SBE) technique (SNAPshot®). The SNP miniplexes were evaluated for reliability, reproducibility, sensitivity, species specificity, detection limitations, and assignment accuracy. Six SNPplexes were developed containing 39 intergenic SNPs and 26 phenotypic SNPs, including a sex identification marker, ZFXY. The combined random match probability (cRMP) was 6.58 × 10^(-19) across all Western cat populations and the likelihood ratio was 1.52 × 10^(18). These SNPplexes can distinguish individual cats and their phenotypic traits, which could provide insight into crime reconstructions. A SNP database of 237 cats from 13 worldwide populations is now available for forensic applications.

Laparoscopy for the treatment of ovarian remnant syndrome in four dogs and two cats.
Brückner M
OBJECTIVE: To describe the clinical workup and laparoscopic treatment of ovarian remnant syndrome in dogs and cats. MATERIAL AND METHODS: After confirming the diagnosis with some or all of the following tests — vaginoscopy with cytology, hormonal tests, and ultrasound — laparoscopic removal of the ovarian remnants was performed. A three-portal technique was used in the four dogs and a two-portal technique in the two cats. RESULTS: All patients recovered well and were discharged the same day. No post-operative complications occurred in any patient. CONCLUSION AND CLINICAL RELEVANCE: Overall, in the hands of an experienced laparoscopic surgeon, laparoscopic removal of ovarian remnants appears to be a safe procedure in dogs and cats. In addition, laparoscopy offers the advantages of excellent visualization and a reduced morbidity for the patient. Careful case selection and complete pre-operative workup to rule out co-morbidities or underlying neoplasia are important. As with any laparoscopy the surgeon should always be prepared to convert to an open laparotomy if necessary.

Ticks associated with domestic dogs and cats in Florida, USA.
Burroughs JE, Thomasson JA, Marsella R, Greiner EC, Allan SA
*Exp Appl Acarol* (2016) 69:87-95
Voluntary collections of ticks from domestic dogs and cats by veterinary practitioners across Florida, USA, were conducted over a 10 month period. Of the 1337 ticks submitted, five species of ixodid ticks were identified and included Rhipicephalus sanguineus, Amblyomma americanum, A. maculatum, Dermacentor variabilis, and Ixodes scapularis. Most ticks were collected from dogs (98.4 %) with the most predominant species being R. sanguineus (94.3 %). Of the ticks collected from cats (1.6 %), A. americanum were the most common (74 %). Only R. sanguineus were collected throughout the state, with the other species collected only in central and north Florida. The tick species collected from dogs and cats represent a risk to these domestic species as well as associated humans for a range of tick-borne diseases in Florida.

Seroprevalence of Leishmania infection and molecular detection of Leishmania tropica and Leishmania infantum in stray cats of İzmir, Turkey.
Can H, Döşkay M, Özdemir HG et al.
Leishmaniasis caused by more than 20 species of genus Leishmania is transmitted by the bite of infected phlebotomine sand flies. The studies on Leishmania infection in cats is very few in Turkey and therefore we aimed to screen stray cats living in city of İzmir located in western Turkey using nested PCR targeting kinetoplast DNA and serological techniques (ELISA and IFA). Leishmania DNA
positive samples were also studied by ITS1 real time PCR. Whole blood and serum samples were obtained from stray cats (n: 1101) living in different counties of İzmir. In serological assays, a serum sample was considered positive in 1:40 dilution in IFA and for ELISA a serum sample was accepted positive when the absorbance value (AV) exceeded the mean AV + Standard Deviation (SD) of the negative control serum samples. According to the results, the seropositivity rates were 10.8% (119/1101) and 15.2% (167/1101) by in house ELISA and IFA, respectively. Among serology coherent samples, the seropositivity rate was 11.1% (116/1047) as detected by both assays after discordant samples (n: 54) were discarded. Of the 1101 stray cats, six (0.54%) were positive by nested PCR while only one of these six samples was positive by ITS1 real time PCR. During PCR, three controls designated as Leishmania infantum, Leishmania tropica, and Leishmania major were used for species identification. According to nested PCR results, L. tropica was identified in two cats (no.76 and 95). In another cat (no. 269), there were two bands in which one of them was well-matched with L. infantum and the other band had ~850 bp size which does not match with any controls. Remaining three cats (no. 86, 514, and 622) also had the ~850 bp atypical band size. ITS1 real time PCR detected L. tropica in only one cat (no. 622) which showed an atypical band size in nested PCR. These results indicated that three cats with only one atypical band (no. 86, 514, and 622) and the cat with mixed infection (no. 269) were infected with L. tropica. Altogether, L. tropica was detected in all six DNA positive cats and L. infantum was detected in one cat with mixed infection. In conclusion, although the reservoir role of cats in nature is still unclear the high seroprevalence rate against Leishmania parasites and detecting parasite DNA in stray cats in İzmir indicates that the stray cats are frequently bitten by infected sand flies. Further research activities are required to reveal the frequency of leishmaniasis in cats in different regions of Turkey where Leishmania species are endemic.

2016 AAFP Guidelines for the Management of Feline Hyperthyroidism.
Carney HC, Ward CR, Bailey SJ et al.
CLINICAL CONTEXT: Since 1979 and 1980 when the first reports of clinical feline hyperthyroidism (FHT) appeared in the literature, our understanding of the disease has evolved tremendously. Initially, FHT was a disease that only referral clinicians treated. Now it is a disease that primary clinicians routinely manage. Inclusion of the measurement of total thyroxine concentration in senior wellness panels, as well as in diagnostic work-ups for sick cats, now enables diagnosis of the condition long before the cat becomes the classic scrappy, unkempt, agitated patient with a bulge in its neck. However, earlier recognition of the problem has given rise to several related questions: how to recognize the health significance of the early presentations of the disease; how early to treat the disease; whether to treat FHT when comorbid conditions are present; and how to manage comorbid conditions such as chronic kidney disease and cardiac disease with treatment of FHT. The 2016 AAFP Guidelines for the Management of Feline Hyperthyroidism (hereafter referred to as the Guidelines) will shed light on these questions for the general practitioner and suggest when referral may benefit the cat. SCOPE: The Guidelines explain FHT as a primary disease process with compounding factors, and provide a concise explanation of what we know to be true about the etiology and pathogenesis of the disease. The Guidelines also: Distill the current research literature into simple recommendations for testing sequences that will avoid misdiagnosis and separate an FHT diagnosis into six clinical categories with associated management strategies. Emphasize the importance of treating all hyperthyroid cats, regardless of comorbidities, and outline the currently available treatments for the disease. Explain how to monitor the treated cat to help avoid exacerbating comorbid diseases. Dispel some of the myths surrounding certain aspects of FHT and replace them with an evidence-based narrative that veterinarians and their practice teams can apply to feline patients and communicate to
their owners. EVIDENCE BASE: To help ensure better case outcomes, the Guidelines reflect currently available, evidenced-based knowledge. If research is lacking, or if a consensus does not exist, the expert panel of authors has made recommendations based on their extensive, cumulative clinical experience.

**Evaluation and optimisation of propofol pharmacokinetic parameters in cats for target-controlled infusion.**

Cattai A, Pilla T, Cagnardi P, Zonca A, Franci P  
*Vet Rec* (2016) **178**:503

The aim of this study was to develop and evaluate a pharmacokinetic model-driven infusion of propofol in premedicated cats. In a first step, propofol (10 mg/kg) was administered intravenously over 60 seconds to induce anaesthesia for the elective neutering of seven healthy cats, premedicated intramuscularly with 0.3 mg/kg methadone, 0.01 mg/kg medetomidine and 2 mg/kg ketamine. Venous blood samples were collected over 240 minutes, and propofol concentrations were measured via a validated high-performance liquid chromatography assay. Selected pharmacokinetic parameters, determined by a three-compartment open linear model, were entered into a computer-controlled infusion pump (target-controlled infusion-1 (TCI-1)). In a second step, TCI-1 was used to induce and maintain general anaesthesia in nine cats undergoing neutering. Predicted and measured plasma concentrations of propofol were compared at specific time points. In a third step, the pharmacokinetic parameters were modified according to the results from the use of TCI-1 and were evaluated again in six cats. For this TCI-2 group, the median values of median performance error and median absolute performance error were -1.85 per cent and 29.67 per cent, respectively, indicating that it performed adequately. Neither hypotension nor respiratory depression was observed during TCI-1 and TCI-2. Mean anaesthesia time and time to extubation in the TCI-2 group were 73.90 (±20.29) and 8.04 (±5.46) minutes, respectively.

**Distribution of blood types in a sample of 245 New Zealand non-purebred cats.**

Cattin RP  
*N Z Vet J* (2016) **64**:154-157

AIMS: To determine the distribution of feline blood types in a sample of non-pedigree, domestic cats in New Zealand, whether a difference exists in this distribution between domestic short haired and domestic long haired cats, and between the North and South Islands of New Zealand; and to calculate the risk of a random blood transfusion causing a severe transfusion reaction, and the risk of a random mating producing kittens susceptible to neonatal isoerythrolysis. METHODS: The results of 245 blood typing tests in non-pedigree cats performed at the New Zealand Veterinary Pathology (NZVP) and Gribbles Veterinary Pathology laboratories between the beginning of 2009 and the end of 2014 were retrospectively collated and analysed. Cats that were identified as domestic short or long haired were included. For the cats tested at Gribbles Veterinary Pathology 62 were from the North Island, and 27 from the South Island. RESULTS: The blood type distribution differed between samples from the two laboratories (p=0.029), but not between domestic short and long haired cats (p=0.50), or between the North and South Islands (p=0.76). Of the 89 cats tested at Gribbles Veterinary Pathology, 70 (79%) were type A, 18 (20%) type B, and 1 (1%) type AB; for NZVP 139/156 (89.1%) cats were type A, 16 (10.3%) type B, and 1 (0.6%) type AB. It was estimated that 18.3-31.9% of random blood transfusions would be at risk of a transfusion reaction, and neonatal isoerythrolysis would be a risk in 9.2-16.1% of random matings between non-pedigree cats. CONCLUSIONS: The results from this study suggest that there is a high risk of complications for a random blood transfusion between non-purebred cats in New Zealand. Neonatal isoerythrolysis should be considered an important differential diagnosis in illness or
Policies for the vaccination of cats and dogs in New Zealand veterinary practices.

Cave NJ, Jackson R, Bridges JP


AIMS: To determine current practices and attitudes towards vaccination of dogs and cats of veterinarians in New Zealand; the methods used for informing clients on which vaccines to use, and the preferred site for vaccination of cats. METHODS: A postal questionnaire was sent to all 483 listed veterinary practices in New Zealand during February 2012. Some questions were specific to pet dogs, cats, or working farm dogs. Responses were categorised according to practice type and geographical region of the respondent. Factors associated with respondent recommendation of annual vaccination with modified live viral (MLV) vaccines were examined using logistic regression analysis. Vaccines that were considered to be essential for every animal were defined as core; those that may be recommended for animals whose location or lifestyle placed them at risk, were defined as non-core. RESULTS: There were 204 useable returns, equivalent to a response rate of 42.2%, distributed across the country. Annual vaccination with MLV vaccines of dogs was recommended by 54/198 (27.3%) respondents, and of cats by 107/181 (59.1%) respondents. Factors associated with the recommendation of annual administration of MLV vaccines to dogs included being a companion animal practice, a desire for policies on vaccination to be left to individual clinics, and having one veterinarian in the practice. Administration of the final vaccination for puppies was recommended at ≥14 weeks old by 55/185 (29.7%) respondents, and for kittens at ≥13 weeks old by 42/183 (23%) respondents. Of respondents that administered MLV vaccines annually, 62/103 (60.2%) believed reducing the frequency of vaccination would reduce income, and 52/103 (50.5%) considered it would have a negative effect on animal health. Advice to enable clients to decide which non-core vaccines were administered was given by 181/199 (91%) respondents. Factors considered when recommending a vaccine included consideration of risk to individual patients (190/203; 93.6%), requirements of boarding kennels/catteries (165/203; 81.3%) and clinic vaccination policy (142/203; 70%). The preferred site for administering MLV vaccines to cats was the dorsal neck or inter-scapular region (137/198; 69.2%). Amongst respondents, 18 wanted disease surveillance information to allow for truly informed decisions to be made about vaccination. CONCLUSIONS AND CLINICAL RELEVANCE: Veterinarians can now compare their own vaccination practices and attitudes with those of veterinarians nationally, and internationally. There is a need for national surveillance information and for continued education of the public and commercial kennel and cattery owners for optimal vaccination strategies to be developed.

Food puzzles for cats: feeding for physical and emotional wellbeing.

Dantas LM, Delgado MM, Johnson I, Buffington CT

*J Feline Med Surg* (2016)

This article aims to equip veterinary professionals with the tools to assist clients in the use of food puzzles for their cats as ways to support feline enrichment, physical health and emotional wellbeing. We outline the types of food puzzles, how to introduce them to cats and how to troubleshoot challenges with their use. Owing to the paucity of evidence-based studies of food puzzles, we provide examples of the use and benefits of food puzzles from our own veterinary and behavioral practices.

Follow-up on long-term antiretroviral therapy for cats infected with feline immunodeficiency virus.

de Oliveira Medeiros S, Abreu CM, Delvecchio R et al.
OBJECTIVES: Feline immunodeficiency virus (FIV) is a lentivirus that induces AIDS-like disease in cats. Some of the antiretroviral drugs available to treat patients with HIV type 1 are used to treat FIV-infected cats; however, antiretroviral therapy (ART) is not used in cats as a long-term treatment. In this study, the effects of long-term ART were evaluated in domestic cats treated initially with the nucleoside transcriptase reverse inhibitor (NTRI) zidovudine (AZT) over a period ranging from 5-6 years, followed by a regimen of the NTRI lamivudine (3TC) plus AZT over 3 years. METHODS: Viral load, sequencing of pol (reverse transcriptase [RT]) region and CD4:CD8 lymphocyte ratio were evaluated during and after treatment. Untreated cats were evaluated as a control group. RESULTS: CD4:CD8 ratios were lower, and uncharacterized resistance mutations were found in the RT region in the group of treated cats. A slight increase in viral load was observed in some cats after discontinuing treatment. CONCLUSIONS AND RELEVANCE: The data strongly suggest that treated cats were resistant to therapy, and uncharacterized resistance mutations in the RT gene of FIV were selected for by AZT. Few studies have been conducted to evaluate the effect of long-term antiretroviral therapy in cats. To date, resistance mutations have not been described in vivo.

Development of a laboratory model to assess fear and anxiety in cats.

A. C. de Rivera, J. Ley, B. Milgram, G. Landsberg

OBJECTIVES: The objectives of this study were: (1) to develop a laboratory-based model to assess fear and anxiety in cats using the feline open-field test (OFT) and the feline human interaction test (HIT); and (2) to validate the model using diazepam, a known anxiolytic. METHODS: Laboratory-housed cats (n = 41) were first classified as fearful, mildly fearful or non-fearful by a technician familiar with the cats and also by veterinary behaviorists (GL, JL), by assessing the cats’ behavior in their home rooms. In experiment 1, each cat’s behavior was assessed in an OFT and an HIT. In experiment 2, after administration of the anxiolytic diazepam, a subset of the cats was re-tested.

RESULTS: In experiment 1, the OFT revealed significant group effects on two measures: duration of inactivity, and vocalization. Fearful animals had significantly longer periods of inactivity than non-fearful animals. Non-fearful and mildly fearful cats vocalized more frequently than fearful cats. In the HIT, fearful cats travelled less than non-fearful and mildly fearful cats. Fearful and mildly fearful animals had significantly longer durations of inactivity, and non-fearful and mildly fearful cats had a significantly higher frequency of vocalization compared with fearful cats. In experiment 2, in the OFT, treatment with diazepam caused an increase in distance travelled, shorter durations of inactivity, and more frequent inactivity and vocalization. In the HIT, diazepam increased distance travelled and decreased duration of inactivity. Fearful cats spent significantly less time near the human compared with non-fearful cats, and this persisted under diazepam. CONCLUSIONS AND RELEVANCE: The feline OFT and feline HIT can be used jointly to assess the effects of medications or other therapies on fear and anxiety in the domestic cat.

Interspecies spread of Staphylococcus aureus clones among companion animals and human close contacts in a veterinary teaching hospital. A cross-sectional study in Greece.

E. Drougka, A. Foka, C. Koutinas et al.

OBJECTIVES: The interspecies transmission of Staphylococcus aureus and methicillin-resistant S. aureus (MRSA) was investigated among companion animals and human close contacts in a veterinary teaching hospital in Greece. Strains’ molecular characteristics were evaluated in order to assess S. aureus transmission. Specimens (224) from colonized and infected sites of 102 animals (92 dogs, 10 cats) and 18 VP were collected during 2012 and 2013. Antibiotic
susceptibility was performed by the disk diffusion method and Etest. mecA, mecC, tst (toxic shock syndrome toxin) and lukF/lukS-PV (Panton-Valentine leukocidin, PVL) genes were investigated by PCR. Genotypes were identified by Multi Locus Sequence Typing (MLST), Staphylococcal Cassette Chromosome mec (SCCmec), accessory gene regulator group (agr), spa and Pulsed Field Gel Electrophoresis (PFGE). S. aureus prevalence among pets and VP was 36.3% (37/102) and 38.9% (7/18), respectively. Younger companion animals, those living in rural areas, having a disease upon admission or Coagulase-negative staphylococci co-carriage showed significantly higher prevalence of S. aureus isolation (p<0.05). Twenty-six pets and five VP carried PVL-positive S. aureus. In total, 60 S. aureus strains were recovered (53 from pets, seven from VP) of which 16 were MRSA (26.7%), 12 mecA- and four mecC-positive. MRSA showed higher resistance rates against other antimicrobials as compared to methicillin-susceptible ones. Strains were classified by MLST in 13 STs, with the predominance of ST80 and ST15. In MRSA, SCCmec types II, IV and XI were identified. The most frequent spa types were t5559 and t7558. Fifty-six strains were classified into 15 PFGE types. Comparison of genetic markers shows that identical or very similar strains disseminate among animals and VP. Companion animals harbor PVL-positive clones constituting a possible source for transmission to humans.

Evaluation and comparison of a flumethrin-imidacloprid collar and repeated monthly treatments of fipronil(s)-methoprene to control flea, Ctenocephalides f. felis, infestations on cats for eight months.

Dryden MW, Smith V, Davis WL, Settje T, Hostetler J
 Parasit Vectors (2016) 9:287

BACKGROUND: This controlled laboratory study was designed to evaluate the efficacy of the 10 % imidacloprid/4.5 % flumethrin collar (Seresto®, Bayer Animal Health) against fleas (Ctenocephalides f. felis) on cats, when compared to fipronil (9.8 %w/w)(s)-methoprene (11.8 % w/w) topical spot-on formulation (Frontline® Plus for Cats and Kittens, Merial). METHODS: Thirty cats were randomized into three groups of ten animals based on pre-treatment flea counts: Group 1: imidacloprid/flumethrin collar; Group 2: fipronil/(s)-methoprene topical spot-on and Group 3: non-treated controls. The imidacloprid/flumethrin collars were applied one time on Day 0, while the fipronil/(s)-methoprene spot-on was administered every 30 days from Day 0 through Day 210. Cats were infested with 100 fleas on study days 0, 7, 14, 29, 59, 89, 119, 149, 179, 209 and 239. All flea counts were conducted by combing to remove fleas on post-treatment days 2, 8, 15, 30, 60, 90, 120, 150, 180, 210 and 240. RESULTS: The efficacy of the imidacloprid/flumethrin collar ranged from 98.2 to 100 % for eight months. The efficacy of fipronil/(s)-methoprene spot-on ranged from 68.2 to 99.9 %. Efficacy was < 85 % for fipronil/(s)-methoprene on Days 90, 150 and 210. The flea counts in both treatment groups were significantly fewer than those in the non-treated control group at every post-treatment study day (P < 0.0001). In addition, there were significantly fewer fleas in the imidacloprid/flumethrin collar group when compared to the fipronil/(s)-methoprene group on Days 90, 150 and 210 (P < 0.0001). CONCLUSIONS: This study demonstrated that the imidacloprid/flumethrin collar (Seresto®, Bayer Animal Health) maintained excellent (> 98.2 %) efficacy against fleas on cats for the entire 8 month study. Monthly applications of fipronil/(s)-methoprene (Frontline® Plus for Cats and Kittens, Merial) generally had high, but variable (68.2 to 99.9 %) efficacy over the course of the eight month study. Based on the very high residual efficacy achieved by the imidacloprid/flumethrin collar in this study, veterinarians should expect that this collar will control and eliminate existing flea infestations on cats and in their in-home premises as long as every flea infested host is treated.

Xenotransfusion of anemic cats with blood compatibility issues: pre- and posttransfusion
laboratory diagnostic and crossmatching studies.
Euler CC, Raj K, Mizukami K et al.
*Vet Clin Pathol* (2016) 45:244-253

BACKGROUND: Finding compatible feline blood donors can be challenging. Canine blood has been occasionally used when compatible feline blood was not available in emergency situations.

OBJECTIVES: The study goals were to describe the effects of xenotransfusion in 2 anemic cats receiving canine blood because of discordant blood types and acute transfusion reaction, respectively, and to report in vitro heterotyping and crossmatching results between canine and feline blood samples.

MATERIAL AND METHODS: Blood samples from patients and other cats and dogs were typed, crossmatched, and assessed for alloantibodies using gel, card, and immunochromatographic strip techniques. RESULTS: Cat 1 was found to have type AB blood. Cat 2, which experienced an acute transfusion reaction, had type A blood. Neither had detectable alloantibodies against feline RBC. Both cats transiently improved after transfusion with canine blood; however, acute intravascular hemolysis occurred and the PCV rapidly declined. Blood typing post xenotransfusion with DEA 1 strips revealed a positive control band that was absent in feline blood, thus allowing for the identification of transfused canine RBC. Longitudinal assessment revealed that canine RBC could no longer be detected 4 days after xenotransfusion. Major crossmatching (feline plasma with canine RBC) resulted in both positive and negative reactions, depending on the cat. Minor crossmatching results showed mostly incompatibility. CONCLUSION: While both cats survived xenotransfusion, the positive control band on the DEA 1 strip revealed that transfused canine RBC were short-lived and intravascular hemolysis occurred. Crossmatch results between cats and dogs showed varied incompatibilities and may not predict transfusion reactions.

**Renal leiomyosarcoma in a cat.**
Evans D, Fowlkes N

Renal leiomyosarcoma was diagnosed in a 10-year-old Domestic Shorthair cat with a 3-year history of clinically managed, chronic renal disease. Sudden death was preceded by a brief episode of mental dullness and confusion. At postmortem examination, the gross appearance of the left kidney was suggestive of hydronephrosis, and a nephrolith was present in the contralateral kidney. However, histology revealed an infiltrative, poorly differentiated, spindle cell sarcoma bordering the grossly cavitated area. Neoplastic cells were immunoreactive for vimentin and smooth muscle actin, which led to a diagnosis of renal leiomyosarcoma; neoplastic cells were not immunoreactive for desmin. Leiomyosarcoma arising in the kidney is a rare occurrence in humans and an even rarer occurrence in veterinary medicine with no prior cases being reported in cats in the English literature. The macroscopic appearance of the tumor at postmortem examination was misleadingly suggestive of hydronephrosis as a result of the large cavitation and may be similar to particularly unusual cases of renal leiomyosarcomas in humans that have a cystic or cavitated appearance.

**Hypercalcaemia in cats: The complexities of calcium regulation and associated clinical challenges.**
Finch NC

PRACTICAL RELEVANCE: Calcium is essential for many normal physiological processes within the body. Aberrations in calcium homeostasis leading to hypercalcaemia can result in clinical signs such as polyuria and polydipsia, lethargy and weakness due to depressed excitability of muscle and nervous tissue, and gastrointestinal (GI) signs due to effects on GI smooth muscle. Hypercalcaemia in cats is
mostly idiopathic, with chronic kidney disease and neoplasia also being common causes. CLINICAL
CHALLENGES: Hypercalcaemia can be a diagnostic challenge and a good understanding of the
regulation of calcium homeostasis can aid in interpreting results of diagnostic tests. Furthermore, the
management approach may depend on the underlying cause of hypercalcaemia, and also its severity
and chronicity. AUDIENCE: This review offers a comprehensive discussion of the regulation of
calcium homeostasis, with a focus on the normal response to hypercalcaemia. It also discusses the
diagnostic approach to, and management of, hypercalcaemia in cats, as well as specific aetiologies.
This is relevant to all clinicians working with feline patients. EVIDENCE BASE: The review draws
evidence from peer-reviewed publications and also the author’s own clinical experience.

**Apoptosis and Ki-67 as predictive factors for response to radiation therapy in feline nasal
lymphomas.**
Fu DR, Kato D, Endo Y, Kadosawa T
Nasal lymphoma is the most common nasal tumor in cats and is generally a solitary and radiosensitive
tumor. We retrospectively evaluated the response to radiation and survival time in relation to apoptosis
and Ki-67 indices in feline nasal lymphomas treated with radiation therapy. The apoptotic and Ki-67
indices were evaluated with TUNEL and immunohistochemical staining in 30 biopsy tissues that were
taken before any treatment. These two indices were compared, and differences between different
treatment response groups were analyzed. The correlation between the median survival times (MST)
and the indices was estimated using the Kaplan Meier method, and statistical differences between
survival curves were analyzed using a log-rank method. With regard to apoptotic index, a statistical
difference was observed between the samples taken from cats with complete response and stable
disease (1.22% vs. 0.45%; *P*=0.045). The Ki-67 index in cats with both complete response and partial
response was significantly higher than in cats with stable disease (44.4% and 39.6% vs. 16.3%;
*P*<0.001 and *P*=0.008, respectively). The cats with a high level of apoptosis (>0.9%) nasal lymphoma
were not significantly prolonged MSTs (*P*=0.202), however, high Ki-67-positive (>40%) cats
experienced a statistically significant relationship with longer survival time (*P*=0.015). Our results
indicate that spontaneous apoptotic and Ki-67 indices are strong predictors for response to radiation
therapy in feline nasal lymphomas.

**Evaluation of associations among Coxiella burnetii and reproductive abnormalities in cats.**
Fujishiro MA, Scorza AV, Gookin JL, Lappin MR
OBJECTIVES: *Coxiella burnetii* is an obligate intracellular bacterium that is found worldwide, is
associated or suggested to be associated with reproductive abnormalities in a number of species
including cats, and is the cause of Q fever in humans. In a previous study, *C. burnetii* DNA was
amplified from the uterine tissues of 8.5% of client-owned cats in the USA but reproductive history
was unknown and histopathological examination was not performed. In this study, uterine tissues of 26
normal cats and 11 cats with histopathological evidence of uterine disease or other reproductive
abnormalities were evaluated for the presence of *C. burnetii*. METHODS: A PCR assay that amplifies
the repetitive transposon-like region (Trans 1 and 2) and a PCR assay that amplifies the IS-1111-
insertion sequence (IS-1111) were optimised and applied to the DNA extracts. The sensitivity threshold
of both PCR assays was 12 pg/µl. Positive samples were evaluated for the presence of the organism
using immunohistochemistry performed on paraffin-embedded tissue. RESULTS: Amplicons of the
expected size developed in three samples (one from a cat with reproductive abnormalities) in the IS-
1111 assay; however, there was not enough DNA for sequence analysis. Immunohistochemical analysis
was used to further evaluate these three samples and was negative for C. burnetii. While C. burnetii could not be confirmed by sequence analysis or immunohistochemistry, the PCR positive prevalence rate (8.1%) was similar to that published previously. CONCLUSIONS AND RELEVANCE: Biosafety precautions should be taken when working with cats that are aborting or parturient. Further research should be performed to evaluate the role that C. burnetii may play in reproductive abnormalities in cats.

A dominant TRPV4 variant underlies osteochondrodysplasia in Scottish fold cats.
Gandolfi B, Alamri S, Darby WG et al.
Osteoarthritis Cartilage (2016) 24:1441-1450
OBJECTIVE: Scottish fold cats, named for their unique ear shape, have a dominantly inherited osteochondrodysplasia involving malformation in the distal forelimbs, distal hindlimbs and tail, and progressive joint destruction. This study aimed to identify the gene and the underlying variant responsible for the osteochondrodysplasia. DESIGN: DNA samples from 44 Scottish fold and 54 control cats were genotyped using a feline DNA array and a case-control genome-wide association analysis conducted. The gene encoding a calcium permeable ion channel, transient receptor potential cation channel, subfamily V, member 4 (TRPV4) was identified as a candidate within the associated region and sequenced. Stably transfected HEK293 cells were used to compare wild-type and mutant TRPV4 expression, cell surface localisation and responses to activation with a synthetic agonist GSK1016709A, hypo-osmolarity, and protease-activated receptor 2 stimulation. RESULTS: The dominantly inherited folded ear and osteochondrodysplasia in Scottish fold cats is associated with a p.V342F substitution (c.1024G>T) in TRPV4. The change was not found in 648 unaffected cats. Functional analysis in HEK293 cells showed V342F mutant TRPV4 was poorly expressed at the cell surface compared to wild-type TRPV4 and as a consequence the maximum response to a synthetic agonist was reduced. Mutant TRPV4 channels had a higher basal activity and an increased response to hypotonic conditions. CONCLUSIONS: Access to a naturally-occurring TRPV4 mutation in the Scottish fold cat will allow further functional studies to identify how and why the mutations affect cartilage and bone development.

A Novel Variant in CMAH Is Associated with Blood Type AB in Ragdoll Cats.
Gandolfi B, Grahn RA, Gustafson NA et al.
The enzyme cytidine monophospho-N-acetylneuraminic acid hydroxylase is associated with the production of sialic acids on cat red blood cells. The cat has one major blood group with three serotypes; the most common blood type A being dominant to type B. A third rare blood type is known as AB and has an unclear mode of inheritance. Cat blood type antigens are defined, with N-glycolyneuraminic acid being associated with type A and N-acetylneuraminic acid with type B. Blood type AB is serologically characterized by agglutination using typing reagents directed against both A and B epitopes. While a genetic characterization of blood type B has been achieved, the rare type AB serotype remains genetically uncharacterized. A genome-wide association study in Ragdoll cats (22 cases and 15 controls) detected a significant association between blood type AB and SNPs on cat chromosome B2, with the most highly associated SNP being at position 4,487,432 near the candidate gene cytidine monophospho-N-acetylneuraminic acid hydroxylase. A novel variant, c.364C>T, was identified that is highly associated with blood type AB in Ragdoll cats and, to a lesser degree, with type AB in random bred cats. The newly identified variant is probably linked with blood type AB in Ragdoll cats, and is associated with the expression of both antigens (N-glycolyneuraminic acid and N-acetylneuraminic acid) on the red blood cell membrane. Other variants, not identified by this work, are likely to be associated with blood type AB in other breeds of cat.
Domestic cats (Felis catus) are definitive hosts for Sarcocystis sinensis from water buffaloes (Bubalus bubalis).
Gjerde B, Hilali M

The definitive hosts of Sarcocystis sinensis in water buffaloes have hitherto been unknown, but the close similarity of this species to the cat-transmitted Sarcocystis bovifelis in cattle suggested they were felids. In a previous study, two domestic cats were fed macroscopic sarcocysts of Sarcocystis fusiformis contained within or dissected from the esophageal muscles of water buffaloes, while no microscopic sarcocysts of S. sinensis were noticed. Both cats started shedding small numbers of sporocysts 8–10 days post infection (dpi) and were euthanized 15 dpi. Using a PCR-based molecular assay targeting the mitochondrial cox1 gene of S. fusiformis, both cats were shown to act as definitive hosts for this species. In the present study, DNA samples derived from oocysts/sporocysts in the intestinal mucosa of both cats were further examined by PCR for the presence of S. sinensis using 2 newly designed primers selectively targeting the cox1 gene of this species. All 6 DNA samples examined from each cat tested positive for S. sinensis. A 1,038-bp-long portion of cox1 was amplified and sequenced as 2 overlapping fragments from 5 of these DNA samples. The 5 sequences shared 99.3–100% identity with 7 previous cox1 sequences of S. sinensis obtained from sarcocysts in water buffaloes. Additionally, amplification of the ITS1 region with primers targeting various Sarcocystis spp., yielded amplicons of 2 different lengths, corresponding to those obtained from sarcocyst isolates of S. sinensis and S. fusiformis, respectively. This is the first study to show that cats act as definitive hosts for S. sinensis.

**Chlamydia felis: Lack of association between clinical signs and the presence of the cryptic plasmid.**
Gonsales FF, Brandão PE, Melville PA, Zuniga E, Benites NR
*Microb Pathog* (2016) 97:14-18

*Chlamydia felis* is an obligate intracellular bacterial pathogen that infects cats, causing severe conjunctivitis associated with upper respiratory tract disease (URTD). In the present study, 186 cats from three non-commercial catteries in São Paulo, SP, Brazil were evaluated. The detection of *Chlamydia felis* was performed by PCR. The clinical severity was scored from 1 to 4, with a score of 4 as the most severe manifestation. The total occurrence of *C. felis* was of 18.82% (35/186) of cats overall, but notably, 58.06% (18/31) of infected cats originated from a single cattery. All animals harboring *C. felis* had URTD clinical signs and higher scores (3 and 4). In addition, *C. felis* occurrence was associated with the presence of cryptic plasmid. However, the virulence and clinical severity were not correlated.

**A Prospective, Placebo-Controlled Pilot Evaluation of the Effect of Omeprazole on Serum Calcium, Magnesium, Cobalamin, Gastrin Concentrations, and Bone in Cats.**
Gould E, Clements C, Reed A et al.

BACKGROUND: Chronic proton pump inhibitor administration has been associated with electrolyte and cobalamin deficiency, disrupted bone homeostasis, hypergastrinemia, and rebound acid hypersecretion in humans. It is unknown if this occurs in cats. OBJECTIVES: Prolonged oral omeprazole results in altered bone mineral density or content, serum calcium, magnesium, cobalamin, and gastrin concentrations in healthy cats. ANIMALS: Six healthy adult DSH cats. METHODS: In a within subjects, before and after design, cats received placebo followed by omeprazole (0.83–1.6 mg/kg
PO q12h) for 60 days each. Analysis of serum calcium, magnesium, cobalamin, and gastrin concentrations was performed on days 0, 30, and 60. Bone density and content were evaluated on days 0 and 60 of each intervention. Continuous data were analyzed using a two-way ANOVA (α = 0.006). On day 60 of omeprazole administration, continuous intragastric pH monitoring was performed in 2 cats to evaluate the effects of abrupt withdrawal of omeprazole. RESULTS: No significant changes were detected between treatments for any variables, except serum gastrin, which was significantly higher during omeprazole treatment in comparison to placebo (P = 0.002). Evidence of gastric hyperacidity was seen in both cats in which intragastric pH monitoring was performed following cessation of omeprazole. CONCLUSIONS AND CLINICAL IMPORTANCE: Although further studies with larger populations of cats will be needed to draw any definitive conclusions, these preliminary results suggest that prolonged PPI treatment results in hypergastrinemia and abrupt PPI withdrawal might result in RAH in cats.

Feline corneal sequestra: outcome of corneoconjunctival transposition in 97 cats (109 eyes).
Graham KL, White JD, Billson FM
CASE SERIES SUMMARY: A retrospective study was undertaken to review outcomes of keratectomy and corneoconjunctival transposition in cats with superficial and deep corneal sequestra. Information including pertinent history, signalment, ophthalmological findings and postoperative outcome was collected from medical records. Follow-up was obtained by clinical examination, contact with the referring veterinarians and review of medical records or telephone contact with owners. Ninety-seven cats (109 eyes) were included from 2005-2015. The most commonly affected breeds included Persian, Burmese and Himalayan. The mean age at the time of surgery was 6.8 years (median 6.5 years; range 8.0 months-18.0 years). A corneal sequestrum in the contralateral eye was diagnosed in 28 cats (28.9%). Recurrent corneal sequestration was diagnosed in eight cats (nine eyes), with recurrence occurring a mean of 703 days after surgery (range 29-1750 days). Age, sex, breed, depth of sequestration and concurrent ocular disease in the contralateral eye were compared between cats with and without recurrence, with no risk factors for recurrence identified. RELEVANCE AND NOVEL INFORMATION: Excellent surgical outcomes have previously been described in a series of 17 cats with superficial and mid-stromal corneal sequestra. This paper adds further information to the literature by describing a larger series of cats, with corneal sequestra affecting the full range of corneal thickness, and good long-term postoperative outcomes.

Understanding public perceptions of risk regarding outdoor pet cats to inform conservation action.
Gramza A, Teel T, VandeWoude S, Crooks K
Conserv Biol (2016) 30:276-286
Free-ranging domestic cats (Felis catus) incur and impose risks on ecosystems and represent a complex issue of critical importance to biodiversity conservation and cat and human health globally. Prior social science research on this topic is limited and has emphasized feral cats even though owned cats often comprise a large proportion of the outdoor cat population, particularly in urban areas. To address this gap, we examined public risk perceptions and attitudes toward outdoor pet cats across varying levels of urbanization, including along the wildland-urban interface, in Colorado (U.S.A.), through a mail survey of 1397 residents. Residents did not view all types of risks uniformly. They viewed risks of cat predation on wildlife and carnivore predation on cats as more likely than disease-related risks. Additionally, risk perceptions were related to attitudes, prior experiences with cats and cat-wildlife interactions, and cat-owner behavior. Our findings suggest that changes in risk perceptions may result
in behavior change. Therefore, knowledge of cat-related risk perceptions and attitudes could be used to develop communication programs aimed at promoting risk-aversive behaviors among cat owners and cat-management strategies that are acceptable to the public and that directly advance the conservation of native species.

**A survey of ticks (Acari: Ixodidae) of companion animals in Australia.**
Greay TL, Oskam CL, Gofton AW, Rees RL, Ryan UM, Irwin PJ
*Parasit Vectors* (2016) 9:207

BACKGROUND: Ticks are among the most important vectors of pathogens affecting companion animals, and also cause health problems such as tick paralysis, anaemia, dermatitis, and secondary infections. Twenty ixodid species have previously been recorded on dogs, cats, and horses in Australia, including Rhipicephalus sanguineus, Ixodes holocyclus and Haemaphysalis longicornis, which transmit tick-borne diseases. A survey of hard ticks (Acari: Ixodidae) was conducted during 2012-2015 to investigate tick species that infest dogs, cats, and horses in Australia. METHODS: Individual tick specimens were collected from dogs, cats and horses across Australia and sample collection locations were mapped using QGIS software. Ticks were morphologically examined to determine species, instar and sex. The companion animal owners responded to questionnaires and data collected were summarised with SPSS software. RESULTS: A total of 4765 individual ticks were identified in this study from 7/8 states and territories in Australia. Overall, 220 larvae, 805 nymphs, 1404 males, and 2336 females of 11 tick species were identified from 837 companion animal hosts. One novel host record was obtained during this study for Ixodes myrmecobii, which was found on Felis catus (domestic cat) in the town of Esperance, Western Australia. The most common tick species identified included R. sanguineus on dogs (73 %), I. holocyclus on cats (81 %) and H. longicornis on horses (60 %). CONCLUSIONS: This study is the first of its kind to be conducted in Australia and our results contribute to the understanding of the species and distribution of ticks that parasitise dogs, cats, and horses in Australia. Records of R. sanguineus outside of the recorded distribution range emphasise the need for a systematic study of the habitat range of this species. Several incomplete descriptions of ixodid species encountered in this study hindered morphological identification.

**Diagnostic utility of cerebrospinal fluid immunocytochemistry for diagnosis of feline infectious peritonitis manifesting in the central nervous system.**
Gruendl S, Matiasek K, Matiasek L et al.
*J Feline Med Surg* (2016)

OBJECTIVES: The aim of the study was to evaluate whether an ante-mortem diagnosis of central nervous system (CNS) feline infectious peritonitis (FIP) is possible via immunocytochemical staining (ICC) of feline coronavirus antigen (FCoV) within macrophages of cerebrospinal fluid (CSF).

METHODS: Prospectively, CSF samples of 41 cats were investigated, including cats with histopathologically confirmed FIP and neurological signs (n = 10), cats with confirmed FIP without CNS involvement (n = 11), cats with neurological signs but another confirmed CNS disease (n = 17), and cats without neurological signs and a disease other than FIP (n = 3). ICC staining of CSF macrophages was performed in all cats. Sensitivity, specificity, positive (PPV) and negative predictive values (NPV) of CSF ICC were calculated. RESULTS: Of 10 samples from cats with CNS FIP, eight had detectable CSF macrophages, seven of which were positive for FCoV. Ten of 11 samples from cats with confirmed FIP without neurological signs had macrophages in the CSF, with all 10 being ICC-positive. In cats with other CNS disorders, 11/17 had macrophages, two of which stained positively. In cats with diseases other than FIP and without neurological disorders, 2/3 revealed macrophages, with one cat showing positive ICC staining. Diagnosis of FIP via CSF ICC had a sensitivity of 85.0% and a
specificity of 83.3%. PPV and NPV were 85.0% and 83.3%. CONCLUSIONS AND RELEVANCE: 
CSF ICC is a highly sensitive test for ante-mortem diagnosis of FIP manifesting in the 
CNS. However, CNS ICC specificity is too low to confirm FIP and the method should only be applied in conjunction 
with other features such as CSF cytology. CNS ICC could be helpful to discover pre-neurological 
stages of CNS FIP.

Community Attitudes and Practices of Urban Residents Regarding Predation by Pet Cats on 
Wildlife: An International Comparison.
Hall CM, Adams NA, Bradley JS et al.
PloS One (2016) 11:e0151962

International differences in practices and attitudes regarding pet cats’ interactions with 
wildlife were assessed by surveying citizens from at least two cities in Australia, New Zealand, the 
UK, the USA, China and Japan. Predictions tested were: (i) cat owners would agree less than non-cat owners 
that cats might threaten wildlife, (ii) cat owners value wildlife less than non-cat owners, (iii) cat owners are less 
accepting of cat legislation/restrictions than non-owners, and (iv) respondents from regions with high 
endemic biodiversity (Australia, New Zealand, China and the USA state of Hawaii) would be most 
concerned about pet cats threatening wildlife. Everywhere non-owners were more likely than owners to 
agree that pet cats killing wildlife were a problem in cities, towns and rural areas. Agreement amongst 
non-owners was highest in Australia (95%) and New Zealand (78%) and lowest in the UK (38%). 
Irrespective of ownership, over 85% of respondents from all countries except China (65%) valued 
wildlife in cities, towns and rural areas. Non-owners advocated cat legislation more strongly than 
owners except in Japan. Australian non-owners were the most supportive (88%), followed by Chinese 
non-owners (80%) and Japanese owners (79.5%). The UK was least supportive (non-owners 43%, 
owners 25%). Many Australian (62%), New Zealand (51%) and Chinese owners (42%) agreed that pet 
cats killing wildlife in cities, towns and rural areas was a problem, while Hawaiian owners were similar 
to the mainland USA (20%). Thus high endemic biodiversity might contribute to attitudes in some, but 
not all, countries. Husbandry practices varied internationally, with predation highest where fewer cats 
were confined. Although the risk of wildlife population declines caused by pet cats justifies 
precautionary action, campaigns based on wildlife protection are unlikely to succeed outside Australia 
or New Zealand. Restrictions on roaming protect wildlife and benefit cat welfare, so welfare is a better 
rationale.

Positive Impact of Nutritional Interventions on Serum Symmetric Dimethylarginine and 
Creatinine Concentrations in Client-Owned Geriatric Cats.
Hall JA, MacLeay J, Yerramilli M et al.
PloS One (2016) 11:e0153654

A prospective study was conducted in client-owned geriatric cats to evaluate the short-term effects of a 
test food on serum symmetric dimethylarginine (SDMA) and creatinine (Cr) concentrations. Test food 
contained functional lipids (fish oil), antioxidants (vitamins C and E), L-carnitine, botanicals 
(vegetables), highly bioavailable protein, and amino acid supplements. Cats (n = 80) were fed either 
test food or owner’s-choice foods (non-nutritionally controlled cohort). Cats were included based on 
age (≥ 9 years), indoor only, neutered, and free of chronic disease. At baseline, all cats had serum Cr 
concentrations within the reference interval. Renal function biomarkers and urinalysis results at 
baseline and after consuming test food or owner’s-choice foods for 3 and 6 months were evaluated. 
Cats consuming test food showed significant decreases in serum Cr and BUN concentrations across 
time. Overall, cats consuming owner’s-choice foods showed significant increases in serum SDMA 
concentrations at 3 and 6 months compared with baseline (P ≤ 0.05), whereas in cats consuming test
food serum SDMA concentrations did not change. At baseline or during the 6-month feeding trial, 23 (28.8%) cats had increased serum SDMA, but normal serum Cr consistent with IRIS Stage 1 chronic kidney disease. This included 6 cats fed test food and 17 cats fed owner’s-choice foods. In the 6 cats fed test food, serum SDMA decreased in 3 cats and remained stable in 1 cat, whereas in the 17 cats fed owner’s-choice foods, serum SDMA increased in 13 cats and decreased or remained stable in 4 cats. The increase in serum SDMA concentration was significant (P = 0.02) only for cats fed owner’s-choice foods. These results suggest that nonazotemic cats with elevated serum SDMA (early renal insufficiency) when fed a food designed to promote healthy aging are more likely to demonstrate stable renal function compared with cats fed owner’s-choice foods. Cats fed owner’s-choice foods were more likely to demonstrate progressive renal insufficiency.

Serum Concentrations of Symmetric Dimethylarginine and Creatinine in Dogs with Naturally Occurring Chronic Kidney Disease.

Hall JA, Yerramilli M, Obare E, Yerramilli M, Almes K, Jewell DE


BACKGROUND: Serum concentrations of symmetric dimethylarginine (SDMA) detected chronic kidney disease (CKD) in cats an average of 17.0 months before serum creatinine (Cr) concentrations increased above the reference interval. OBJECTIVES: To report on the utility of measuring serum SDMA concentrations in dogs for detection of CKD before diagnosis by measurement of serum Cr. ANIMALS: CKD dogs (n = 19) included those persistently azotemic for ≥3 months (n = 5), dogs that were azotemic at the time of death (n = 4), and nonazotemic dogs (n = 10). CKD dogs were compared with healthy control dogs (n = 20). METHODS: Retrospective study, whereby serum Cr concentrations were determined by enzymatic colorimetry and serum SDMA concentrations were determined by liquid chromatography-mass spectrometry in dogs with necropsy confirmed CKD. RESULTS: Serum SDMA increased before serum Cr in 17 of 19 dogs (mean, 9.8 months; range, 2.2-27.0 months). Duration of elevations in serum SDMA concentrations before the dog developed azotemia (N = 1) or before the dog died (N = 1) was not determined. Serum SDMA and Cr concentrations were linearly related (r = 0.84; P < .001). Serum SDMA (r = -0.80) and serum Cr (r = -0.89) concentrations were significantly related to glomerular filtration rate (both P < .001). CONCLUSION AND CLINICAL IMPORTANCE: Using serum SDMA as a biomarker for CKD allows earlier detection of kidney dysfunction in dogs than does measurement of serum Cr. Earlier detection might be desirable for initiating renoprotective interventions that slow progression of kidney disease.

Evaluation of a feline-specific multiplex, bead-based assay for detection of cytokines, chemokines, growth factors, and other immunologically active proteins in serum and plasma samples from cats.

Halpin RE, Saunders RS, Thompson BJ et al.


OBJECTIVE To evaluate a feline-specific multiplex, bead-based assay system for detection of recombinant and native proteins in serum samples and in EDTA-treated and heparinized plasma samples. SAMPLE Serum samples and EDTA-treated and heparinized plasma samples from 30 sick cats and 9 healthy client-owned cats and heparinized whole blood samples from 5 healthy purpose-bred cats. PROCEDURES Ability of the assay system to detect 19 recombinant and native immunologically active proteins in plasma and serum samples from healthy and purpose-bred cats was evaluated via spike-and-recovery tests, assessments of inter- and intra-assay variation, linearity results, and leukocyte stimulation. Effects of various concentrations of heparin and serum matrix solution on percentages of analytes recovered were also evaluated. Analyte concentrations in samples from healthy and sick cats
were measured and compared between groups. RESULTS Percentages of analytes recovered were unsatisfactory for most assays. Serum and heparinized plasma samples yielded better recovery results than did EDTA-treated plasma samples. Use of serum matrix solution did not improve results. Use of heparin concentrations greater than the recommended range affected the results. Linearity of results was difficult to assess because of the poor recovery. For the analytes that were recovered sufficiently for assessment, linearity appeared to be reasonable despite the limited detection. CONCLUSIONS AND CLINICAL RELEVANCE Poor percentages of analytes recovered and adverse effects of sample protein matrix limited the usefulness of the multiplex, bead-based assay system for measurement of immunologically active proteins in solutions with high protein content; however, recovery results were fairly linear, potentially allowing evaluation of feline plasma or serum samples with high analyte concentrations.

Antigen Concentrations as an Indicator of Clinical Remission and Disease Relapse in Cats with Histoplasmosis.
Hanzlíček AS, Meinkoth JH, Renschler JS, Goad C, Wheat LJ

BACKGROUND: Treatment monitoring is subjective and disease relapse is common in cats with histoplasmosis. The Histoplasma antigen enzyme immunoassay (EIA) is a noninvasive test used for determining disease remission and detecting disease relapse in humans with histoplasmosis. The utility of the antigen EIA for these purposes in cats remains unknown. HYPOTHESIS/OBJECTIVES: Those Histoplasma antigen concentrations in urine and serum would decline with antifungal treatment and that antigen elimination would be an indicator of clinical remission in cats with histoplasmosis treated with antifungal treatment. ANIMALS: Fifteen client-owned cats with histoplasmosis. METHODS: Masked observational study. Cats were monitored monthly during antifungal treatment. Time of clinical remission and serum and urine antigen elimination were determined for each cat. RESULTS: Twelve of 15 cats achieved clinical remission. At the time of diagnosis, antigen was detectable in urine in 14/15 (93%) cats and in serum in 11/15 (73%) cats. Both serum (P <.0005) and urine (P <.0001) antigen concentrations significantly decreased over time with effective treatment. Antigen elimination was sensitive [urine, 90.0% (95% CI 72.3-97.4%); serum, 90.4% (68.2-98.3%)] but less specific [urine, 64.6% (51.7-75.8%); serum, 52.1% (37.4-66.5%)] for disease remission. Urine antigen was positive in both cats and serum antigen was positive in 1 cat at the time of disease relapse. CONCLUSIONS AND CLINICAL IMPORTANCE: Measurement of Histoplasma antigen in urine and serum might be useful tests for determining disease remission and relapse in cats with histoplasmosis. Further research is needed to investigate the importance of low-level antigenemia and antigenuria.

Toxicity and response in cats with neoplasia treated with toceranib phosphate.
Harper A, Blackwood L
*J Feline Med Surg* (2016)

OBJECTIVES: Toceranib phosphate is a tyrosine kinase inhibitor licensed for the treatment of non-resectable Patnaik grade II/III recurrent cutaneous mast cell tumours in dogs. There is no information in cats regarding the tolerated dose, toxicity or tumour response of this drug. The aim of this study was to analyse retrospectively a cohort of cats with advanced neoplasia treated with toceranib to identify toxicity and response. METHODS: The medical records of the Small Animal Teaching Hospital were reviewed. Cats were included if they had received toceranib for at least 2 weeks for the treatment of histologically or cytologically confirmed neoplastic disease, and had at least one set of monitoring blood tests (haematology, biochemistry) performed after baseline tests. Toxicity was graded according to Veterinary Comparative Oncology Group - common terminology criteria for adverse events and
response was measured according to Response Evaluation In Solid Tumors (RECIST) criteria. RESULTS: Fourteen cats met the inclusion criteria, the majority of which (13/14) had received previous therapy (surgery, radiotherapy, chemotherapy). The most common tumour types were mast cell tumours or malignant epithelial tumours. Toxicity occurred in 10/14 cats - 10 cats had mild myelosuppression or gastrointestinal effects. Two cats developed severe hepatotoxicity. One cat died from congestive heart failure, although whether this was related to toceranib therapy is unknown. Regarding response, one cat achieved complete response; two cats achieved partial response and five cats achieved stable disease: overall biological response rate was 57.1%. All of the cats that achieved either partial or complete response were treated for mast cell disease. Overall median duration of response was 90 days (range 14-570 days). None of the cats with squamous cell carcinoma achieved a response. CONCLUSIONS AND RELEVANCE: Toceranib phosphate is generally well tolerated in cats with the majority (10/14) of toxicity limited to mild gastrointestinal or myelosuppressive effects; however, hepatotoxicity is a concern. Response to treatment in this small cohort was similar to that reported in dogs.

A novel placement technique for nasogastric and nasoesophageal tubes.

Herring JM

*J Vet Emerg Crit Care (San Antonio)* (2016) **26**:593-597

BACKGROUND: Early enteral nutrition in dogs and cats can have significant benefit in the therapeutic management of critical illness. Blind placement of nasogastric or nasoesophageal feeding tubes to accomplish this goal has become standard practice. However, complications from tube misdirection into the tracheobronchial tree can lead to significant patient morbidity and mortality. Safe and consistent alternatives are desirable to minimize these risks. KEY CONCEPTS: A modified method for placement of nasoenteric tubes is described. The main variation from standard procedure involves a second tube measurement, with the distal tip of the tube positioned at the thoracic inlet and measured to the nostril. The tube is advanced to this level and tested for negative pressure using a 12 mL syringe attached to the end of the feeding tube. This improves confidence in esophageal positioning before complete advancement of the tube to its distal endpoint. SIGNIFICANCE: This procedural adaptation to feeding tube placement has the potential to reduce bronchopulmonary trauma from intratracheal misdirection by providing an early safety check to identify malpositioning. Prospective validation studies are needed to support its advantages over standard tube placement techniques.

Cutaneous amelanotic signet-ring cell malignant melanoma with interspersed myofibroblastic differentiation in a young cat.

Hirz M, Herden C


The diagnosis of malignant melanoma can be difficult because these tumors can be amelanotic and may contain diverse variants and divergent differentiations, of which the signet-ring cell subtype is very rare and has only been described in humans, dogs, cats, and a hamster. We describe herein histopathologic and immunohistochemical approaches taken to diagnose a case of signet-ring cell malignant melanoma with myofibroblastic differentiation in a cat. A tumor within the abdominal skin of a 2-year-old cat was composed of signet-ring cells and irregularly interwoven streams of spindle cells. Both neoplastic cell types were periodic-acid-Schiff, Fontana, and Sudan black B negative. Signet-ring cells strongly expressed vimentin and S100 protein. Spindle cells strongly expressed vimentin and smooth muscle actin; some cells expressed S100, moderately neuron-specific enolase, and others variably actin and desmin. A few round cells expressed melan A, and a few plump spindle cells expressed melan A and PNL2, confirming the diagnosis of amelanotic signet-ring cell malignant melanoma with
myofibroblastic differentiation in a cat. Differential diagnoses were excluded, including signet-ring cell forms of adenocarcinomas, lymphomas, liposarcomas, leiomyosarcomas, squamous cell carcinomas, basal cell carcinomas, and adnexal tumors.

**Assessment of platelet function in healthy cats in response to commonly prescribed antiplatelet drugs using three point-of-care platelet function tests.**

*J Feline Med Surg* (2016)

**OBJECTIVES:** The objective was to determine if decreased platelet function could be detected after treatment with aspirin and/or clopidogrel in healthy cats using three point-of-care platelet function tests that evaluate platelet function by different methods: Multiplate (by impedance), Platelet Function Analyzer 100 (by mechanical aperture closure) and Plateletworks (by platelet counting).

**METHODS:** Thirty-six healthy cats were randomly assigned to receive one of three oral treatments over an 8 day period: (1) aspirin 5 mg q72h; (2) aspirin 20.25 mg q72h; or (3) clopidogrel 18.75 mg q24h. Cats treated with 5 and 20.25 mg aspirin also received clopidogrel on days 4-8. Platelet aggregation in response to adenosine diphosphate and collagen ± arachidonic acid was assessed on days 1 (baseline), 4 and 8. Aspirin and clopidogrel metabolites were measured by high-performance liquid chromatography. Platelet function in response to treatment was analyzed by ANCOVA, linear regression and Spearman correlation.

**RESULTS:** The only solitary aspirin effect was detected using Plateletworks with collagen in cats treated with 20.25 mg. The only effect detected by Multiplate was using arachidonic acid in cats treated with both aspirin 20.25 mg and clopidogrel. All clopidogrel treatment effects were detected by Platelet Function Analyzer 100, Plateletworks (adenosine diphosphate) and Plateletworks (collagen). Drug metabolites were present in all cats, but concentrations were minimally correlated to platelet function test results.

**CONCLUSIONS AND RELEVANCE:** Platelet Function Analyzer 100 and Plateletworks using adenosine diphosphate ± collagen agonists may be used to detect decreased platelet function in response to clopidogrel treatment. Either aspirin is not as effective an antiplatelet drug as clopidogrel, or the tests used were not optimal to measure aspirin effect. Cats with heart disease are commonly prescribed antiplatelet drugs to decrease the risk of aortic thromboembolism. Platelet Function Analyzer 100 and Plateletworks may be useful for confirming clopidogrel treatment in these cats.

**Feline Coronavirus 3c Protein: A Candidate for a Virulence Marker.**

Hora AS, Tonietti PO, Taniwaki SA et al.  

Feline infectious peritonitis virus (FIPV) is highly virulent and responsible for the highly fatal disease feline infectious peritonitis (FIP), whereas feline enteric coronavirus (FECV) is widespread among the feline population and typically causes asymptomatic infections. Some candidates for genetic markers capable of differentiating these two pathotypes of a unique virus (feline coronavirus) have been proposed by several studies. In the present survey, in order to search for markers that can differentiate FECV and FIPV, several clones of the 3a-c, E, and M genes were sequenced from samples obtained from cats with or without FIP. All genes showed genetic diversity and suggested the presence of FCoV mutant spectrum capable of producing a virulent pathotype in an individual-specific way. In addition, all the feline coronavirus FIPV strains demonstrated a truncated 3c protein, and the 3c gene was the only observed pathotypic marker for FCoVs, showing that 3c gene is a candidate marker for the distinction between the two pathotypes when the mutant spectrum is taken into account.

**Molecular detection and characterization of Cryptosporidium spp. among breeding cattery cats**
Cryptosporidium spp. are pathogenic protozoa that can cause gastrointestinal illness in mammalian hosts. As a result of the close contact between humans and cats, there is concern regarding the potential zoonotic transmission of Cryptosporidium spp. from infected cats; however, few data have been reported regarding the prevalence of this pathogen among cats. Here, we report the prevalence of Cryptosporidium spp. among breeding cattery cats in Japan. A total of 286 fresh fecal samples were collected from breeding cattery cats at seven facilities located across Japan. A nested polymerase chain reaction (PCR) assay targeting the 18S rRNA gene was employed for the detection of Cryptosporidium spp. Four cats (1.4%), from two catteries, were positive for Cryptosporidium spp. Age and fecal condition were not significantly associated with prevalence. The four positive samples displayed 99-100% sequence similarity to Cryptosporidium felis sequences. Our findings indicated that the prevalence of Cryptosporidium spp. was low among breeding cattery cats in Japan, and therefore the risk of zoonotic transmission to humans was also likely to be low.

Transfusion practice in dogs and cats: an Internet-based survey.
Jagodich TA, Holowaychuk MK
*J Vet Emerg Crit Care (San Antonio)* (2016) **26**:360-372

OBJECTIVE: To characterize and compare current canine and feline transfusion practices at private referral hospitals (PRH) and veterinary teaching hospitals (VTH), including information regarding blood donor screening; blood product collection, storage, and administration; recipient screening; and monitoring during transfusions. DESIGN: Internet-based survey. SUBJECTS: Sixty-five board-certified specialist veterinarians, 3 veterinarians, and 5 veterinary technicians from 53 PRH and 20 VTH. METHODS: A survey was disseminated via email LISTSERVs; 1 survey response per hospital was included. MAIN RESULTS: Survey results revealed that PRH more commonly obtained canine and feline blood products solely from blood banks (P < 0.05) and VTH more commonly used hospital-run donor programs (P < 0.05). Canine cryo-poor plasma was more likely to be stored by VTH compared to PRH (P = 0.018) and VTH were more likely to store canine fresh platelet products for >72 hours (P = 0.046). The use of client-owned canine donors (P = 0.043), administration of precollection 1-deamino-8-d-arginine vasopressin to canine donors (P = 0.041), and storage of blood products in a dedicated refrigerator (P = 0.003) and -20°C or -80°C freezer (P = 0.044) were more common in VTH than PRH. However, the use of a refrigerator freezer (P = 0.001), single bag canine collection systems (P = 0.021), and agglutination cards for feline blood typing (P = 0.032), as well as warming of blood products prior to administration (P = 0.021) were more commonly reported by PRH compared to VTH. CONCLUSIONS: Although some transfusion practices including the method and length of storage of blood products, use and screening of blood donors, and administration methods varied between VTH and PRH, most transfusion practices were similar. The information reported from this survey could aid the development of future veterinary transfusion consensus statements.

Maximizing the diagnostic utility of endoscopic biopsy in dogs and cats with gastrointestinal disease.
Jergens AE, Willard MD, Allenspach K
*Vet J* (2016) **214**:50-60

Flexible endoscopy has become a valuable tool for the diagnosis of many small animal gastrointestinal (GI) diseases, but the techniques must be performed carefully so that the results are meaningful. This article reviews the current diagnostic utility of flexible endoscopy, including practical/technical
considerations for endoscopic biopsy, optimal instrumentation for mucosal specimen collection, the correlation of endoscopic indices to clinical activity and to histopathologic findings, and new developments in the endoscopic diagnosis of GI disease. Recent studies have defined endoscopic biopsy guidelines for the optimal number and quality of diagnostic specimens from different regions of the gut. They also have shown the value of ileal biopsy in the diagnosis of canine and feline chronic enteropathies, and have demonstrated the utility of endoscopic biopsy specimens beyond routine hematoxylin and eosin histopathological analysis, including their use in immunohistochemical, microbiological, and molecular studies.

**Characterization of canine and feline methicillin-resistant Staphylococcus pseudintermedius (MRSP) from Thailand.**
Kadlec K, Weiß S, Wendlandt S, Schwarz S, Tonpitak W
_Vet Microbiol_ (2016)
Methicillin-resistant Staphylococcus pseudintermedius (MRSP) in small animal practice are very difficult to treat due to multi-resistance. In contrast to other countries, little is known about MRSP from Thailand. In particular, information on feline MRSP isolates in general is rare. In total, 39 MRSP isolates from dogs (n=28) and cats (n=11) from Thailand collected from independent clinical cases were used. Oxacillin resistance and presence of the mecA gene was confirmed. Susceptibility to additional 29 antimicrobial agents was tested according to CLSI recommendations. Antimicrobial resistance genes were detected by PCR assays. Molecular typing comprised spa typing, dru typing and macrorestriction analysis with subsequent pulsed-field gel electrophoresis (PFGE). For selected isolates, multi-locus sequence typing (MLST) was performed. All isolates were multi-resistant with resistance to at least six classes of antimicrobial agents. In all cases corresponding resistance genes were detected. In addition to mecA, the genes blaZ, catpC221, aacA/aphD, erm(B), dfrG, tet(M) and tet(K) were identified. Six spa types (t02, t05, t09, t10, t23, t72), eleven dru types (dt8ak, dt10ao, dt10cp, dt10cq, dt11a, dt11bo, dt11cb, dt11cj, dt11v, dt11y, dt11z) and 27 PFGE types (designated as A1-A10, B1-B8, C1-C2, D, E, F, G, H, I, J) were identified. MLST for one isolate of each main PFGE pattern A-J revealed seven types [ST45 (n=3), ST112, ST155, ST282 and the novel types ST432, ST433 (n=2) and ST434]. This study showed that MRSP isolates from clinical cases in individual dogs and cats in Thailand are multi-resistant with similar resistance genes and characteristics as isolates from Europe and North America.

**Effect of short-term probiotic Enterococcus faecium SF68 dietary supplementation in overweight and obese cats without comorbidities.**
Kathrani A, Larsen JA, Kass PH, Fascetti AJ
_Vet Rec Open_ (2016) 3:e000164
Obesity in cats is associated with metabolic abnormalities and increased susceptibility to diseases such as diabetes mellitus. Studies in mouse models and human beings have shown that probiotics can reduce food intake, promote weight loss and improve metabolic profile. Studies assessing the effects of probiotics on these same parameters are absent in cats. Therefore, the aim of this study was to determine if probiotic Enterococcus faecium strain SF68 dietary supplementation reduces food intake, promotes weight loss and improves metabolic profile in overweight and obese cats without comorbidities. Twenty overweight and obese specific pathogen-free cats without comorbidities were acclimatised to a dry diet for four weeks. After exclusion of four cats for unrelated reasons, eight cats received a daily oral probiotic for eight weeks and eight control cats received no probiotic. All cats were fed ad libitum with food intake measured daily and bodyweight weekly. Blood was collected at three time points: after four weeks of acclimatisation to the diet, after eight weeks of intervention and
after six weeks of washout for measurement of glucose, triglyceride, cholesterol, fructosamine, insulin, leptin, total adiponectin and deuterium oxide for body composition. There were no differences in food intake, metabolic parameters and body composition between the probiotic and control groups after eight weeks of intervention and six weeks of washout (P ≥ 0.050). Short-term use of E. faecium SF68 dietary supplementation had no significant effect on food intake, bodyweight, body composition or metabolic parameters in overweight and obese specific pathogen-free cats without comorbidities.

**Comparison between point-of-care dermatophyte test medium and mycology laboratory culture for diagnosis of dermatophytosis in dogs and cats.**

Kaufmann R, Blum SE, Elad D, Zur G

*Vet Dermatol* (2016) 27:284-e68

**BACKGROUND:** Point-of-care Dermatophyte Test Medium (PoC-DTM) is a diagnostic procedure to rule in/rule out dermatophytosis in veterinary clinics. **OBJECTIVE:** To evaluate the performance of PoC-DTM in the clinic compared to DTM plate culture in a mycology laboratory and to compare results obtained by general practitioners and referral clinicians. **ANIMALS:** Hair samples were collected from 47 cats and 54 dogs with suspected dermatophytosis and from nine healthy controls (seven cats and two dogs). **METHODS:** This was a multicentre blinded study. In one group (65 suspected cases, 9 healthy controls), PoC-DTM results were evaluated by clinicians in a referral clinic (SP group) who examined the colony morphology macroscopically and microscopically. In the other group (36 suspected cases) PoC-DTM results were evaluated by clinicians from general practice for colour change only, with no macroscopic or microscopic examination (GP group). All hair samples were also cultured on DTM plates in a mycology laboratory. Laboratory culture was considered the gold standard for comparison. **RESULTS:** Agreements between tests were 97% (two false positive; κ = 0.839) and 80.6% (five false positives and two false negatives; κ = 0.466) in the SP and GP groups, respectively. This difference between groups was significant (P = 0.024). **CONCLUSION AND CLINICAL IMPORTANCE:** When applying macroscopic and microscopic evaluation of the colony, PoC-DTM is accurate for diagnosing dermatophytes with only a 3% chance of error. However, when macroscopic and microscopic examination is not included there is significant (19.4%) chance for an incorrect diagnosis.

**The use of fluoxetine by veterinarians in dogs and cats: a preliminary survey.**

Kaur G, Voith VL, Schmidt PL

*Vet Rec Open* (2016) 3:e000146

**OBJECTIVE:** To describe the prescribing habits of a sample of small animal veterinarians pertaining to use of fluoxetine in dogs and cats. **DESIGN:** Exploratory descriptive survey using a questionnaire, available on paper and through email, distributed to small animal veterinarians by convenience sampling. **PARTICIPANTS:** Veterinarians practicing small animal medicine in North America contacted by email and at local veterinary meetings. **RESULTS:** Of 127 initial respondents, 106 prescribed fluoxetine for dogs and/or cats. The majority (91 per cent) indicated the drug be given once every 24 hours. Respondents used one or more formulations of fluoxetine. Of those who prescribed fluoxetine for both dogs and cats (57 per cent), 80 per cent used a generic form. A third prescribed fluoxetine only for dogs (31 per cent) and 72 per cent of these prescribed the US Food and Drug Administration approved product that was available at that time. The primary use of fluoxetine was related to behaviour problems. Overall for dogs, uses of fluoxetine were organised into five major categories by the investigators: Anxieties, Aggression, Compulsive Disorders, Phobias/Fear and Other, Anxieties being the most common. Of those who prescribed fluoxetine, 12 per cent did so only for cats and the majority of these prescribed generic (58 per cent) and or compounded (42 per cent) forms.
Overall for cats, uses of fluoxetine were organised into six major categories: Elimination behaviours, Anxieties, Aggression, Dermatologic/Grooming, Compulsive Disorders and Other, Elimination behaviours being most common. CONCLUSIONS: This study indicates that practitioners prescribed fluoxetine in generic, proprietary and compounded formulations for a variety of behaviour problems of dogs and cats. The broad use by the respondents suggests how important psychotropic drugs are in veterinary medicine. Research, information and continuing education regarding such drugs and animal behaviour should be made available to the general practitioner.

Design and evaluation of a novel chitosan-based system for colon-specific drug delivery.
Kavianinia I, Plieger PG, Cave NJ et al.
Tritrichomonas foetus is a flagellated protozoan parasite that colonizes the feline colon causing colitis and chronic foul smelling diarrhoea. Despite the efficacy of Ronidazole in the treatment of T. foetus, Ronidazole has been reported to cause neurotoxicity in some cats due to rapid absorption in the small intestine. A novel amphoteric derivative of chitosan was synthesised and characterized. A combination of time, pH, and an enzyme controlled system was used in a study of a new compression coated tablet for delivery of Ronidazole to the colon. Axial, radial swelling and erosion of selected tablets were carried out in various media. The effect of weight ratio, enzyme and pH on in vitro drug release profile was investigated. The results show that less than 2% of the drug was released in the physiological environment of the stomach and small intestine.

Comparative pharmacokinetics of fluralaner in dogs and cats following single topical or intravenous administration.
Kilp S, Ramirez D, Allan MJ, Roepke RK
*Parasit Vectors* (2016) 9:296
BACKGROUND: Bravecto™ Chewable Tablets for Dogs, containing fluralaner as active ingredient, is an innovative treatment for flea and tick infestations that provides safe, rapid and long acting efficacy after a single oral administration in dogs. Topically applied fluralaner provides similar safe, rapid and long acting efficacy, both in dogs and in cats. The pharmacokinetic profile of fluralaner was evaluated in dogs and in cats following either topical or intravenous administration. METHODS: Twenty four dogs and 24 cats received three different topical doses, with the mid-dose based on the respective minimum recommended dose, and one intravenous dose. Plasma samples were collected for 112 days and fluralaner concentrations were quantified using a validated high performance liquid chromatography with tandem mass spectrometry (HPLC-MS/MS) method. Pharmacokinetic parameters were calculated using non-compartmental methods. RESULTS: In dogs, fluralaner was readily absorbed from the topical administration site into the skin, subjacent tissues and blood. Fluralaner plasma concentrations showed an apparent plateau between ~ day 7 and 63, with individual tmax seen within this time period. After the plasma plateau, concentrations declined slowly and were quantifiable for more than 12 weeks. In cats, fluralaner was readily systemically absorbed from the topical administration site, reaching maximum concentrations (Cmax) in plasma between 3 and 21 days post administration, after which concentrations declined slowly, and were also quantifiable for more than 12 weeks. Systemic exposure, as shown by Cmax and the area under the concentration versus time curve from time 0 to the last measurable concentration (AUC(0→t)) increased proportionally with dose in both species. Following intravenous administration fluralaner showed a relatively high apparent volume of distribution (Vz), a low plasma clearance (Cl), a long terminal half-life (t1/2) and a long mean residence time (MRT); thereby demonstrating a long persistence of fluralaner in both species.
CONCLUSIONS: The pharmacokinetic characteristics of fluralaner explain its prolonged activity against fleas and ticks on both dogs and cats after a single topical administration.

Correction: Reversal of the Progression of Fatal Coronavirus Infection in Cats by a Broad-Spectrum Coronavirus Protease Inhibitor.
Kim Y, Liu H, Kankanamalage AC et al.
[This corrects the article DOI: 10.1371/journal.ppat.1005531.].

Evaluation of quality of anesthesia and analgesia and of vital signs after intramuscular administration of a combination of butorphanol, medetomidine and alfaxalone in cats.
Kim YW, Suh SI, Choi R, Hyun C
This study evaluated the quality of anesthesia, duration of analgesia and changes in vital signs after intramuscular administration of a combination of butorphanol, medetomidine and alfaxalone in domestic cats. Ten healthy adult domestic cats (weighing 2.9 ± 0.5 kg) were used in this study. Rectal temperature (T), pulse rate (PR), respiratory rate (fR) and systolic arterial pressure (SAP) were measured and recorded prior to intramuscular (IM) administration of butorphanol (0.2 mg/kg), medetomidine (20 ug/kg) and alfaxalone (5 mg/kg) and then every 10 min until return of consciousness. Qualitative scores for induction of anesthesia and recovery were allocated, duration of anesthesia and recovery were calculated, and adverse events were recorded. A needle prick with a 22-gauge hypodermic needle was used to assess analgesia. Scores for induction and recovery quality were acceptable. No significant adverse events except nausea (7/10) and vomiting (5/10) were observed. The mean ± SD times from induction to extubation and to standing (full recovery) were 114 ± 8 and 125 ± 7 min, respectively. There were statistically significant changes in PR, fR and SAP after induction of anesthesia. The combination of butorphanol, medetomidine and alfaxalone provided acceptable quality of anesthesia and analgesia and exerted minimal cardiopulmonary effects in domestic cats.

A Mutation in LTBP2 Causes Congenital Glaucoma in Domestic Cats (Felis catus).
Kuehn MH, Lipsett KA, Menotti-Raymond M et al.
The glaucomas are a group of diseases characterized by optic nerve damage that together represent a leading cause of blindness in the human population and in domestic animals. Here we report a mutation in LTBP2 that causes primary congenital glaucoma (PCG) in domestic cats. We identified a spontaneous form of PCG in cats and established a breeding colony segregating for PCG consistent with fully penetrant, autosomal recessive inheritance of the trait. Elevated intraocular pressure, globe enlargement and elongated ciliary processes were consistently observed in all affected cats by 8 weeks of age. Varying degrees of optic nerve damage resulted by 6 months of age. Although subtle lens zonular instability was a common feature in this cohort, pronounced ectopia lentis was identified in less than 10% of cats examined. Thus, glaucoma in this pedigree is attributed to histologically confirmed arrest in the early postnatal development of the aqueous humor outflow pathways in the anterior segment of the eyes of affected animals. Using a candidate gene approach, significant linkage was established on cat chromosome B3 (LOD 18.38, θ = 0.00) using tightly linked short tandem repeat (STR) loci to the candidate gene, LTBP2. A 4 base-pair insertion was identified in exon 8 of LTBP2 in affected individuals that generates a frame shift that completely alters the downstream open reading frame and eliminates functional domains. Thus, we describe the first spontaneous and highly penetrant non-rodent model of PCG identifying a valuable animal model for primary glaucoma that closely
resembles the human disease, providing valuable insights into mechanisms underlying the disease and a valuable animal model for testing therapies.

**Percutaneous Ultrasound-guided Cholecystocentesis and Bile Analysis for the Detection of Platynosomum spp.-Induced Cholangitis in Cats.**
Köster L, Shell L, Illanes O, Lathroum C, Neuville K, Ketzis J  
BACKGROUND: Examination of bile could be useful to diagnose Platynosomum spp.-induced cholangitis in cats. Obtaining bile via percutaneous ultrasound-guided cholecystocentesis (PUC) is possible but raises safety concerns in cats with severe cholecystitis. OBJECTIVES: The objectives of this study were to investigate the use of PUC to collect bile samples from cats with known platynosomosis and to determine if bile analysis could be a diagnostic test. ANIMALS: Twenty-seven free-roaming cats positive for Platynosomum spp. eggs via fecal examination. METHODS: In this prospective study, fecal egg counts were performed by double centrifugation with Sheather’s solution. Bile was collected using PUC from anesthetized cats. Egg counts in bile were performed with a stereoscope. Euthanasia and postmortem examination were performed immediately after PUC. RESULTS: All cats had ultrasound (US) evidence of cholangitis or cholecystitis. Thirty-nine PUCs were performed with 14 cats having 2 PUCs 12 or 24 days apart. Postmortem examinations showed no overt gallbladder damage or leakage but fresh blood was noted in the gallbladder lumen of 3 cats. Median Platynosomum spp. egg counts were higher in bile (1450 eggs/mL; IQR, 400; 5138 eggs/mL) as compared to feces (46 eggs/mL; IQR, 10; 107 eggs/mL) (P <.001). CONCLUSION AND CLINICAL IMPORTANCE: Bile egg count analysis is an alternative method with higher egg counts as compared to fecal egg count analysis for the diagnosis of platynosomosis. Obtaining bile via US guidance is technically feasible and safe in cats with cholangitis/cholecystitis. Cholecystocentesis and bile analysis are especially relevant for those cats with chronic cholangitis/cholecystitis and negative fecal egg counts for Platynosomum.

**Mechanisms of airway responses to esophageal acidification in cats.**
Lang IM, Haworth ST, Medda BK, Forster H, Shaker R  
*J Appl Physiol (1985)* (2016) 120:774-783  
Acid in the esophagus causes airway constriction, tracheobronchial mucous secretion, and a decrease in tracheal mucociliary transport rate. This study was designed to investigate the neuropharmacological mechanisms controlling these responses. In chloralose-anesthetized cats (n= 72), we investigated the effects of vagotomy or atropine (100 μg·kg(-1)·30 min(-1)iv) on airway responses to esophageal infusion of 0.1 M PBS or 0.1 N HCl at 1 ml/min. We quantified1) diameter of the bronchi,2) tracheobronchial mucociliary transport rate,3) tracheobronchial mucous secretion, and4) mucous content of the tracheal epithelium and submucosa. We found that vagotomy or atropine blocked the airway constriction response but only atropine blocked the increase in mucous output and decrease in mucociliary transport rate caused by esophageal acidification. The mucous cells of the mucosa produced more Alcian blue- than periodic acid-Schiff (PAS)-stained mucosubstances, and the mucous cells of the submucosa produced more PAS- than Alcian blue-stained mucosubstances. Selective perfusion of the different segments of esophagus with HCl or PBS resulted in significantly greater production of PAS-stained mucus in the submucosa of the trachea adjacent to the HCl-perfused esophagus than in that adjacent to the PBS-perfused esophagus. In conclusion, airway constriction caused by esophageal acidification is mediated by a vagal cholinergic pathway, and the tracheobronchial transport response is mediated by cholinergic receptors. Acid perfusion of the esophagus selectively increases production of neutral mucosubstances of the apocrine glands by a local
mechanism. We hypothesize that the airway responses to esophageal acid exposure are part of the innate, rather than acute emergency, airway defense system.

**Cardiac troponin I in three cat breeds with hypertrophic cardiomyopathy.**
*Vet Rec* (2016) **178**:532

**Pharmacokinetics and bioavailability of itraconazole oral solution in cats.**
Liang C, Shan Q, Zhong J et al.
*J Feline Med Surg* (2016) **18**:310-314

**OBJECTIVES:** The aim of this study was to describe the pharmacokinetics and bioavailability of itraconazole (ITR) oral solution in healthy cats. METHODS: The pharmacokinetics of ITR were studied in eight healthy, fasted cats after a single intravenous (IV) and oral (PO) administration at a dose of 5 mg/kg, in a two-period crossover design study. Blood was obtained at predetermined intervals for the determination of ITR concentrations with high-performance liquid chromatography. Pharmacokinetic characterisation was performed by a non-compartmental method using WinNonlin 5.2.1. RESULTS: After IV administration, the major pharmacokinetic parameters were as follows (mean ± SD): terminal elimination half-life (T1/2λz) 15.8 ± 1.88 h; area under the curve from time zero to infinity (AUC0-∞) 13.9 ± 3.17 h·μg/ml; total body clearance 0.37 ± 0.08 l/h/kg; apparent volume of distribution 8.51 ± 1.92 l/kg; mean residence time 20.6 ± 3.95 h. After PO administration, the principal pharmacokinetic parameters were as follows (mean ± SD): T1/2λz 15.6 ± 3.20 h; AUC0-∞ 7.94 ± 2.83 h·μg/ml; peak concentration 0.70 ± 0.14 μg/ml; time of peak 1.43 ± 0.53 h. The absolute bioavailability of ITR oral solution after oral administration was 52.1 ± 11.6%. CONCLUSIONS AND RELEVANCE: The disposition of ITR oral solution in cats is characterised by a long terminal half-life, a short peak time and moderate bioavailability.

**Hepatic encephalopathy in dogs and cats.**
Lidbury JA, Cook AK, Steiner JM
*J Vet Emerg Crit Care (San Antonio)* (2016) **26**:471-487

**OBJECTIVE:** To comparatively review the pathogenesis, clinical presentation, diagnosis, and management of hepatic encephalopathy (HE) in dogs and cats. DATA SOURCES: The Medline database was searched for articles related to HE in people, dogs, and cats. Articles published within the last 5 years were given special importance. HUMAN DATA SYNTHESIS: The pathogenesis of HE is complex and incompletely understood, but ammonia appears to play a central role. Hyperammonemia leads to accumulation of glutamine in astrocytes, with subsequent astrocyte swelling and neurological dysfunction. The development of HE in patients with hepatic cirrhosis is a poor prognostic indicator. The fermentable disaccharide lactulose and the antimicrobial rifaximin are US Food and Drug Administration approved treatments for human HE. Severe protein restriction is no longer recommended for patients with this condition. VETERINARY DATA SYNTHESIS: HE is often associated with portosystemic shunting in dogs and cats. Ammonia plays a central role in the pathogenesis of HE in dogs and cats, but other factors such as manganese and endogenous benzodiazepines may also contribute. Recently, a soy protein-based diet was found to be beneficial in treating canine HE. Severe dietary protein restriction is likely to be detrimental in affected animals. There have been no clinical trials of drugs routinely used in the management HE in veterinary medicine, but lactulose and antimicrobials such as metronidazole are well-established treatments. CONCLUSIONS: HE is a potentially life-threatening condition that is probably underdiagnosed in
companion animals. Although various treatment recommendations have been proposed, there is a lack of evidence in the veterinary literature regarding optimal strategies for the management of this condition. As our understanding of the pathogenesis of HE in dogs and cats evolves, novel diagnostic tests and therapeutic agents may become available.

**Owner-reported lower urinary tract signs in a cohort of young cats.**
Longstaff L, Gruffydd-Jones TJ, Buffington CT, Casey RA, Murray JK
*J Feline Med Surg* (2016)

OBJECTIVES: The most common cause of lower urinary tract signs (LUTS) in cats under the age of 10 years is feline idiopathic cystitis (FIC). The prevalence of LUTS in the UK pet cat population is difficult to assess. This study used data collected prospectively to investigate the prevalence of, and risk factors for, owner-reported LUTS in a cohort of young pet cats. METHODS: Cat owners were recruited into a long-term longitudinal study and asked to complete questionnaires at specified age points for their cats. All cats were at least 18 months of age at the time of analysis. The prevalence of owner-reported LUTS at 18, 30 and 48 months of age was calculated, based on whether the owner had seen the cat urinating, and whether the cat had displayed one or more of the following clinical signs: dysuria, haematuria or vocalising during urination. A case-control study to investigate the risk factors for owner-reported LUTS in study cats at age 18 months was also conducted, using a multivariable logistic regression model. RESULTS: The prevalence of owner-reported LUTS in cats seen urinating by the owner was 4.3%, 3.8% and 6.0%, with 95% confidence intervals of 3.2-5.7%, 2.5-5.7% and 3.4-10.5% at ages 18, 30 and 48 months, respectively. An indoor-only lifestyle at the age of 18 months and a change in diet between the ages of 12 and 18 months were identified as risk factors for owner-reported LUTS at the age of 18 months from the multivariable model. No clear type of change in diet was identified in our sample of cats with LUTS. CONCLUSIONS AND RELEVANCE: The prevalence of owner-reported LUTS in a cohort of young pet cats was higher than the previously reported prevalence of LUTS in cats presenting to veterinary hospitals for LUTS or other reasons. A novel risk factor of change in diet between 12 and 18 months of age warrants further investigation.

**Insoluble fibres, satiety and food intake in cats fed kibble diets.**
Loureiro BA, Sakomura NK, Vasconcellos RS et al.
*J Anim Physiol Anim Nutr (Berl)* (2016)

Fibre is generally considered to dilute food energy, alter intestinal transit time and promote satiety; however, in cats, conflicting results have been found. In this study, two insoluble fibres were evaluated in four feline diets: control (no added fibre); diet with 10% sugar cane fibre; diet with 20% sugar cane fibre; and diet with 10% cellulose. The experiment was conducted with 32 cats, eight animals per diet, over 42 days: 1-7 for diet adaptation; 8-14 for total collection of faeces for digestibility; 15-17 for fresh faeces collection for fermentation products measurements; 18-20 for gastrointestinal transit time determination; 21 and 37 to evaluate the pattern of food intake; and 22 and 42 to assess satiety. Means were compared by analysis of variance and orthogonal contrasts, and the pattern of food intake was compared by repeated-measures analysis of variance (p < 0.05). The cats exhibited increased food intake after fibre addition to the diets (p < 0.05), achieving similar energy consumption. Cellulose and the two levels of sugar cane fibre reduced nutrient availability and energy digestibility, but only sugar cane fibre reduced fat digestibility (p < 0.05). Faecal output and the number of defecations per day increased with fibre inclusion (p < 0.05). Gastrointestinal transit time did not change with sugar cane fibre inclusion, but it was reduced with cellulose addition (p = 0.032). The pattern of food intake did not change, but cats fed fibre-supplemented diets exhibited greater consumption of a challenge meal, increasing energy intake (p < 0.01) when exposed to a palatable, energy-dense food.
**Audiogenic reflex seizures in cats.**
Lowrie M, Bessant C, Harvey RJ, Sparkes A, Garosi L

OBJECTIVES: This study aimed to characterise feline audiogenic reflex seizures (FARS).

METHODS: An online questionnaire was developed to capture information from owners with cats suffering from FARS. This was collated with the medical records from the primary veterinarian. Ninety-six cats were included. RESULTS: Myoclonic seizures were one of the cardinal signs of this syndrome (90/96), frequently occurring prior to generalised tonic-clonic seizures (GTCSs) in this population. Other features include a late onset (median 15 years) and absence seizures (6/96), with most seizures triggered by high-frequency sounds amid occasional spontaneous seizures (up to 20%). Half the population (48/96) had hearing impairment or were deaf. One-third of cats (35/96) had concurrent diseases, most likely reflecting the age distribution. Birmans were strongly represented (30/96). Levetiracetam gave good seizure control. The course of the epilepsy was non-progressive in the majority (68/96), with an improvement over time in some (23/96). Only 33/96 and 11/90 owners, respectively, felt the GTCSs and myoclonic seizures affected their cat’s quality of life (QoL). Despite this, many owners (50/96) reported a slow decline in their cat’s health, becoming less responsive (43/50), not jumping (41/50), becoming uncoordinated or weak in the pelvic limbs (24/50) and exhibiting dramatic weight loss (39/50). These signs were exclusively reported in cats experiencing seizures for >2 years, with 42/50 owners stating these signs affected their cat’s QoL. CONCLUSIONS AND RELEVANCE: In gathering data on audiogenic seizures in cats, we have identified a new epilepsy syndrome named FARS with a geriatric onset. Further studies are warranted to investigate potential genetic predispositions to this condition.

**Toxoplasma gondii and Neospora caninum in wild small mammals: Seroprevalence, DNA detection and genotyping.**
Machačová T, Ajzenberg D, Žákovská A, Sedlák K, Bártová E

Generally, rodents and other small mammals are considered as one of the sources of Toxoplasma gondii or Neospora caninum infection for cats and dogs as the definitive hosts of these two parasites, respectively. The aim of the study was to find out the prevalence of these two parasites in wild small mammals from the Czech Republic and to characterize *T. gondii* isolates by methods of molecular biology. A total of 621 wild small mammals were caught in the Czech Republic during years 2002-2014. Antibodies to *T. gondii* were detected by latex agglutination test in six (2.5%) of 240 small mammals (in two A. agrarius and four A. flavicollis). Antibodies to *N. caninum* were detected by commercially available competitive-inhibition enzyme-linked immunosorbent assay in one A. flavicollis (0.4%). Three of 427 (0.7%) liver samples were positive for *T. gondii* by PCR while negative for *N. caninum*. All embryo samples (n=102) were negative for both *T. gondii* and *N. caninum*. The three liver samples positive for *T. gondii* DNA (two from A. flavicollis and one from A. sylvaticus) were genotyped by 15 microsatellite markers and characterized as type II. To our knowledge, this is the first information about genetic characterization of *T. gondii* isolates in small mammals from Europe and the first detection of *N. caninum* antibodies in wild rodents from the Czech Republic.

**Identification of vector-borne pathogens in dogs and cats from Southern Brazil.**
Malheiros J, Costa MM, do Amaral RB et al.
*Ticks Tick Borne Dis* (2016) 7:893-900

Dogs and cats are often infected with vector-borne pathogens and play a crucial role as reservoirs and
hosts in their life cycles. The aim of the present study was to investigate the occurrence of vector-borne pathogens among dogs and cats in the northwestern region of Rio Grande do Sul (RS) State, Brazil. One hundred and ten blood samples were collected from dogs (n=80) and cats (n=30). Laboratory analysis were carried out through stained blood smears, indirect enzyme-linked immunosorbent assay (ELISA) for Babesia vogeli and Ehrlichia canis (only for dogs) and polymerase chain reaction (PCR) aiming the detection of pathogens. The following pathogens were screened by PCR among dogs and cats: Babesia spp. and Hepatozoon spp. (18S rRNA gene), Anaplasma spp. (16S rRNA gene), and Ehrlichia spp. (dsb gene for dogs and 16S rRNA gene for cats) and Bartonella spp. (nuoG gene only for cats). Using blood smears structures morphologically compatible with piroplasms were found in 5.45% (6/110) of the samples. Anti-B. vogeli and anti-E. canis antibodies were detected in 91% (73/80) and 9% (7/80) of the dogs, respectively. All the seropositive dogs to E. canis were also to B. vogeli. Nineteen (17.3%) animals were positive to hemoparasites by PCR. After sequencing Rangelia vitalii 6/80 (7.5%), B. vogeli 3/80 (4%), Hepatozoon spp. 1/80 (1%), and Anaplasma spp. 1/80 (1%) were found in the dogs, and B. vogeli 2/30 (7%) and Bartonella spp. 6/30 (20%) were detected in the screened cats. No sample was positive for genes dsb and 16S rRNA of Ehrlichia spp. Only those animals which were positive for R. vitalii showed findings compatible with rangeliosis, such as anemia (100%), thrombocytopenia (67%), jaundice (50%), external bleeding (50%), and anorexia (50%). This is the first time that B. vogeli detected among cats in Southern Brazil.

Lack of effects of intramuscular medetomidine on intraocular pressure in clinically normal cats.
Malmasi A, Selk Ghaffari M
OBJECTIVES: This study aimed to determine the effects of intramuscular medetomidine on the results of tonometry in healthy cats. METHODS: Sixteen healthy cats were randomly divided into two groups of eight cats. The first group was sedated with intramuscular medetomidine alone (100 µg/kg) and the second group received only saline (0.5 ml/5 kg). Intraocular pressure (IOP) values were measured immediately before (T0) and after the injections at 15 mins (T15) and 25 mins (T25) in both groups. RESULTS: Sedation with medetomidine did not cause a statistically significant change in the mean IOP values. The pretreatment mean ± SD IOPs in the treatment and control groups were 16.2 ± 3.1 and 15.9 ± 4.0 mmHg, respectively. In the medetomidine group the mean ± SD IOPs at T15 and T25 were 16.1 ± 4.1 (P = 0.9) and 14.6 ± 2.2 (P = 0.1). CONCLUSIONS AND RELEVANCE: Based on this study in healthy cats, medetomidine may be a good choice as a sedative agent in uncooperative cats when IOP measurements are needed. Further investigations in cats with abnormal IOPs are warranted.

Genome characterization of feline morbillivirus from Italy.
Marcacci M, De Luca E, Zaccaria G et al.
Feline morbillivirus (FeMV) has been recently identified by RT-PCR in the urine sample of a nephropathic cat in Italy. In this report, we describe the whole genome sequence of strain Piuma/2015 obtained by combination of sequence independent single primer amplification method (SISPA) and next generation sequencing (NGS) starting from RNA purified from the infected urine sample. The existence in Germany and Turkey of FeMVs from cats divergent from Piuma/2015, suggests the presence of FeMV heterogeneity in Europe as it has been described previously in Japan and China.

 Guardians’ Perceptions of Cats’ Welfare and Behavior Regarding Visiting Veterinary Clinics.
Mariti C, Bowen JE, Campa S, Grebe G, Sighieri C, Gazzano A
J Appl Anim Welf Sci (2016) 1-10
To assess the welfare of cats at the veterinary clinic and how caregivers and veterinarians affect it, a survey of Italian cat guardians (n = 1,111) was conducted using a 28-item multiple-choice questionnaire. Most cats showed impaired welfare during all stages of a clinic visit: before entering, in the waiting room, moving to the examination room, on the examination table, and after returning home. A relationship was found between welfare states in each stage. Stress worsened with further experience and had negative effects on traveling and handling in other situations. Restraint, pain, and anxiety led to aggression toward vets and guardians. Guardians showed a positive attitude toward their cats’ health and welfare, and the veterinarians’ behavior toward the cats was a reason for changing the veterinarian. One in 10 veterinarians examined the cat immediately, without stroking, talking, or offering food. However, the use of food was effective only if cats were not already stressed. Educating guardians and veterinarians to minimize stress during every stage of a clinic visit is the best approach to improving welfare for cats visiting the clinic.

**Beyond the skeleton: the role of vitamin D in companion animal health.**
Mellanby RJ
*J Small Anim Pract* (2016) 57:175-180
While the role of vitamin D in the maintenance of skeletal health has been well-established for many years, the discovery that many non-skeletal tissues express the vitamin D receptor stimulated renewed interest in vitamin D and its wider physiological roles. Subsequently, a vast literature has emerged over the past three decades which has linked vitamin D deficiency to the development of many human diseases including cancer, autoimmune, infectious and cardiovascular disorders. In contrast, the role vitamin D plays in the physiology of non-skeletal tissues in cats and dogs has received little attention. The situation is now starting to change with the publication of several studies that have indicated that vitamin D metabolism is deranged in numerous companion animal disorders. This article reviews the biology of vitamin D in companion animals and highlights some of the recent studies which have advanced understanding of vitamin D homeostasis in cats and dogs. Finally, the essay discusses how a “One Health” approach could further the understanding of vitamin D metabolism in mammals. Investigating vitamin D homeostasis in companion animals offers many advantages compared to human studies in which vitamin D status is influenced by many more variables.

**Retrospective evaluation of toceranib phosphate (Palladia®) toxicity in cats.**
Merrick CH, Pierro J, Schleis SE et al.
*Vet Comp Oncol* (2016) The purpose of this study was to describe the toxicity profile of toceranib phosphate in tumour bearing cats. Medical records were reviewed from seven institutions. Patients with incomplete medical records and those receiving concurrent chemotherapy or NSAIDs (non-steroidal anti-inflammatory) were excluded. Fifty-five cats met the inclusion criteria. Carcinoma was diagnosed in 55% of cases. Median oral toceranib dose was 2.7 mg kg(-1) and was most commonly administered on Monday, Wednesday and Friday. Thrombocytopenia (16.3%) and neutropenia (9.1%) were the most common haematologic toxicities. Azotemia (14.5%) and alanine aminotransferase (ALT) elevations (7.2%) were the most frequently encountered biochemical alterations. Gastrointestinal (GI) toxicity was seen in 21.8% of cats, and was lower than previously reported in dogs. The results of this study showed that treatment of cats with toceranib is well-tolerated and toxicity is uncommon. Additional studies to define a more structured dosing schedule and to evaluate the efficacy of toceranib in the treatment of feline cancers are needed.

Comparison of perioperative and short-term postoperative complications of gastrointestinal biopsies via laparoscopic-assisted technique versus laparotomy.
Mitterman L, Bonczynski J, Hearon K, Selmic LE
Can Vet J (2016) 57:395-400
This retrospective report describes perioperative and short-term postoperative complications of gastrointestinal biopsies obtained via a laparoscopic-assisted technique compared with laparotomy in a population of 60 client-owned dogs and cats with naturally occurring gastrointestinal disease. The medical records were examined for patients that underwent surgery for diagnostic gastrointestinal biopsies. Data were collected regarding perioperative complications such as hypotension, hypercarbia, and hypoxemia, and short-term postoperative complications including seroma and incisional infection/inflammation. The perioperative complication rate was 17.6% for the laparoscopically assisted group and 16.6% for the control group. The short-term postoperative complication rate was 5.9% for the laparoscopically assisted group and 0% for the control group. There was a 0% rate of intestinal dehiscence. There were no statistically significant differences in complication rates between the 2 groups, showing that laparoscopic-assisted gastrointestinal biopsies can be performed with acceptable perioperative and short-term postoperative complication rates. Abstract available from the publisher.

Novel Feline Leukemia Virus Interference Group Based on the env Gene.
Miyake A, Watanabe S, Hiratsuka T et al.
Feline leukemia virus (FeLV) subgroups have emerged in infected cats via the mutation or recombination of the env gene of subgroup A FeLV (FeLV-A), the primary virus. We report the isolation and characterization of a novel env gene, TG35-2, and report that the TG35-2 pseudotype can be categorized as a novel FeLV subgroup. The TG35-2 envelope protein displays strong sequence identity to FeLV-A Env, suggesting that selection pressure in cats causes novel FeLV subgroups to emerge.

Gastrointestinal parasites of cats in Brazil: frequency and zoonotic risk.
Monteiro MF, Ramos RA, Calado AM et al.
Gastrointestinal helminths are considered to be the most common parasites affecting cats worldwide. Correct diagnosis of these parasites in animals living in urban areas is pivotal, especially considering the zoonotic potential of some species (e.g. Ancylostoma sp. and Toxocara sp.). In this study, a copromicroscopic survey was conducted using fecal samples (n = 173) from domestic cats living in the northeastern region of Brazil. Samples were examined through the FLOTAC technique and the overall results showed positivity of 65.31% (113/173) among the samples analyzed. Coinfections were observed in 46.01% (52/113) of the positive samples. The most common parasites detected were Ancylostoma sp., Toxocara cati, Strongyloides stercoralis, Trichuris sp., Dipylidium caninum and Cystoisospora sp. From an epidemiological point of view, these findings are important, especially considering that zoonotic parasites (e.g. Ancylostoma sp. and Toxocara sp.) were the nematodes most frequently diagnosed in this study. Therefore, the human population living in close contact with cats is at risk of infection caused by the zoonotic helminths of these animals. In addition, for the first time the FLOTAC has been used to diagnosing gastrointestinal parasites of cats in Brazil.

Effect of Acarbose, Sitagliptin and combination therapy on blood glucose, insulin, and incretin
hormone concentrations in experimentally induced postprandial hyperglycemia of healthy cats.
Mori A, Ueda K, Lee P et al.
Acarbose (AC) and Sitagliptin (STGP) are oral hypoglycemic agents currently used either alone or in conjunction with human diabetic (Type 2) patients. AC has been used with diabetic cats, but not STGP thus far. Therefore, the objective of this study was to determine the potential use of AC or STGP alone and in combination for diabetic cats, by observing their effect on short-term post-prandial serum glucose, insulin, and incretin hormone (active glucagon-like peptide-1 (GLP-1) and total glucose dependent insulinotropic polypeptide (GIP)) concentrations in five healthy cats, following ingestion of a meal with maltose. All treatments tended (p<0.10; 5-7.5% reduction) to reduce postprandial glucose area under the curve (AUC), with an accompanying significant reduction (p<0.05, 35-45%) in postprandial insulin AUC as compared to no treatment. Meanwhile, a significant increase (p<0.05) in postprandial active GLP-1 AUC was observed with STGP (100% higher) and combined treatment (130% greater), as compared to either AC or no treatment. Lastly, a significant reduction (p<0.05) in postprandial total GIP AUC was observed with STGP (21% reduction) and combined treatment (7% reduction) as compared to control. Overall, AC, STGP, or combined treatment can significantly induce positive post-prandial changes to insulin and incretin hormone levels of healthy cats. Increasing active GLP-1 and reducing postprandial hyperglycemia appear to be the principal mechanisms of combined treatment. Considering the different, but complementary mechanisms of action by which AC and STGP induce lower glucose and insulin levels, combination therapy with both these agents offers great potential for treating diabetic cats in the future.

Retrospective comparison of negative-pressure wound therapy and silver-coated foam dressings in open-wound treatment in cats.
Nolff MC, Fehr M, Reese S, Meyer-Lindenberg AE
OBJECTIVES: The objective of this study was to evaluate negative-pressure wound therapy (NPWT) for the treatment of complicated wounds in cats. METHODS: Twenty cats undergoing open-wound treatment in two clinics were classed according to treatment method: NPWT (group A, n = 10) and polyurethane foam dressing (group B, n = 10). Pairs of patients from each group were matched based on wound conformation, localisation and underlying cause. Cats from both groups were compared in terms of duration of previous treatment, time to closure and complications. RESULTS: Signalment, duration of previous treatment, antibiotic and antiseptic treatment, and bacterial status were comparable between groups. Total time to wound closure was significantly shorter (ITALIC! P = 0.046, strong effect size; Cohen d = 0.8) in group A (25.8 days, range 11.0-57.0 days) compared with group B (39.5 days, range 28.0-75.0 days). NPWT-treated wounds suffered fewer complications and became septic less frequently during treatment compared with wounds treated with a foam dressing. The progression of fat tissue necrosis was particularly well controlled under NPWT, resulting in fewer deaths due to this condition in this group. However, although a strong effect of NPWT on the progression of infection, fever and sepsis was detected (Cramer-V 0.5), this difference was not significant. CONCLUSIONS AND RELEVANCE: This study demonstrated that time to healing was considerably shorter, and complication rate lower, in NPWT-treated animals compared with foam dressing-treated cats. In particular, the effective management of infection by NPWT emphasises the value of NPWT in the treatment of cats suffering from infected wounds.

The pharmacokinetics of intravenous fenoldopam in healthy, awake cats.
O’Neill KE, Labato MA, Court MH
Fenoldopam is a selective dopamine-1 receptor agonist that improves diuresis by increasing renal blood flow and perfusion and causing peripheral vasodilation. Fenoldopam has been shown to induce diuresis and be well-tolerated in healthy cats. It is used clinically in cats with oliguric kidney injury at doses extrapolated from human medicine and canine studies. The pharmacokinetics in healthy beagle dogs has been reported; however, pharmacokinetic data in cats are lacking. The goal of this study was to determine pharmacokinetic data for healthy, awake cats receiving an infusion of fenoldopam. Six healthy, awake, client-owned cats aged 2-6 years old received a 120-min constant rate infusion of fenoldopam at 0.8 μg/kg/min followed by a 20-min washout period. Ascorbate stabilized plasma samples were collected during and after the infusion for the measurement of fenoldopam concentration by HPLC with mass spectrometry detection. This study showed that the geometric mean of the volume of distribution, clearance, and half-life (198 mL/kg, 46 mL/kg/min, and 3.0 mins) is similar to pharmacokinetic parameters for humans. No adverse events were noted. Fenoldopam at a constant rate infusion of 0.8 μg/kg per min was well tolerated in healthy cats. Based on the results, further evaluation of fenoldopam in cats with kidney disease is recommended.

Comparison of Serum Spec fPL(™) and 1,2-o-Dilauryl-Rac-Glycero-3-Glutaric Acid-(6'-Methylresorufin) Ester Assay in 60 Cats Using Standardized Assessment of Pancreatic Histology.

Oppliger S, Hilbe M, Hartnack S, Zini E, Reusch CE, Kook PH


BACKGROUND: Feline pancreas-specific lipase (Spec fPL) is considered a useful test for the antemortem diagnosis of pancreatitis in cats. A recent study found good agreement between the results of the Spec fPL and catalytic 1,2-o-dilauryl-rac-glycero-3-glutaric acid-(6'-methylresorufin) ester (DGGR) lipase assay. Prospective studies evaluating their sensitivity and specificity are lacking.

OBJECTIVES: To compare the results of the Spec fPL and the DGGR assay with a standardized histologic assessment of the pancreas.

ANIMALS: Sixty client-owned cats presented for necropsy.

METHODS: PROSPECTIVE STUDY: Spec fPL concentrations and serum DGGR lipase activity were measured from the same blood sample. The pancreas was removed within 3 hours after euthanasia; serial transverse sections were made every 0.5 cm throughout the entire pancreas and reviewed using a histologic grading scheme. Sensitivity and specificity for the Spec fPL and DGGR assay results were determined.

RESULTS: The sensitivity and specificity for the Spec fPL assay (cutoff value ≥5.4 μg/L) was 42.1 [95% confidence interval (95% CI), 29.4-55.9%] and 100% (95% CI, 31.0-100.0%). The sensitivity and specificity for the DGGR assay (cutoff value >26 U/L) was 36.8 (95% CI, 24.7-50.7%) and 100% (95% CI, 31.0-100.0%). When lymphocytic inflammation up to 10% of a section was considered normal, the sensitivity and specificity for Spec fPL assay (cutoff value ≥5.4 μg/L) was 61.1 (95% CI, 36.1-81.7%) and 69.0% (95% CI, 52.8-81.9%) and the sensitivity and specificity for the DGGR assay (cutoff value >26 U/L) was 66.7 (95% CI, 41.2-85.6%) and 78.6% (95% CI, 62.8-89.2%).

CONCLUSIONS AND CLINICAL IMPORTANCE: Both lipase assays performed similarly well, but their agreement with histologic pancreatic inflammation was limited.

Congenital and inherited neurologic diseases in dogs and cats: Legislation and its effect on purchase in Italy.

Passantino A, Masucci M


Many of the congenital neurologic diseases can result in incapacity or death of the animal. Some of them, such as idiopathic epilepsy and hydrocephalus, exhibit breed or familial predisposition and a genetic basis was proved or suggested. Some diseases can be presumptively diagnosed after a detailed
signalment (breed predisposition), history (e.g. family history because many of these defects have familial tendencies), and through physical exam; other diagnostic methods (radiography, computed tomography, magnetic resonance, electrophysiologic tests, etc.) can provide supportive evidence for the congenital defect and help to confirm the diagnosis. Some cases can lead to civil law-suits when the lesions are congenital, but not easily recognizable, or when the lesions are hereditary but tend to became manifest only after some time (more than 12 months after the date of purchase, e.g., after the vice-free guarantee period has expired). Moreover, quite frequently an early diagnosis is not made because there are delays in consulting the veterinarian or the general practitioner veterinarian does not perceive subtle signs. This study was designed to focus on the medico-legal aspects concerning the buying and selling in Italy of dogs and cats affected by congenital and hereditary neurologic diseases that could constitute vice in these animals. While adequate provisions to regulate in detail the various aspects of pet sale have still to be drawn up by legislators, it may be helpful to involve breeders, by obliging them by contract to extend guarantees in the case of hereditary lesions, including neurologic diseases.

Parasitic zoonoses associated with dogs and cats: a survey of Portuguese pet owners’ awareness and deworming practices.


BACKGROUND: Parasitic diseases of companion animals comprise a group of globally distributed and rapidly spreading illnesses that are caused by a wide range of arthropods, helminths and protozoa. In addition to their veterinary importance, many of these parasites can also affect the human population, due to their zoonotic potential. The aim of the present work was to evaluate the knowledge of Portuguese pet owners regarding the zoonotic potential of parasites that dogs and cats can harbour, most common drugs, frequency of use and reasons for endo- and ectoparasite control. METHODS: Seventy hundred and fifty multiple-choice questionnaires designed to obtain data knowledge about the meaning of zoonosis, knowledge about parasitic diseases and perception regarding their zoonotic potential, as well as the drugs, frequency and reason for deworming their animals were delivered to dog and/or cat owners from non-rural (i.e. urban or semi-urban) and rural parishes who attended veterinary medical centres from continental Portugal. RESULTS: A total of 536 (71.5 %) questionnaires were retrieved. Two hundred and ninety five (56.5 %) responders had heard of zoonosis/zoonoses, but only 184 (35.2 %) knew their meaning. Tick fever, mange, leishmaniosis and ascaridiosis/roundworms were the parasitic diseases from pets most frequently identified. The number of owners who recognized the different parasitoses, who stated to have heard about zoonoses and who were aware of the potential transmission of parasites from animals to humans was significantly higher in those with intermediate (i.e. ≥9 and ≤ 12 years of schooling) and/or higher academic degree (i.e. licentiate, master’s and/or doctorate degrees). The combinations of febantel-pyrantel-praziquantel (23.5 %) and milbemycin-praziquantel (34.5 %) were the most widely endoparasitic drugs used in dogs and in cats, respectively. The most common ectoparasiticide used in dogs was a combination of imidacloprid-permethrin (33.4 %), while in cats it was imidacloprid (26.3 %) followed by fipronil (25.4 %). The most used treatment schedule against internal and external parasites in dogs and cats was an administration every three months and the main reason to do it was as a prophylactic purpose. CONCLUSIONS: The majority of Portuguese owners that attended veterinarian clinics use endoparasiticides and ectoparasiticides in/on their pets as a prophylactic measure, although in many cases not in the correct schedule of treatment. In addition, most of them are not aware of the possible transmission of parasites from their dogs and cats to themselves, a fact which highlights the important role of veterinarians in the continuous implementation of effective control measures to reduce the risk of parasitic infections in
Detection of vector-borne pathogens in cats and their ectoparasites in southern Italy.
Persichetti MF, Solano-Gallego L, Serrano L et al. 
*Parasit Vectors* (2016) 9:247

BACKGROUND: Vector-borne pathogens are the subject of several investigations due to the zoonotic concern of some of them. However, limited data are available about the simultaneous presence of these pathogens in cats and their ectoparasites. The aim of the present study was to define the species of ectoparasites found on cats as well as to investigate vector-borne pathogens in cats and their ectoparasites in southern Italy. METHODS: Blood from 42 cats and fleas or flea pools (n = 28) and ticks (n = 73) collected from them were investigated by quantitative PCR for the detection of vector-borne pathogens. Feline serum samples were tested by IFAT to detect IgG antibodies against Leishmania infantum, Bartonella henselae, Rickettsia conorii, Rickettsia felis, Rickettsia typhi, Babesia microti, Ehrlichia canis and Anaplasma phagocytophilum antigens. RESULTS: Only one flea species (Ctenocephalides felis) and four tick species belonging to the genera Rhipicephalus and Ixodes were identified on cats from southern Italy. Molecular evidence of Bartonella spp., Rickettsia spp., hemoplasmas, Babesia vogeli and L. infantum was found in ectoparasites (fleas and/or ticks) while DNA from Hepatozoon felis and Ehrlichia/Anaplasma spp. was not detected. Likewise, DNAs from Bartonella, hemoplasma and Leishmania were the only pathogens amplified from feline blood samples. Cats had also antibodies against all the investigated pathogens with the exception of Rickettsia typhi. Agreement between serological and molecular results in individual cats and their ectoparasites was not found. The only exception was for Bartonella with a fair to moderate agreement between individual cats and their ectoparasites. Bartonella clarridgeiae was the species most frequently found in cats and their fleas followed by B. henselae. CONCLUSIONS: In conclusion, cats harboring ticks and fleas are frequently exposed to vector-borne pathogens. Furthermore, ticks and fleas harbored by cats frequently carry pathogens of zoonotic concern therefore appropriate feline ectoparasiticide preventative treatments should be used in cats.

Evaluation of quantitative thyroid scintigraphy for diagnosis and staging of disease severity in cats with hyperthyroidism: comparison of the percent thyroidal uptake of pertechnetate to thyroid-to-salivary ratio and thyroid-to-background ratios.
Peterson ME, Guterl JN, Rishniw M, Broome MR

Thyroid scintigraphy is commonly used for evaluation of cats with hyperthyroidism, with the thyroid-to-salivary ratio (T/S) being the most common method to quantify the degree of thyroid activity and disease. Calculation of thyroid-to-background ratios (T/B) or percent thyroidal uptake of (99m) TcO4 (TcTU) has only been reported in a few studies. The purpose of this prospective, cross-sectional study was to evaluate a number of quantitative scintigraphic indices as diagnostic tests for hyperthyroidism, including the T/S, three different T/B, TcTU, and estimated thyroid volume. Of 524 cats referred to our clinic for evaluation of suspected hyperthyroidism, the diagnosis was confirmed (n = 504) or excluded (n = 20) based on results of a serum thyroid panel consisting of thyroxine (T4), triiodothyronine (T3), free T4 (fT4), and thyroid-stimulating hormone (TSH) concentrations. In the hyperthyroid cats, median values for TcTU, T/S, and three T/B ratios were all significantly higher (P < 0.001) than values in euthyroid suspect cats or clinically normal cats. All scintigraphic parameters were relatively sensitive and specific as diagnostic tests for hyperthyroidism, but the T/S ratio had the highest test accuracy. The T/S ratio correlated strongly with the TcTU (r = 0.85). However, the TcTU had a higher and more significant correlation (P < 0.01) with serum T4 (r = 0.76 vs. 0.64), T3 (r = 0.77
vs. 0.64), and estimated thyroid volume \((r = 0.62 \text{ vs. } 0.38)\). Overall, calculation of TcTU is an accurate diagnostic test, but also appears to be the best parameter to predict the functional volume and metabolic activity of the feline adenomatous thyroid gland.

[Perioperative pain therapy in dogs and cats - an overview].
Pieper K  
_Tierzarl Prax Ausg K Kleintiere Heimtiere_ (2016) **44**:200-208  
Undermanaged pain leads to negative systemic effects that may greatly disturb our patients’ welfare. Therefore, a pain assessment tool should be routinely implemented into clinical practice. Validated pain assessment tools are available for dogs and cats. Advanced analgesic therapy follows the principle of a multimodal approach. This means that different analgesic drugs, which act on different targets within the nociceptive pathway, are combined to achieve the desired analgesic effects. In addition to opioids, nonsteroidal anti-inflammatory drugs and local anaesthetics, \(\alpha2\)-receptor-agonists, ketamine and gabapentin as well as different nonpharmacologic analgesic techniques are used within the framework of a multimodal analgesic plan.

Febrile neutropenia in cats treated with chemotherapy.
Pierro J, Krick E, Flory A et al.  
_Vet Comp Oncol_ (2016)  
The purpose of this study was to describe the clinical presentation, potential causative agents, treatment and outcome of febrile neutropenia (FN) in chemotherapy-treated cats. Medical records from eight institutions were retrospectively reviewed. A total of 22 FN events in 20 cats were evaluated. Lymphoma was the most common cancer diagnosis; lomustine and vinca alkaloids were the most frequently implicated causative agents. Presenting clinical signs included decreased appetite, lethargy, vomiting and diarrhoea. Median body temperature and absolute neutrophil count at presentation were 104.1 °F; 40 °C (range: 103.1-105.1 °F; 39.5-40.6 °C) and 246 mL(-1) (range: 0-1600 mL(-1)), respectively. Median number of days between chemotherapy administration and FN onset was 5 (range: 4-25 days). All but one cat were treated with intravenous fluids and broad spectrum antibiotics. Fevers resolved in all cases and absolute neutrophil counts returned to normal in 19 cats. Clinical presentation of cats with FN appears similar to that of dogs.

Genotyping of feline leukemia virus in Mexican housecats.
Ramírez H, Autran M, García MM, Carmona MÁ, Rodríguez C, Martínez HA  
_Arch Virol_ (2016) **161**:1039-1045  
Feline leukemia virus (FeLV) is a retrovirus with variable rates of infection globally. DNA was obtained from cats’ peripheral blood mononuclear cells, and proviral DNA of pol and env genes was detected using PCR. Seventy-six percent of cats scored positive for FeLV using env-PCR; and 54 %, by pol-PCR. Phylogenetic analysis of both regions identified sequences that correspond to a group that includes endogenous retroviruses. They form an independent branch and, therefore, a new group of endogenous viruses. Cat gender, age, outdoor access, and cohabitation with other cats were found to be significant risk factors associated with the disease. This strongly suggests that these FeLV genotypes are widely distributed in the studied feline population in Mexico.

Reis ÉG, Schubach TM, Pereira SA et al.  
_Med Mycol_ (2016)
Feline sporotrichosis is an endemic disease in Rio de Janeiro, Brazil, where zoonotic transmission of Sporothrix spp. has been reported since 1998. Itraconazole (ITZ) remains the first choice for treating this disease in cats. However, there have been reports of therapeutic failure and a long-term endeavor. Potassium iodide (KI), considered in the past as a drug with variable effectiveness in cats with sporotrichosis, arises as an important option in the treatment of cats from the endemic area of Rio de Janeiro. In order to evaluate the effectiveness of the association of ITZ and KI in naive cats with sporotrichosis, a prospective cohort study was conducted on 30 cats receiving ITZ 100 mg/day and KI 2.5 mg-20 mg/kg/day. Clinical and laboratory adverse effects were assessed once a month according to the standard care protocol. The cure rate was 96.15% within a median of 14 weeks of treatment. Adverse effects were observed in 50% of cats and were managed with a temporary drug suspension and/or a hepatoprotective therapy. The association of ITZ and KI emerges as an effective option for the treatment of feline sporotrichosis.

Clinical and laboratory features of cats with feline infectious peritonitis - a retrospective study of 231 confirmed cases (2000-2010).
Riemer F, Kuehner KA, Ritz S, Sauter-Louis C, Hartmann K
OBJECTIVES: The objectives of this study were to review signalment, clinical signs and laboratory features in a large number of naturally occurring cases of feline infectious peritonitis (FIP), and to evaluate potential changes in diagnostic criteria for FIP and compare findings in cats with and without effusion. METHODS: The medical records of 231 cats with confirmed FIP that presented to the Clinic of Small Animal Medicine of the Ludwig-Maximilian University of Munich, Germany, were reviewed for signalment, history, and clinical and laboratory parameters. Age, sex and breed distribution of the cats were compared with the clinic population. RESULTS: Male sex and young age were significantly correlated with FIP. Neutering status was not associated with FIP. No breed predisposition was observed and the majority of cats presented were domestic shorthair and mixed breed. Microcytosis of peripheral erythrocytes was found in 35.1% of cats, of which 42.4% did not have concurrent anaemia. Band neutrophilia was documented in 44.3% (81/183), of which 35.8% did not have mature neutrophilia. Lymphopenia, observed significantly more often with effusion, was documented in only 26.8% of cats without effusion. Hyperbilirubinaemia also occurred significantly more often in cats with vs without effusion. While serum total protein was increased in only 17.5% of cats, hyperglobulinaemia was documented in 89.1%. Nearly 85.0% of cats had an albumin-to-globulin (A:G) ratio <0.8, while 67.8% had an A:G ratio <0.6. CONCLUSIONS AND RELEVANCE: Microcytosis was common and can increase suspicion of FIP in the presence of other typical clinical and laboratory abnormalities. The low prevalence of lymphopenia in cats without effusion suggests that this is not a useful parameter in non-effusive FIP. The frequent occurrence of a left shift in the absence of a mature neutrophilia complicates the differentiation of effusive FIP and septic peritonitis. Globulins and A:G ratio were of higher diagnostic value than hyperproteinaemia.

Systemic Trichosporon loubieri infection in a cat.
Rissi DR, Kirby KD, Sanchez S
Our study describes a case of systemic Trichosporon loubieri infection in a cat with acute dyspnea, anorexia, and aggressiveness. Physical examination revealed multiple ulcerative cutaneous lesions on the abdomen, neck, and thorax. Thoracic radiographs and ultrasound showed multiple mediastinal nodules and marked pleural effusion, respectively. A cutaneous biopsy from the ulcerated wounds revealed necrogranulomatous dermatitis and panniculitis with numerous intralesional fungal hyphae.
Fungal culture on fresh swab samples from the cutaneous lesions yielded growth of a fungal organism that was further identified as Trichosporon loubieri by PCR and DNA sequencing. The cat was subsequently euthanized and submitted to autopsy. Gross pathology changes consisted of multifocal to coalescing white nodules ranging from 5 to 10 mm in diameter that expanded the mediastinal fat, intrathoracic lymph nodes, lungs, and costal pleura. These lesions consisted of areas of necrogranulomatous inflammation with numerous intralesional fungal hyphae morphologically similar to those observed in the cutaneous biopsy sample. Gross and histologic changes were consistent with a systemic fungal infection, and the etiologic diagnosis was supported by fungal culture. Fungal identity was confirmed by DNA sequencing of D1-D2 and TS1 regions.

**Evaluation of red blood cell distribution width as a prognostic indicator in cats with acquired heart disease, with and without congestive heart failure.**

Roderick KV, Abelson AL, Nielsen L, Price LL, Quinn R

*J Feline Med Surg* (2016)

**OBJECTIVES:** Congestive heart failure secondary to cardiomyopathy is a common manifestation of cardiac disease in cats, carrying a variable prognosis. The objective of this retrospective study is to evaluate the relationship between red blood cell distribution width (RDW) and survival time in feline patients with acquired heart disease with and without congestive heart failure (CHF).

**METHODS:** Three hundred and forty-nine client-owned cats with echocardiograms and complete blood count, including RDW measurement, performed between March 2006 and December 2011, were included in the study. Patient characteristics, including signalment, hematocrit, RDW, echocardiographic parameters and survival, were recorded. Comparisons between RDW in cats with asymptomatic acquired heart disease and those with CHF were made. Survival was documented and compared at 30 days and 6 months.

**RESULTS:** CHF was present in 80 cats and absent in 269 cats. Cats with CHF had an increase in mortality compared with cats without CHF at 30 days and 6 months (P = 0.007 and P = 0.04, respectively). RDW was not significantly associated with survival in cats with or without CHF at 30 days or 6 months. A significant difference was found between median RDW values in cats with CHF vs cats without CHF (16.3% vs 15.8%; P = 0.02). The median RDW value was significantly higher in cats with unclassified cardiomyopathy compared with cats with other types of cardiomyopathy (16.3% vs 15.8%; P = 0.03).

**CONCLUSIONS AND RELEVANCE:** Single RDW values did not predict mortality in cats with acquired heart disease but may be useful in determining if cats have decompensated heart disease and CHF. Human studies indicate incremental increases in serial RDW measurements are associated with decreased survival; serial RDW measurements in cats may be an area of future study.

Sensitivity of fecal occult blood testing in the cat.

Rudinsky AJ, Guillaumin J, Gilor C

*J Feline Med Surg* (2016)

**OBJECTIVES:** The impact of dietary factors on fecal occult blood (FOB) testing has been previously evaluated in cats, but the analytical sensitivity of this point-of-care test remains unexamined. The primary goal of this study was to assess the analytical sensitivity of the FOB test in cats.

**METHODS:** Five cats were used in a repeated measures study. Following oral administration of blood, feces were collected and tested every 12 h for FOB and melena. All cats were fed an animal protein-free diet starting the week before entry into the study. Blood was administered on a milligram of hemoglobin per kilogram of body weight basis, and dosed at 1.5, 3, 15, 30 and 45 mg/kg hemoglobin in series with a wash-out period between each trial.

**RESULTS:** FOB was detected in one cat at 1.5 mg/kg hemoglobin, three cats at 3 mg/kg hemoglobin and in all five cats at 15, 30 and 45 mg/kg hemoglobin.
Melena was noted in one cat at 30 mg/kg and four cats at 45 mg/kg, but not at lower doses.

CONCLUSIONS AND RELEVANCE: Administration of 15 mg/kg hemoglobin (equivalent to about 1.5 ml blood) was sufficient for positive results in all cats. However, detection occurred with as little as 1.5 mg/kg hemoglobin. Thus, FOB has good analytical sensitivity in cats under appropriate clinical situations.

**Seasonality in the proportions of domestic cats shedding Toxoplasma gondii or Hammondia hammondi oocysts is associated with climatic factors.**

Schares G, Ziller M, Herrmann DC, Globokar MV, Pantchev N, Conraths FJ

A previous study on domestic cats in Germany and neighbouring countries suggested seasonality in shedding Toxoplasma gondii oocysts. The aim of the present study was to elucidate whether this seasonality in shedding could be explained by climatic effects and whether differences between years in the proportions of cats shedding oocysts could also be explained by climatic factors. To this end, a long-term study over a period of 55 months on domestic cats for *T. gondii* and *Hammondia hammondi* oocysts was performed and the results compared with climatic data. Using species-specific PCR, *T. gondii* oocysts were identified in 0.14% (84/61,224) and *H. hammondi* in 0.10% (61/61,224) of the samples. Toxoplasma gondii oocysts were predominantly observed from summer to autumn, while *H. hammondi* oocysts were mainly found during autumn and winter. In statistical analyses using climatic data, even differences in parasitological findings between years could be partially modelled using monthly temperature, North Atlantic Oscillation indices and precipitation. Of the three climatic variables analysed, precipitation as an explanatory variable had the lowest impact in the statistical models while those taking only temperature and North Atlantic Oscillation indices into account were sufficiently predictive. Interestingly, time lags between the climatic event and the parasitological findings had to be implemented in all models. For *T. gondii*, North Atlantic Oscillation indices with a time lag of 7 months and temperature with a time lag of 2 months had the best predictive value. In contrast, temperature (with a time lag of 6 months) and the interaction of precipitation (with a time lag of 5 months) and North Atlantic Oscillation indices (with a time lag of 11 months) were optimal for predicting the seasonality of *H. hammondi*. These results suggest prominent differences in the life cycles of the two closely related parasites. Previous findings showed that *H. hammondi* lack avian hosts, in contrast to *T. gondii*, and the coincidence in the periods of high abundance of birds and high proportions of cats shedding *T. gondii* suggest that birds may play an important role in the epidemiology of this infection. The result that North Atlantic Oscillation index is an important variable in modelling variations in the proportion of cats shedding *T. gondii* and *H. hammondi* over the year is an indication that global warming may also influence the infection risk of animals and humans with *T. gondii* and *H. hammondi*. The findings have important implications for planning epidemiological studies and for estimating the risk of human infection.


**Plasma bupivacaine concentrations following orbital injections in cats.**

Shilo-Benjamini Y, Pypendop BH, Newbold G, Pascoe PJ
*Vet Anaesth Analg* (2016)

OBJECTIVE: To determine plasma bupivacaine concentrations after retrobulbar or peribulbar injection of bupivacaine in cats. STUDY DESIGN: Randomized, crossover, experimental trial with a 2 week washout period. ANIMALS: Six adult healthy cats, aged 1-2 years, weighing 4.6 ± 0.7 kg. METHODS:
Cats were sedated by intramuscular injection of dexmedetomidine (36-56 μg kg(-1)) and were administered a retrobulbar injection of bupivacaine (0.75 mL, 0.5%; 3.75 mg) and iopamidol (0.25 mL), or a peribulbar injection of bupivacaine (1.5 mL, 0.5%; 7.5 mg), iopamidol (0.5 mL) and 0.9% saline (1 mL) via a dorsomedial approach. Blood (2 mL) was collected before and at 5, 10, 15, 22, 30, 45, 60, 120, 240 and 480 minutes after bupivacaine injection. Atipamezole was administered approximately 30 minutes after bupivacaine injection. Plasma bupivacaine and 3-hydroxy-bupivacaine concentrations were determined using liquid chromatography-mass spectrometry. Bupivacaine maximum plasma concentration (Cmax) and time to Cmax (Tmax) were determined from the data. RESULTS: The bupivacaine median (range) Cmax and Tmax were 1.4 (0.9-2.5) μg mL(-1) and 17 (4-60) minutes, and 1.7 (1.0-2.4) μg mL(-1), and 28 (8-49) minutes, for retrobulbar and peribulbar injections, respectively. In both treatments the 3-hydroxy-bupivacaine peak concentration was 0.05-0.21 μg mL(-1). CONCLUSIONS AND CLINICAL RELEVANCE: In healthy cats, at doses up to 2 mg kg(-1), bupivacaine peak plasma concentrations were approximately half that reported to cause arrhythmias or convulsive electroencephalogram (EEG) activity in cats, and about one-sixth of that required to produce hypotension.

Prevalence of Leishmania infantum and co-infections in stray cats in northern Italy.
Spada E, Canzi I, Baggiani L et al.
Stray cats in the city of Milan, Italy, were tested for Leishmania infantum and other selected infections. Twenty-seven cats (30.0%) were seroreactive by indirect fluorescent antibody test (IFAT), with an antibody titer of 1:40 for 16 (17.7%) cats and 1:80 (cut-off for feline L. infantum infection) for 11 (12.2%) cats. One blood (1.1%) and one popliteal lymph node (1.1%) sample tested positive by real-time polymerase chain reaction; no oculoconjunctival swabs tested positive. Feline immunodeficiency virus, feline leukemia virus, and feline coronavirus (FCoV) seroprevalence determined by enzyme-linked immunosorbent assay was 6.1, 6.1, and 39.0%, respectively. Toxoplasma gondii, Bartonella henselae, and Chlamyphilia felis prevalence determined by IFAT was 29.3, 17.1, and 17.1%, respectively. The frequency of seroreactivity to L. infantum was significantly higher in FCoV-seropositive cats (OR=4.4, P=0.04). L. infantum-infected stray cats in Milan have a high seropositivity rate, comparable to that of cats in areas endemic for leishmaniosis.

Diagnosis and interpretation of intestinal dysbiosis in dogs and cats.
Suchodolski JS
Vet J (2016)
The intestinal tracts of dogs and cats harbor a highly complex microbiota, which consists of bacteria, fungi, viruses and protozoa. Until recently, traditional bacterial culture was commonly used to identify bacteria present in the gastrointestinal tract, but it is now well recognized that standard plating techniques do not have enough resolution for identification of the mostly anaerobic bacteria that reside within the gut. Molecular methods are now established for assessing intestinal dysbiosis in dogs and cats with gastrointestinal disease, but these approaches are not yet widely available for routine diagnosis. The loss of normal commensal bacterial microbiota (i.e. Lachnospiraceae, Ruminococcaceae, and Faecalibacterium spp.) in acute and chronic intestinal diseases has been linked to metabolic changes, for example alterations in immunomodulatory bacterial metabolites, such as short chain fatty acids and secondary bile acids. This highlights the importance of dysbiosis in the pathophysiology of gastrointestinal diseases. Development of molecular based assays for specific bacterial groups, calculations of microbial dysbiosis indices and assays for microbial functional metabolites are currently underway to help assess dysbiosis. These will yield a better understanding of
the pathophysiology of gastrointestinal diseases and may also lead to new diagnostic and therapeutic approaches to dysbiosis.

**Enterohepatic Helicobacter spp. in cats with non-hematopoietic intestinal carcinoma: a survey of 55 cases.**
Swennes AG, Parry NM, Feng Y et al.

Several enterohepatic Helicobacter spp. (EHS) have been isolated from cats. Despite the reported association between EHS infection and intestinal neoplasia in other species, this association has not been explored in cats. In this study, 55 non-hematopoietic feline intestinal carcinoma cases were histopathologically evaluated. In contrast with prior reports, large intestinal (LI) carcinoma was observed with greater frequency (61%) relative to small intestinal carcinoma. When considered by intestinal location and histopathologic classification, LI adenocarcinoma was associated with significantly advanced mean age (13) when compared to SI adenocarcinoma and LI mucinous adenocarcinoma (mean = 9 in both cases), which were also frequently encountered. To determine whether EHS might play a role in feline intestinal neoplasia, Helicobacter genus- and species-specific fluorescence in situ hybridization was performed. Of these carcinoma cases, 56% were positive for Helicobacter spp. and one or more species-specific assay for H. bilis, H. canis, or H. marmotae. The presence of EHS was significantly associated with both large intestinal location (68%) and mucinous adenocarcinoma (92%). These findings suggest a role for intestinal bacteria in non-hematopoietic feline intestinal neoplasia.

**The effect of water and shampooing on the efficacy of fluralaner spot-on solution against Ixodes ricinus and Ctenocephalides felis infestations in dogs.**
Taenzler J, Gale B, Zschiesche E, Roepke RK, Heckeroth AR
*Parasit Vectors* (2016) 9:233

BACKGROUND: Fluralaner spot-on solution provides immediate and persistent efficacy against tick and flea infestations in dogs and cats for 12-weeks following topical administration. The active ingredient fluralaner is distributed systemically following transdermal absorption. Therefore, this study tested the hypothesis whether water-immersion or shampooing of dogs following administration of fluralaner spot-on solution has an impact on subsequent tick and flea efficacy. METHODS: Thirty-two Beagle dogs were allocated to four study groups of 8 dogs each. On day 0, dogs in the 2 treatment groups received topical administration of fluralaner (Bravecto™ spot-on solution) according to label instructions. Dogs in the 2 corresponding control groups remained untreated. On days 3, 21, 49, and 77 dogs in one treatment group and control group were water-immersed for 2-5 min, while dogs in the other treatment group and control group were shampooed 6-8 min with a commercial foaming micro-emulsion, unscented product. On days 4, 28, 56, and 84 all dogs were co-infested with 50 ± 2 female and 10 ± 2 male Ixodes ricinus and 100 ± 4 Ctenocephalides felis, with tick and flea removal and counts 48 ± 2 h post-infestation. Efficacy against ticks and fleas was calculated for each assessment time point. RESULTS: No treatment-related adverse event was observed in any of the 16 dogs treated with fluralaner spot-on solution during the study. Efficacy against ticks at each assessment time point was between 99.7 and 100 % in the water-immersed group and between 99.2 and 100 % in the shampooed group. Efficacy against fleas was 100 % at each assessment time point as well in the water-immersed as the shampooed group. Tick and flea reduction in both treatment groups was significant at all assessment time points (p < 0.0001). CONCLUSIONS: Neither water-immersion nor shampooing after single topical administration of fluralaner spot-on solution had an impact on the excellent tick and flea efficacy over the 12-week recommended re-treatment interval.
Pharmacokinetic and pharmacodynamic evaluation of high doses of buprenorphine delivered via high-concentration formulations in cats.
Taylor PM, Luangdilok CH, Sear JW
OBJECTIVES: To evaluate the potential benefits of high-dose buprenorphine formulations for analgesia in cats, serial and crossover studies were undertaken to investigate their pharmacokinetics and thermal antinociceptive effects. METHODS: Twelve healthy adult domestic shorthair cats (6.0 ± 1.1 kg body weight) were studied. Aqueous solutions of buprenorphine hydrochloride at 0, 0.02, 0.06, 0.12 and 0.24 mg/kg body weight and formulations containing 0, 0.3, 0.6 and 1.2 mg/ml with and without preservatives were given subcutaneously. Blood samples were taken and thermal threshold (TT) measured prior to and at regular time points up to 72 h after dosing. Descriptive statistics and analyses of variance were applied as appropriate. RESULTS: Baseline TT was 47.6 ± 4.1°C, which increased in all groups treated with all buprenorphine dosages and formulations. After doses of 0.12 mg/kg and above, TT was significantly higher than baseline at most time points from 1-30 h post-treatment. The time to maximum effect (Tmax) ranged between 0.25 and 2.00 h; and plasma concentrations associated with maximum antinociceptive effect (Cmax) were 1.01-1.72 ng/ml after the 0.02 mg/kg dose, 1.4-4.9 ng/ml after the 0.06 mg/kg dose, 4.6-51.4 ng/ml after the 0.12 mg/kg dose and 5.3-22.3 ng/ml after the 0.24 mg/kg dose. The range of estimates for the buprenorphine elimination half-life were as follows: 0.02 mg/kg = 1.35-5.33 h; 0.06 mg/kg = 16.1-31.2 h; 0.12 mg/kg = 10.1-34.0 h; and 0.24 mg/kg = 16.1-31.6 h. The mean ‘plasma concentration for the offset of analgesia’ was 2.3 ± 2.0 ng/ml. No adverse effects were seen. The addition of preservatives to a high-concentration buprenorphine formulation had no impact on antinociception nor any side effects. CONCLUSIONS AND RELEVANCE: Aqueous high-concentration buprenorphine formulations administered at 0.12 or 0.24 mg/kg have potential for clinical use in cats, providing prolonged antinociception in a single subcutaneous injection of minimal dose volume.

A review of antiviral drugs and other compounds with activity against feline herpesvirus type 1.
Thomasy SM, Maggs DJ
Feline herpesvirus type 1 (FHV-1) is a common and important cause of ocular surface disease, dermatitis, respiratory disease, and potentially intraocular disease in cats. Many antiviral drugs developed for the treatment of humans infected with herpesviruses have been used to treat cats infected with FHV-1. Translational use of drugs in this manner ideally requires methodical investigation of their in vitro efficacy against FHV-1 followed by pharmacokinetic and safety trials in normal cats. Subsequently, placebo-controlled efficacy studies in experimentally inoculated animals should be performed followed, finally, by carefully designed and monitored clinical trials in client-owned animals. This review is intended to provide a concise overview of the available literature regarding the efficacy of antiviral drugs and other compounds with proven or putative activity against FHV-1, as well as a discussion of their safety in cats.

Frequent detection of transcriptionally active Felis catus papillomavirus 2 in feline cutaneous squamous cell carcinomas.
Thomson NA, Munday JS, Dittmer KE
Felis catus papillomavirus 2 (FcaPV-2) causes premalignant skin lesions in cats and has also been found in a proportion of cutaneous squamous cell carcinomas (SCCs) - a common and potentially fatal
cancer of cats. Whilst this could suggest a role of the virus in cancer development, FcaPV-2 has also been detected in skin swabs of normal cats, making it difficult to discern whether the papillomavirus is causing the cancer or merely an ‘innocent bystander’. To distinguish between these two possibilities, real-time PCR was used to determine the viral copy number and the transcriptional activity of FcaPV-2 infections present in 70 formalin-fixed paraffin-embedded skin lesions including 10 papillomavirus-induced premalignant lesions and 60 SCCs. FcaPV-2 gene expression was found in 21 of 60 (35%) SCCs, all 10 premalignant lesions and none of 10 normal skin samples. The results showed two distinct subsets of SCCs. The majority of the SCCs had low copy numbers of FcaPV-2 DNA (mean of 17 copies per copy of reference gene DNA) and no FcaPV-2 gene expression, suggesting the virus was an incidental finding. In contrast, 20 SCCs had detectable FcaPV-2 E6/E7 gene expression and very high copy numbers of FcaPV-2 DNA, with a mean of 32,930 copies per copy of reference gene DNA. The relative quantity of E6/E7 gene expression and the viral copy number in this group were similar to those found in the papillomavirus-induced premalignant lesions, suggesting that FcaPV-2 may play a role in the development of a subset of feline cutaneous SCCs.

Pharmacokinetics of minocycline in domestic cats.
Tyman BE, Papich MG, Kerl ME, Cohn LA

OBJECTIVES: Recently, the increased cost and decreased availability of doxycycline has sparked an interest in using minocycline as an alternative. The purpose of this study was to determine the pharmacokinetics of minocycline in domestic cats in order to facilitate dosage decisions. METHODS: Purpose-bred, young adult cats were administered a single dose of either intravenous (IV; n = 4; 5 mg/kg) or oral (n = 6; 50 mg/cat) minocycline. Blood was collected from each at intervals up to 24 h afterwards. Minocycline was measured using high performance liquid chromatography with ultraviolet detection. A one-compartment pharmacokinetic model was fit to the oral data and a two-compartment model to the IV data via a computer program. Plasma protein binding was measured by fortifying blank plasma from untreated healthy cats with minocycline at two concentrations and applying an ultracentrifugation method. RESULTS: Two cats became transiently lethargic and tachypneic during IV drug infusion. One cat vomited 6.0 h after infusion, and two cats vomited either 1.5 h or ~5.0 h after oral drug administration. The mean oral dose administered was 13.9 ± 0.47 mg/kg. Oral bioavailability was approximately 62%. Plasma protein binding was 60% at 5 µg/ml and 46% at 1 µg/ml. After IV administration, elimination half-life (t½), apparent volume of distribution at steady-state, and systemic clearance were 6.7 h (coefficient of variation [CV] 14.4%), 1.5 l/kg (CV 34.5%) and 2.9 ml/kg/min (CV 40.8%), respectively. After oral administration the terminal t(½) and peak concentration (Cmax) were 6.3 h (CV 9%) and 4.77 µg/ml (CV 36%), respectively. CONCLUSIONS AND RELEVANCE: Because most bacteria will have a minimum inhibitory concentration of ≤0.5 µg/ml, an oral dose of 8.8 mg/kg q24h would be adequate to meet pharmacokinetic-pharmacodynamic targets after adjusting for protein binding. Although some gastrointestinal upset may occur, one 50 mg capsule orally q24h would provide appropriate dosing for most cats.

Inter- and intraobserver variability of (semi-)quantitative parameters commonly used in feline thyroid scintigraphy.
Volckaert V, Vandermeulen E, Duchateau L, Saunders JH, Peremans K

The aim of this study was to assess inter- and intraobserver variability of commonly used semi-quantitative and quantitative parameters in feline thyroid scintigraphy: thyroid to salivary gland ratio (T/S), thyroid to background ratio (T/B) and the percentage technetium pertechnetate uptake for the
thyroid glands (%TcUT). These parameters are being used to diagnose thyroid disease and to assess its severity, but may be influenced by operator related factors when processing the images. Additionally, inter- and intraobserver variability of the percentage technetium pertechnetate uptake for the salivary glands was determined (%TcUSG). The study included technetium pertechnetate scans of 100 hyperthyroid cats. Variability within and between three observers was determined using a random effects model and variance components were estimated by the restricted maximum likelihood procedure. The %TcU for the thyroid and salivary glands, as well as the T/S ratio, showed little to no difference in inter- and intraobserver variability, whereas this was clearly present for the T/B ratio. Overall, the T/S ratio and %TcUSG showed a good repeatability and reproducibility with low inter- and intraobserver variabilities. Inter- and intraobserver variability was higher for the %TcUT, however variations were still considered to be acceptable. On the contrary, inter- and intraobserver variability was clearly larger for the T/B ratio. These findings suggest the preferential use of the T/S ratio or %TcU, especially in facilities with a less experienced staff.

Quality of life assessment in dogs and cats receiving chemotherapy - a review of current methods.
Vøls KK, Heden MA, Kristensen AT, Sandøe P

Vet Comp Oncol (2016)
This study aimed to review currently reported methods of assessing the effects of chemotherapy on the quality of life (QoL) of canine and feline patients and to explore novel ways to assess QoL in such patients in the light of the experience to date in human pediatric oncology. A qualitative comparative analysis of published papers on the effects of chemotherapy on QoL in dogs and cats was conducted. This was supplemented with a comparison of the parameters and domains used in veterinary QoL assessments with those used in the Pediatric Quality of Life Inventory (PedsQL™) questionnaire designed to assess QoL in toddlers. Each of the identified publications including QoL-assessment in dogs and cats receiving chemotherapy applied a different method of QoL-assessment. In addition, the veterinary QoL assessments were mainly focused on physical clinical parameters, whereas the emotional (6/11), social (4/11) and role (4/11) domains were less represented. QoL-assessment of cats and dogs receiving chemotherapy is in its infancy. The most commonly reported method to assess QoL was questionnaire based and mostly included physical and clinical parameters. Standardizing and including a complete range of potentially relevant parameters in future QoL assessments may benefit owner decision making.

Multidrug-resistant opportunistic pathogens challenging veterinary infection control.
Walther B, Tedin K, Lübke-Becker A

Vet Microbiol (2016)
Although the problems associated with healthcare-associated infections (HAI) and the emergence of zoonotic and multidrug-resistant pathogens in companion animal (dogs, cats and horses) medicine have been well-known for decades, current progress with respect to practical implementation of infection control programs in veterinary clinics has been limited. Clinical outbreak events reported for methicillin-resistant Staphyloccocus aureus (MRSA) and Staphylococcus pseudintermedius (MRSP), extended spectrum beta-lactamase (ESBL)-producing Escherichia coli and multidrug-resistant (MDR) Salmonella Serovars indicate the necessity of infection control strategies for protecting animal patients at risk as well as veterinary personnel. The close bond between humans and their companion animals provides opportunities for exchange of microorganisms, including MDR pathogens. This particular aspect of the “One Health” idea requires more representative surveillance efforts and infection control strategies with respect to animal-species specific characters.
Aetiology and pathogenesis of cranial cruciate ligament rupture in cats by histological examination.
Wessely M, Reese S, Schnabl-Feichter E
OBJECTIVES: The aim of this study was to examine histologically intact and ruptured cranial cruciate ligaments in cats, in order to evaluate whether degeneration is a prerequisite for rupture. METHODS: We performed a histological examination of 50 intact and 19 ruptured cranial cruciate ligaments in cadaver or client-owned cats, respectively, using light microscopy. Cats with stifle pathology were further divided into five age groups in order to investigate the relationship of changes in the ligament with lifespan. Cats with ruptured cranial cruciate ligaments were divided into two groups according to medical history, with presumed history of trauma or without any known history of trauma, in order to investigate the relationship of ligament rupture with a traumatic event. Data from 200 healthy cats were selected randomly and reviewed to make a statistical comparison of cats with and without cranial cruciate ligament rupture (reference group). RESULTS: On histological examination, the intact cranial cruciate ligaments showed basic parallel arrangement of the collagen fibres, with no relation to age. While cats of a more advanced age showed fibrocartilage in the middle of the cranial cruciate ligament, a likely physiological reaction to compression forces over the lifespan, degenerative changes within the fibrocartilage were absent in all cases, regardless of age or rupture status. Cats suffering from cranial cruciate ligament rupture without history of trauma were significantly older than cats in the reference group. CONCLUSIONS AND RELEVANCE: This study showed that differentiation of fibrocartilage in the middle of the cranial cruciate ligament is likely a physiological reaction to compressive forces and not a degenerative change associated with greater risk of rupture in advanced age. This finding in cats is distinctive from the known decrease in differentiation of fibrocartilage in dogs with cranial cruciate ligament rupture. Furthermore, the histological examination of cats revealed no other signs of degeneration in the cranial cruciate ligaments. Thus, degeneration is likely not an aetiological factor of cranial cruciate ligament rupture in cats.

Diagnosing feline immunodeficiency virus (FIV) infection in FIV-vaccinated and FIV-unvaccinated cats using saliva.
Westman ME, Malik R, Hall E, Norris JM
We recently showed that two immunochromatography point-of-care FIV antibody test kits (Witness FeLV/FIV and Anigen Rapid FIV/FeLV) were able to correctly assign FIV infection status, irrespective of FIV vaccination history, using whole blood as the diagnostic specimen. A third FIV antibody test kit, SNAP FIV/FeLV Combo (an enzyme-linked immunosorbent assay [ELISA]), was unable to differentiate antibodies produced in response to FIV vaccination from those incited by FIV infection. The aim of this study was to determine if saliva is a suitable diagnostic specimen using the same well characterized feline cohort. FIV infection status of these cats had been determined previously using a combination of serology, polymerase chain reaction (PCR) testing and virus isolation. This final assignment was then compared to results obtained using saliva as the diagnostic specimen utilizing the same three point-of-care FIV antibody test kits and commercially available PCR assay (FIV RealPCR). In a population of cats where one third (117/356; 33%) were FIV-vaccinated, both immunochromatography test kits accurately diagnosed FIV infection using saliva via a centrifugation method, irrespective of FIV vaccination history. For FIV diagnosis using saliva, the specificity of Anigen Rapid FIV/FeLV and Witness FeLV/FIV was 100%, while the sensitivity of these kits was 96% and 92% respectively. SNAP FIV/FeLV Combo respectively. SNAP FIV/FeLV Combo had a specificity of 98% and sensitivity of 44%, while FIV RealPCR testing had a specificity of 100%
and sensitivity of 72% using saliva. A revised direct method of saliva testing was trialed on a subset of FIV-infected cats (n=14), resulting in 14, 7 and 0 FIV positive results using Anigen Rapid FIV/FeLV, Witness FeLV/FIV and SNAP FIV/FeLV Combo, respectively. These results demonstrate that saliva can be used to diagnose FIV infection, irrespective of FIV vaccination history, using either a centrifugation method (Anigen Rapid FIV/FeLV and Witness FeLV/FIV) or a direct method (Anigen Rapid FIV/FeLV). Collection of a saliva specimen therefore provides an acceptable alternative to venipuncture (i) in fractious cats where saliva may be easier to obtain than whole blood, (ii) in settings when a veterinarian or trained technician is unavailable to collect blood and (iii) in shelters where FIV testing is undertaken prior to adoption but additional blood testing is not required.

Morphology of congenital portosystemic shunts involving the left colic vein in dogs and cats.
White RN, Parry AT
OBJECTIVE: To describe the anatomy of congenital portosystemic shunts involving the left colic vein in dogs and cats. METHODS: Retrospective review of a consecutive series of dogs and cats managed for congenital portosystemic shunts. For inclusion a shunt involving the left colic vein with recorded intraoperative mesenteric portovenography or computed tomography angiography along with direct gross surgical observations at the time of surgery was required. RESULTS: Six dogs and three cats met the inclusion criteria. All cases had a shunt which involved a distended left colic vein. The final communication with a systemic vein was variable; in seven cases (five dogs, two cats) it was via the caudal vena cava, in one cat it was via the common iliac vein and in the remaining dog it was via the internal iliac vein. In addition, two cats showed caudal vena cava duplication. CLINICAL SIGNIFICANCE: The morphology of this shunt type appeared to be a result of an abnormal communication between either the left colic vein or the cranial rectal vein and a pelvic systemic vein (caudal vena cava, common iliac vein or internal iliac vein). This information may help with surgical planning in cases undergoing shunt closure surgery.

Willey JL, Julius TM, Claypool SP, Clare MC
OBJECTIVE To evaluate and compare IM administration of xylazine hydrochloride and dexmedetomidine hydrochloride for the induction of emesis in cats. DESIGN Retrospective case series. ANIMALS 47 cats with a history of suspected ingestion of a toxic substance or foreign material between June 2007 and June 2013. PROCEDURES Data collected for analysis from the medical records included signalment, drug dose and route of administration, whether a repeated dose of the emetic agent was administered, and outcome (emesis, yes or no). RESULTS Cats in the 2 treatment groups did not differ with regard to age, sex, or breed distribution. The range of doses of xylazine administered IM was 0.36 to 0.64 mg/kg (0.16 to 0.29 mg/lb). The range of doses of dexmedetomidine administered IM was 6 to 18 μg/kg (2.7 to 8.2 μg/lb). A repeated dose of xylazine or dexmedetomidine was given to 3 and 1 cats, respectively. Emesis was successfully induced in 24 of the 47 (51.1%) cats. Nine of the 21 (43%) cats that received xylazine vomited and 15 of the 26 (58%) cats that received dexmedetomidine vomited. Percentage of cats that vomited after either drug administration did not differ significantly. CONCLUSIONS AND CLINICAL RELEVANCE Following IM administration in cats, xylazine and dexmedetomidine were similarly effective for induction of emesis, indicating that dexmedetomidine is a comparable alternative to xylazine for this purpose. Prospective studies are needed to determine the optimal IM dose of dexmedetomidine for induction of emesis in cats.
Serum Cystatin C Concentrations in Cats with Hyperthyroidism and Chronic Kidney Disease. Williams TL, Dillon H, Elliott J, Syme HM, Archer J


**BACKGROUND:** Currently, no test can accurately predict the development of azotemia after treatment of hyperthyroidism. Serum cystatin C concentrations (sCysC) might be less influenced by changes in body muscle mass and so better indicate the presence of concurrent chronic kidney disease (CKD) in hyperthyroidism. **HYPOTHESES:** sCysC will be higher in hyperthyroid cats that develop azotemia compared with hyperthyroid cats that remain nonazotemic after treatment; sCysC will be higher in nonhyperthyroid cats with azotemic CKD than healthy older cats and, sCysC will decrease after treatment of hyperthyroidism. **ANIMALS:** Ninety-one cats treated in first opinion practice. **METHODS:** Case-control study. sCysC were compared between hyperthyroid cats which developed azotemia within 4 months of successful treatment of hyperthyroidism (pre-azotemic group) and hyperthyroid cats which remained nonazotemic after treatment (nonazotemic group), and between nonhyperthyroid cats with azotemic CKD and healthy older cats. sCysC were also compared between hyperthyroid cats before treatment and at time of establishment of euthyroidism. Data are presented as median [25th, 75th percentile]. **RESULTS:** Baseline sCysC were not different between the pre-azotemic and nonazotemic groups (1.9 [1.4, 2.3] mg/L versus 1.5 [1.1, 2.2] mg/L, respectively; P = .22). sCysC in nonhyperthyroid cats with azotemic CKD and healthy older cats were not significantly different (1.5 [1.0, 1.9] mg/L versus 1.2 [0.8, 1.4] mg/L, respectively; P = .16). sCysC did not change significantly after treatment of hyperthyroidism (pretreatment 1.8 [1.2, 2.3] mg/L, after treatment 1.6 [1.1, 2.4] mg/L; P = .82). **CONCLUSIONS AND CLINICAL IMPORTANCE:** sCysC do not appear to be a reliable marker of renal function in hyperthyroid cats.

The prevalence of intestinal nematodes in cats and dogs from Lancashire, north-west England. Wright I, Stafford K, Coles G

*J Small Anim Pract* (2016)

**OBJECTIVES:** To estimate prevalence of clinically-relevant intestinal nematodes in UK cats and dogs using the sensitive faecal analysis technique FLOTAC. **METHODS:** Faecal samples were collected from 171 domestic dogs and 131 domestic cats living in urban areas of Lancashire and examined for the ova of intestinal parasites using the FLOTAC technique. All tested individuals were at least 6 months old, had not been treated with anthelmintics since 6 months of age nor in the 3 weeks prior to testing. **RESULTS:** In total, 5-3% of dogs (9/171) were positive for Toxocara canis; of these, 5/9 had <100 T. canis epg. Two dogs were positive for Uncinaria stenocephala, and 3 were positive for Strongyloides species. Single animals had Ancylostoma species and Spirocera lupi infection. All egg counts were <100 epg. 26% of cats (34/131) were infected with Toxocara cati; of these, 6/34 had <100 T. cati epg. Two cats were positive for Strongyloides species, for Ancylostoma species and there were single cases of U. stenocephala, Toxascaris leonina and S. lupi. **CLINICAL SIGNIFICANCE:** The high prevalence and zoonotic potential of Toxocara species in cats and dogs suggests the need for greater awareness of the need for repeated treatment. The discovery of S. lupi warrants further investigation and awareness of the clinical signs that this parasite may cause in cats and dogs.


**OBJECTIVE:** To report our experience with the use of contoured mini circular transarticular external skeletal fixators for the management of traumatic tarsal luxations in 15 cats. **MATERIALS AND
METHODS: Fifteen cats with traumatic tarsal joint luxation treated by using mini circular transarticular external fixators with available clinical records and complete clinical and radiographic follow-up of at least 30 weeks duration were included in the study. Data collected were the signalment, history, type of injury, concomitant injury, frame configuration, stabilization technique, duration of the surgery, time to first use of the operated limb, fixator removal time, complications, final outcome and follow-up. RESULTS: The surgical procedure chosen was based on the type of luxation; partial tarsal arthrodesis was performed in 10 cases, tarso-crural stabilization in four cases, and pantarsal arthrodesis in three cases. Five cats started to use the operated limb immediately after recovering from anaesthesia. In the other 10 cats, time to first use ranged from one to four days (mean 2 days). In one case, early pin loosening due to half pin fixation bolt failure was observed as a postoperative complication. Fixator removal time ranged from 24 to 60 days (mean 45 days). Functional outcome was excellent in 15 cats and good in two. CLINICAL RELEVANCE: This is a preliminary report about the treatment of tarsal luxations with a mini circular transarticular external fixation system in which early postoperative and long-term results seem to be favourable.

**Hypochloremia in cats - prevalence and associated diseases.**

Zeugswetter FK, Pagitz M, Friedrich MS

*Tierarztl Prax Ausg K Kleintiere Heimtiere* (2016) 44

OBJECTIVE: To describe the prevalence and possible causes of hypochloremia in the local hospital cat population. MATERIAL AND METHODS: Retrospective study consisting of two parts. Data were collected from the local electronic medical records database using the search terms “chloride” and “cats” (part A), and “blood gas analysis” and “cats” (part B). The medical records of the hypochloremic cats were then reviewed to determine prior treatment or infusions and to identify major underlying disease processes. Part A included an age and gender matched non-hypochloremic control group, whereas in part B acid-base status was assessed. RESULTS: Hypochloremia was detected in 367 (27%) of 1363 blood samples. The application of a correction formula to adjust for free water changes decreased the number of hypochloremic cats to 253 (19%). Only a minority had received glucocorticoids or loop diuretics and the prevalence of vomiting was 44%. Common associated disorders were gastrointestinal and respiratory diseases, as well as azotemia and diabetes mellitus. Polyuria/polydipsia, dehydration, prednisolone or furosemide pretreatment, azotemia and diabetes mellitus increased, whereas fluid therapy and the diagnosis of neoplasia decreased the prevalence of hypochloremia. An inverse correlation was found between corrected chloride and standardized base excess (rs = -0.597, p = 0.001) as well as anion gap (rs = -0.4, p = 0.026). 99% of the hypochloremic cats had derangements of acid-base balance. CONCLUSION: Hypochloremia is a common electrolyte disorder in the local cat population. The correction formula is necessary to adjust for changes in plasma osmolality. Although associated with metabolic alkalosis, most of the hypochloremic cats have a normal or decreased pH. The inverse correlation of chloride and anion gap as well as the high proportion of azotemic or diabetic animals support the concept of compensatory acidosis induced hypochloremia. CLINICAL RELEVANCE: Hypochloremia should prompt the clinician to perform blood-gas analysis. Diabetes mellitus (especially ketoacidosis) and renal disease should be included in current algorithms for the evaluation of hypochloremic patients.

**Invasive Microsporum canis causing rhinitis and stomatitis in a cat.**

Ziglioli V, Panciera DL, LeRoith T, Wiederhold N, Sutton D

*J Small Anim Pract* (2016) 57:327-331

Microsporum canis is a pathogenic fungus that typically causes dermatophytosis in cats. This report describes a cat with a Microsporum canis infection causing invasive fungal rhinitis that extended
through the hard palate, resulting in adjacent stomatitis. Treatment with itraconazole and terbinafine resolved the infection.

**Reasons People Surrender Unowned and Owned Cats to Australian Animal Shelters and Barriers to Assuming Ownership of Unowned Cats.**
Zito S, Morton J, Vankan D et al.
*J Appl Anim Welf Sci* (2016) 19:303-319

Most cats surrendered to nonhuman animal shelters are identified as unowned, and the surrender reason for these cats is usually simply recorded as “stray.” A cross-sectional study was conducted with people surrendering cats to 4 Australian animal shelters. Surrenderers of unowned cats commonly gave surrender reasons relating to concern for the cat and his/her welfare. Seventeen percent of noncaregivers had considered adopting the cat. Barriers to assuming ownership most commonly related to responsible ownership concerns. Unwanted kittens commonly contributed to the decision to surrender for both caregivers and noncaregivers. Nonowners gave more surrender reasons than owners, although many owners also gave multiple surrender reasons. These findings highlight the multifactorial nature of the decision-making process leading to surrender and demonstrate that recording only one reason for surrender does not capture the complexity of the surrender decision. Collecting information about multiple reasons for surrender, particularly reasons for surrender of unowned cats and barriers to assuming ownership, could help to develop strategies to reduce the number of cats surrendered.

**The effect of dexmedetomidine on radiographic cardiac silhouette size in healthy cats.**
Zwicker LA, Matthews AR, Côté E, Andersen E

Dexmedetomidine, an alpha2-adrenergic agonist, may be used in companion animals for chemical restraint, including cardiac evaluation. Echocardiographic changes associated with alpha2-adrenergic agonists have been described; however reports of radiographic changes in cats were not found at the time of this study. Aims of this observational, prospective, experimental study were to describe the effects of dexmedetomidine on the radiographic appearance of the cardiac silhouette in healthy, adult cats. Fourteen healthy adult cats received dexmedetomidine 40 mcg/kg IM. Right lateral, left lateral, ventrodorsal, and dorsoventral thoracic radiographs were obtained for each cat at three time points: presedation, intrasedation, and postsedation (≥ two hours after reversal with atipamezole). Radiographs were evaluated in a blinded, randomized fashion by two independent observers using the vertebral heart score on all four views, the number of intercostal spaces on lateral projections, and the percent width of thorax on ventrodorsal and dorsoventral projections. Median vertebral heart score on right lateral view was significantly increased intrasedation (median = 7.8; range = 7.25-8.25) compared to presedation (median = 7.5; range = 7-8 [P = 0.001]). Median percentage width was significantly higher intrasedation (70% on VD; range 65-80 [P = 0.001], and 75% on DV; range 65-80 [P = 0.006]) compared to presedation (65%; range 65-75 on both projections). Dexmedetomidine was associated with a small but significant increase in cardiac silhouette size on right lateral (vertebral heart score), ventrodorsal (percentage width), and dorsoventral (percentage width) radiographs in healthy adult cats. This effect should be taken into consideration for future interpretation of thoracic radiographs in dexmedetomidine-sedated cats.