Small Animal Article Summaries –
FELINE MEDICINE & SURGERY

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Contributor

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The International Society of Feline Medicine (ISFM) was established in 1996 as the veterinary focus for the work of the charity and, together with the American Society of Feline Practitioners, it publishes the Journal of Feline Medicine and Surgery.
Alberthsen C, Rand J, Morton J, Bennett P, Paterson M, Vankan D
*Animals (Basel)* (2016) 6

Despite high numbers of cats admitted to animal shelters annually, there is surprisingly little information available about the characteristics of these cats. In this study, we examined 195,387 admissions to 33 Australian RSPCA shelters and six friends of the RSPCA groups from July 2006 to June 2010. The aims of this study were to describe the numbers and characteristics of cats entering Australian RSPCA shelters, and to describe reasons for cat surrender. Data collected included shelter, state, admission source, age, gender, date of arrival, color, breed, reproductive status (sterilized or not prior to admission), feral status and surrender reason (if applicable). Most admissions were presented by members of the general public, as either stray animals or owner-surrenders, and more kittens were admitted than adults. Owner-related reasons were most commonly given for surrendering a cat to a shelter. The most frequently cited owner-related reason was accommodation (i.e., cats were not allowed). Importantly, although the percentage of admissions where the cat was previously sterilized (36%) was the highest of any shelter study reported to date, this was still lower than expected, particularly among owner-surrendered cats (47%). The percentage of admissions where the cat was previously sterilized was low even in jurisdictions that require mandatory sterilization.

GASTROINTESTINAL PARASITES OF CAPTIVE AND FREE-LIVING LEMURS AND DOMESTIC CARNIVORES IN EASTERN MADAGASCAR.
Alexander AB, Poirotte C, Porton IJ et al.

Fecal samples from captive and free-living lemurs at Ivoloina Zoological Park (IZP) and domestic carnivores from six villages surrounding IZP were evaluated between July and August 2012. Free-living lemurs from Betampona Natural Reserve (BNR), a relatively pristine rainforest fragment 40 km away, were also evaluated in November 2013. All 33 dogs sampled (100%) and 16 of 22 cats sampled (72.7%) were parasitized, predominantly with nematodes (strongyles, ascarids, and spirurids) as well as cestodes and protozoans. Similar types of parasites were identified in the lemur populations. Identification of spirurid nematodes and protozoans in the lemur fecal samples were of concern due to previously documented morbidity and mortality in lemurs from these parasitic agents. Twelve of 13 free-living (93%) and 31 of 49 captive (63%) lemurs sampled at IZP had a higher parasite prevalence than lemurs at BNR, with 13 of 24 (54%) being parasitized. The lemurs in BNR are likely at risk of increased exposure to these parasites and, therefore, increased morbidity and mortality, as humans and their domestic animals are encroaching on this natural area.

Tritrichomonas 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

Tritrichomonas 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.

Surgical outcome of cats treated for aqueous humor misdirection syndrome: a case series.
Atkins RM, Armour MD, Hyman JA
*Vet Ophthalmol* (2016)
OBJECTIVE: To evaluate the clinical outcome of cats treated surgically for aqueous humor misdirection syndrome. METHODS: A retrospective analysis of cats treated surgically between January 1, 2006, and January 1, 2013, for aqueous humor misdirection syndrome was performed. Signalment, medical therapy, eyes affected, intraocular pressures prior to and after surgery, surgical procedures performed, postoperative complications, and visual status were evaluated. RESULTS: Seven cats (nine eyes) fit the inclusion criteria. Six of seven cats were female, and five of seven cats were diagnosed with bilateral aqueous humor misdirection syndrome. Three surgical approaches were evaluated as follows: (i) phacoemulsification and posterior capsulotomy, (ii) phacoemulsification, posterior capsulotomy and anterior vitrectomy, and (iii) phacoemulsification, posterior capsulotomy, anterior vitrectomy, and endocyclophotocoagulation. The mean age at diagnosis was 12.9 years. Seven of nine eyes had controlled intraocular pressure (≤25 mmHg) during the first 6 months postoperatively. All cats were visual with controlled intraocular inflammation at 1 year postoperatively; however, one eye had an elevated intraocular pressure. All cats were continued on topical antiglaucoma and anti-inflammatory medications following surgery with the mean number of drops per day decreasing from 3.9 drops/day prior to surgery to 2.2 drops/day postoperatively. CONCLUSIONS: Surgical management for feline aqueous humor misdirection syndrome may be a viable option to maintain a visual and normotensive status in cats that no longer have successful control of intraocular pressure with medical therapy.

Morphology of Coronary Ostia in Domestic Shorthair Cat.
Barszcz K, Kupczyńska M, Kleckowska-Nawrot J, Skibniewski M, Janczyk P
*Anat Histol Embryol* (2016) 45:81-87
Diagnosis and treatment of heart diseases due to changes in the coronary vascularization need a detailed knowledge on the morphology and possible variations of the aortic valves and coronary ostia. This study was performed to clarify details on morphology of these structures in domestic cats. The tricuspid aortic valve was examined in 65 domestic shorthair cats. The location of coronary ostia was determined either inferior to (26 and 20%, left and right coronary ostium - LCO and RCO), at (65 and 66%) or superior to the intercommissural line (9 and 14%). In 13 cats (20%), accessory ostia were
found either for left, right or both coronary arteries (LCA and RCA). Their position varied between specimens. They were located beyond the main ostium, at its edge, or inside just below the edge. In one cat, no main trunk of the LCA was found. In one cat, two accessory ostia next to the RCO were observed. Coronary ostia in cats show anatomical variants and morphological anomalies. This study provides basic data useful for, for example, angiography performed for diagnosis of cardiac diseases and as a basis for surgical interventions.

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, LaPerm, 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.

Molecular evidence of vector-borne pathogens in dogs and cats and their ectoparasites in Algiers, Algeria.
Bessas A, Leulmi H, Bitam I et al.
In Algeria, only limited information is currently available on the prevalence of emergent canine and feline vector-borne diseases. The aim of the present work was to detect by qPCR vector-associated bacteria in stray dogs and cats and their ectoparasites from Algiers. 18/117 (15.38%) dogs and 2/107 (1.87%) cats were positive for at least one vector-borne agent. Coxiella burnetii and Bartonella henselae were identified in 1/117 (0.85%) dog individually. Ehrlichia canis DNA was detected in 17/117 (14.52%) dogs. 1/107 (0.93%) cat was positive to C. burnetii and another 1/107 (0.93%) to B. henselae. DNA of Rickettsia massiliae, Rickettsia conorii and E. canis was detected in Rhipicephalus sanguineus. Cat fleas were infected with Rickettsia felis, B. henselae and Bartonella claridgeiae. B. vinsonii subsp. berkhoffii was identified in Xenopsylla cheopis collected from dogs. The findings of this study indicate that dogs and cats from Algeria are exposed to multiple tick and flea-borne pathogens.
Detection of Rickettsia Species in Fleas Collected from Cats in Regions Endemic and Nonendemic for Flea-Borne Rickettsioses in California.

Billeter SA, Diniz PP, Jett LA et al.

*Vector Borne Zoonotic Dis* (2016) **16**:151-156

Rickettsia typhi, transmitted by rat fleas, causes most human flea-borne rickettsioses worldwide. Another rickettsia, Rickettsia felis, found in cat fleas, Ctenocephalides felis, has also been implicated as a potential human pathogen. In the continental United States, human cases of flea-borne rickettsioses are reported primarily from the southern regions of Texas and California where the cat flea is considered the principal vector. In California, more than 90% of locally acquired human cases are reported from suburban communities within Los Angeles and Orange counties despite the almost ubiquitous presence of cat fleas and their hosts throughout the state. The objective of this study is to assess the presence and infection rate of Rickettsia species in cat fleas from selected endemic and nonendemic regions of California. Cat fleas were collected from cats in Los Angeles County (endemic region) and Sacramento and Contra Costa counties (nonendemic region). Sequencing of 17 amplicons confirmed the presence of R. felis in both the endemic and non-endemic regions with a calculated maximum likelihood estimation of 131 and 234 per 1000 fleas, respectively. R. typhi was not detected in any flea pools. Two R. felis-like genotypes were also detected in fleas from Los Angeles County; Genotype 1 was detected in 1 flea pool and Genotype 2 was found in 10 flea pools. Genotype 1 was also detected in a single flea pool from Sacramento County. Results from this study show that R. felis is widespread in cat flea populations in both flea-borne rickettsioses endemic and nonendemic regions of California, suggesting that a high prevalence of this bacterium in cat fleas does not predispose to increased risk of human infection. Further studies are needed to elucidate the role of R. felis and the two R. felis-like organisms as etiologic agents of human flea-borne rickettsioses in California.

Pet Face: Mechanisms Underlying Human-Animal Relationships.

Borgi M, Cirulli F

*Front Psychol* (2016) **7**:298

Accumulating behavioral and neurophysiological studies support the idea of infantile (cute) faces as highly biologically relevant stimuli rapidly and unconsciously capturing attention and eliciting positive/affectionate behaviors, including willingness to care. It has been hypothesized that the presence of infantile physical and behavioral features in companion (or pet) animals (i.e., dogs and cats) might form the basis of our attraction to these species. Preliminary evidence has indeed shown that the human attentional bias toward the baby schema may extend to animal facial configurations. In this review, the role of facial cues, specifically of infantile traits and facial signals (i.e., eyes gaze) as emotional and communicative signals is highlighted and discussed as regulating the human-animal bond, similarly to what can be observed in the adult-infant interaction context. Particular emphasis is given to the neuroendocrine regulation of the social bond between humans and animals through oxytocin secretion. Instead of considering companion animals as mere baby substitutes for their owners, in this review we highlight the central role of cats and dogs in human lives. Specifically, we consider the ability of companion animals to bond with humans as fulfilling the need for attention and emotional intimacy, thus serving similar psychological and adaptive functions as human-human friendships. In this context, facial cuteness is viewed not just as a releaser of care/parental behavior, but, more in general, as a trait motivating social engagement. To conclude, the impact of this
information for applied disciplines is briefly described, particularly in consideration of the increasing evidence of the beneficial effects of contacts with animals for human health and wellbeing.

**In vitro susceptibility of antifungal drugs against Sporothrix brasiliensis recovered from cats with sporotrichosis in Brazil.**
Brilhante RS, Rodrigues AM, Sidrim JJ et al.
*Med Mycol* (2016) **54**:275-279

Sporotrichosis is an important subcutaneous mycosis of humans and animals. Classically, the disease is acquired upon traumatic inoculation of Sporothrix propagules from contaminated soil and plant debris. In addition, the direct horizontal transmission of Sporothrix among animals and the resulting zoonotic infection in humans highlight an alternative and efficient route of transmission through biting and scratching. Sporothrix brasiliensis is the most virulent species of the Sporothrix schenckii complex and is responsible for the long-lasting outbreak of feline sporotrichosis in Brazil. However, antifungal susceptibility data of animal-borne isolates is scarce. Therefore, this study evaluated the in vitro activity of amphotericin B, caspofungin, itraconazole, voriconazole, fluconazole, and ketoconazole against animal-borne isolates of *S. brasiliensis*. The susceptibility tests were performed through broth microdilution (M38-A2). The results show the relevant activity of itraconazole, amphotericin B, and ketoconazole against *S. brasiliensis*, with the following MIC ranges: 0.125-2, 0.125-4 and 0.0312-2 µg/ml, respectively. Caspofungin was moderately effective, displaying higher variation in MIC values (0.25-64 µg/ml). Voriconazole (2-64 µg/ml) and fluconazole (62.5-500 µg/ml) showed low activity against *S. brasiliensis* strains. This study contributed to the characterization of the in vitro antifungal susceptibility of strains of *S. brasiliensis* recovered from cats with sporotrichosis, which have recently been considered the main source of human infections.

**Chronic Kidney Disease in Aged Cats: Clinical Features, Morphology, and Proposed Pathogeneses.**
Brown CA, Elliott J, Schmiedt CW, Brown SA
*Vet Pathol* (2016) **53**:309-326

Chronic kidney disease (CKD) is the most common metabolic disease of domesticated cats, with most affected cats being geriatric (>12 years of age). The prevalence of CKD in cats exceeds that observed in dogs, and the frequency of the diagnosis of CKD in cats has increased in recent decades. Typical histologic features include interstitial inflammation, tubular atrophy, and fibrosis with secondary glomerulosclerosis. In contrast to people and dogs, primary glomerulopathies with marked proteinuria are remarkably rare findings in cats. Although a variety of primary renal diseases have been implicated, the disease is idiopathic in most cats. Tubulointerstitial changes, including fibrosis, are present in the early stages of feline CKD and become more severe in advanced disease. A variety of factors—including aging, ischemia, comorbid conditions, phosphorus overload, and routine vaccinations—have been implicated as factors that could contribute to the initiation of this disease in affected cats. Factors that are related to progression of established CKD, which occurs in some but not all cats, include dietary phosphorus intake, magnitude of proteinuria, and anemia. Renal fibrosis, a common histologic feature of aged feline kidneys, interferes with the normal relationship between peritubular capillaries and renal tubules. Experimentally, renal ischemia results in morphologic changes similar to those observed in spontaneous CKD. Renal hypoxia, perhaps episodic, may play a role in the initiation and progression of this disease.
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.

More or less: spontaneous quantity discrimination in the domestic cat.
Bánszegi O, Urrutia A, Szenczi P, Hudson R
Anim Cogn (2016)
We examined spontaneous quantity discrimination in untrained domestic cats in three food choice experiments. In Experiment 1, we presented the cats with two different quantities of food in eight numerical combinations. Overall, the subjects chose the larger quantity more often than the smaller one, and significantly so when the ratio between the quantities was less than 0.5. In Experiment 2, we presented the cats with two pieces of food in four different size combinations. Again, subjects chose the larger piece above chance, although not in the combination where the largest item was presented. In Experiment 3, a subset of the cats was presented multiple times with two different quantities of food, which were hidden from view. In this case, the cats did not choose the larger quantity more often than the smaller one, suggesting that in the present experiments they mainly used visual cues when comparing quantities. We conclude that domestic cats are capable of spontaneously discriminating quantities when faced with different numbers or sizes of food items, and we suggest why they may not always be motivated to choose the larger quantity. In doing so, we highlight the advantages of testing spontaneous choice behavior, which is more likely to reflect animals’ everyday manner of responding than is the case when training them in order to test their absolute limits of performance which may not always coincide with their daily needs.

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.

Central tarsal bone fracture in a cat.
Cinti F, Pisani G, Penazzi C, Carusi U, Vezzoni L, Vezzoni A

Fracture of the central tarsal bone is an uncommon injury in dogs and occurs predominantly in racing Greyhounds. To the authors’ knowledge, this type of fracture has not been described previously in cats. This case report describes a five-year-old Domestic Shorthair cat referred to the Centro Veterinario Luni Mare because of lameness, swelling and signs of pain in the right hindlimb caused by trauma. Clinical examination and diagnostic imaging revealed a right central tarsal bone fracture. Open reduction and internal fixation with a 2.0 mm position screw and two 0.8 mm Kirschner wires were carried out. The last follow-up examination three years postoperatively found the cat in good health with normal range of motion and function, and no signs of lameness in the right hindlimb.

Household Food Items Toxic to Dogs and Cats.
Cortinovis C, Caloni F
*Front Vet Sci* (2016) 3:26

Several foods that are perfectly suitable for human consumption can be toxic to dogs and cats. Food-associated poisoning cases involving the accidental ingestion of chocolate and chocolate-based products, Allium spp. (onion, garlic, leek, and chives), macadamia nuts, Vitis vinifera fruits (grapes, raisins, sultanas, and currants), products sweetened with xylitol, alcoholic beverages, and unbaked bread dough have been reported worldwide in the last decade. The poisoning episodes are generally due to lack of public knowledge of the serious health threat to dogs and cats that can be posed by these products. The present review aims to outline the current knowledge of common food items frequently involved in the poisoning of small animals, particularly dogs, and provides an overview of poisoning episodes reported in the literature.

Trends and molecular mechanisms of antimicrobial resistance in clinical staphylococci isolated from companion animals over a 16 year period.
Couto N, Monchique C, Belas A, Marques C, Gama LT, Pomba C

OBJECTIVES: The objective of this study was to investigate the evolution of resistance to antimicrobials, corresponding mechanisms and molecular characteristics of Staphylococcus spp.,
between 1999 and 2014. METHODS: Susceptibility to 38 antimicrobials was determined for 632 clinical staphylococcal isolates obtained from companion animals (dogs, cats, horses and other animals). Twenty antimicrobial resistance genes, including mecA and mecC, were screened by PCR. Methicillin-resistant staphylococci were characterized by spa (Staphylococcus aureus), SCCmec, MLST and PFGE typing. Statistical analyses were performed using SAS v9.3 and differences were considered relevant if P≤0.05. RESULTS: The mecA gene was identified in 74 staphylococcal isolates (11.6%): 11 MRSA (40.7%), 40 methicillin-resistant Staphylococcus pseudintermedius (MRSP; 8.7%) and 23 methicillin-resistant CoNS (26.7%). Resistance to the majority of antimicrobials and the number of mecA-positive isolates increased significantly over time. Eighteen spa types were identified, including two new ones. MRSA isolates were divided into three PFGE clusters that included ST22-IV, ST105-II, ST398-V and ST5-VI. Most methicillin-resistant Staphylococcus epidermidis isolates were of clonal complex (CC) 5, including a new ST, and clustered in eight PFGE clusters. MRSP were grouped into five PFGE clusters and included ST45-NT, ST71-II-III, ST195-III, ST196-V, ST339-NT, ST342-IV and the new ST400-III. Methicillin-resistant Staphylococcus haemolyticus clustered in two PFGE clusters. CONCLUSIONS: The significant increase in antimicrobial-resistant and mecA-positive isolates in recent years is worrying. Furthermore, several isolates are MDR, which complicates antimicrobial treatment and increases the risk of transfer to humans or human isolates. Several clonal lineages of MRSA and methicillin-resistant S. epidermidis circulating in human hospitals and the community were found, suggesting that companion animals can become infected with and contribute to the dissemination of highly successful human clones. Urgent measures, such as determination of clinical breakpoints and guidelines for antimicrobial use, are needed.

Efficacy of a single dose of milbemycin oxime/praziquantel combination tablets, Milpro(®), against adult Echinococcus multilocularis in dogs and both adult and immature E. multilocularis in young cats.
Two single-site, laboratory, negatively controlled, masked, randomised dose confirmation studies were performed: one in dogs, the other in cats. After a period of acclimatisation, both the dogs and cats were orally infected with Echinococcus multilocularis protoscoleces. In the dog study, 10 dogs received a single dose of Milpro® tablets at a minimum dose of 0.5 mg/kg milbemycin oxime and 5 mg/kg praziquantel 18 days post-infection and 10 dogs received no treatment. In the cat study, 10 cats received a single dose of Milpro® tablets at a minimum dose of 2 mg/kg milbemycin oxime and 5 mg/kg praziquantel 7 days post-infection, 10 cats received a single dose of the treatment 18 days post-infection and 10 cats remained untreated. In both studies, intestinal worm counts were performed 23 days post-infection at necropsy. No worms were retrieved from any of the 30 treated animals. Nine of 10 control dogs had multiple worms (geometric mean 91, arithmetic mean 304) and all 10 control cats had multiple worms (geometric mean 216, arithmetic mean 481). The difference in worm counts between all three treated groups and their controls was highly significant (ANOVA p values of log transformed data <0.0001). Efficacy of 100 % was demonstrated for the elimination of adult E. multilocularis in dogs and cats as well as for elimination of immature E. multilocularis in cats as evidenced by the effectiveness of treatment 7 days post-infection. The treatments were well accepted and tolerated, and there were no adverse drug reactions observed.
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.
de Rivera C, Ley J, Milgram B, Landsberg G
*J Feline Med Surg* (2016)
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.

Third eyelid gland neoplasms of dogs and cats: a retrospective histopathologic study of 145 cases.
Dees DD, Schobert CS, Dubielzig RR, Stein TJ
PURPOSE: To describe the various types of primary neoplasms affecting the third eyelid (TEL) gland of dogs and cats. METHODS: A retrospective search of the Comparative Ocular Pathology Laboratory of Wisconsin (COPLOW) database was performed. Veterinary ophthalmologists, primary care veterinarians, and, when appropriate, owners were contacted for patient follow-up information. Patient data points collected included species, age, sex, breed, laterality, tumor type, surgical margins, recurrence, metastasis, and length of follow-up. RESULTS: A total of 127 canine and 18 feline cases met the inclusion criteria. The most common canine TEL gland tumor was adenocarcinoma (n = 108; 85.0%) followed by adenoma (n = 18; 14.2%) and squamous cell carcinoma (SCC) (n = 1; 0.8%). For canine cases with follow-up information available (n = 62), 8.1% had confirmed or suspected metastasis and 11.3% had confirmed or suspected local recurrence of disease. The most common feline TEL gland tumor was adenocarcinoma (n = 15; 83.3%) followed by SCC (n = 3; 16.7%). For feline cases with follow-up information available (n = 9), 40.0% had confirmed or suspected metastasis and 30.0% had confirmed or suspected local recurrence of disease. CONCLUSIONS: This study determined that adenocarcinoma was the most common third eyelid gland tumor in both dogs and cats. The overall survival times were less, and metastatic occurrence and recurrence rates appeared to be higher for feline tumors as compared to those diagnosed in dogs. This is the first report of SCC originating from glandular ductular epithelium.

A novel feline norovirus in diarrheic cats.
Di Martino B, Di Profio F, Melegari I et al.
Infect Genet Evol (2016) 38:132-137
By screening a collection of fecal samples from young cats housed in three different shelters in South Italy, noroviruses (NoVs) were found in 3/48 (6.2%) specimens of animals with enteritis signs while they were not detected in samples collected from healthy cats (0/57). Upon sequence analysis of the short RNA-dependent RNA polymerase (RdRp) region, the three strains displayed the highest nucleotide (nt) and amino acid (aa) identities to the prototype GIV.2 strain lion/Pistoia/387/06/ITA (91.0-93.0% nt and 97.0-98.0% aa). The sequence of ~3.4-kb portion at the 3’ end of the genome of a NoV strain, TE/77-13/ITA, was determined. In the full-length ORF2, encoding the VP1 capsid protein, the virus was genetically closest to the canine GVI.2 NoV strains C33/Viseu/2007/PRT and FD53/2007/ITA (81.0-84.0% nt and 93.0-94.0% aa identities), suggesting a recombination nature, with the cross-over site being mapped to the ORF1-ORF2 junction. Based on the full-length VP1 amino acid sequence, we classified the novel feline NoV, together with the canine strains Viseu and FD53, as a genotype 2, within the genogroup GVI. These findings indicate that, as observed for GIV NoV, GVI strains may infect both the canine and feline host. Unrestricted circulation of NoV strains in small carnivores may provide the basis for quick genetic diversification of these viruses by recombination.
Interspecies circulation of NoVs in pets must also be considered when facing outbreaks of enteric diseases in these animals.

Effects of a medetomidine-ketamine combination on Schirmer tear test I results of clinically normal cats.
Di Pietro S, Macrì F, Bonarrigo T, Giudice E, Palumbo Piccionello A, Pugliese A
OBJECTIVE To evaluate the effects of a medetomidine-ketamine combination on tear production of clinically normal cats by use of the Schirmer tear test (STT) I before and during anesthesia and after reversal of medetomidine with atipamezole. ANIMALS 40 client-owned crossbred domestic shorthair cats (23 males and 17 females; age range, 6 to 24 months). PROCEDURES A complete physical examination, CBC, and ophthalmic examination were performed on each cat. Cats with no abnormalities on physical and opthalmic examinations were included in the study. Cats were allocated into 2 groups: a control group (n = 10 cats) anesthetized by administration of a combination of medetomidine hydrochloride (80 µg/kg) and ketamine hydrochloride (5 mg/kg), and an experimental group (30) anesthetized with the medetomidine-ketamine combination and reversal by administration of atipamezole. Tear production of both eyes of each cat was measured by use of the STT I before anesthesia, 15 minutes after the beginning of anesthesia, and 15 minutes after administration of atipamezole. RESULTS Anesthesia with a medetomidine-ketamine combination of cats with no ophthalmic disease caused a significant decrease in tear production. The STT I values returned nearly to preanesthetic values within 15 minutes after reversal with atipamezole, whereas the STT I values for the control group were still low at that point. CONCLUSIONS AND CLINICAL RELEVANCE Results indicated that a tear substitute should be administered to eyes of cats anesthetized with a medetomidine-ketamine combination from the time of anesthetic administration until at least 15 minutes after administration of atipamezole.

First evidence of the European wildcat (Felis silvestris silvestris) as definitive host of Angiostrongylus chabaudi.
Diakou A, Psalla D, Migli D et al.
Angiostrongylus chabaudi (Strongylida, Angiostrongylidae) is a parasitic nematode described for the first time last century from the pulmonary arteries of six European wildcats (Felis silvestris silvestris) in central Italy. Since then, this parasite remained practically unknown until recently, when immature A. chabaudi have been reported from one wildcat in Germany and two domestic cats (Felis silvestris catus) in Italy. The present report describes the first record of A. chabaudi in Greece and, most importantly, the first known case of patent infection by A. chabaudi. The necropsy of a road-killed F. s. silvestris found near the lake Kerkini, in the municipality of Serres (Macedonia, Greece), revealed the presence of nematodes of both sexes in the right ventricle and the pulmonary artery of the heart. All parasites were mature adults and numerous eggs were present in the uteruses of females. The morphological characteristics of the parasites were consistent with those of A. chabaudi. Moreover, Angiostrongylus-like first stage larvae (L1) were present in the faeces of the animal that was negative for any other cardio-pulmonary parasite. Genetic examination of adult parasites and L1 confirmed the morphological identification as A. chabaudi. Histopathological examination of the lungs showed severe, multifocal to coalescing, chronic, interstitial granulomatous pneumonia due to the presence of adult parasites, larvae and eggs. These findings demonstrate for the first unequivocal time that this
nematode reproduces in the European wildcat which should be ultimately considered a definitive host of A. chabaudi. Finally, the L1 of A. chabaudi are described here for the first time, opening new prospects for further studies on this neglected parasite.

Computed tomography and magnetic resonance diagnosis of variations in the anatomical location of the major salivary glands in 1680 dogs and 187 cats.
Durand A, Finck M, Sullivan M, Hammond G
*Vet J* (2016) **209**:156-162
During assessment of routine clinical magnetic resonance imaging (MRI) of the heads of dogs, variations in the location of mandibular and zygomatic salivary glands (SGs) were observed incidentally. The aims of this retrospective study were to describe anatomical variations of the major SGs found on MRI and computed tomography (CT) studies of the head in dogs and cats and to investigate possible clinical relevancy. No anatomical variation of the SGs was seen in cats, but in dogs, although variation of the parotid SG was not identified, that of the mandibular SG was found in 33/1680 animals (2%), either unilaterally (6/33 right-sided, 13/33 left-sided) or bilaterally (14/33). The Border terrier breed (19/33, 58%) was over-represented. Each atypically located mandibular SG was positioned medial to the digastric muscle and rostral to the retropharyngeal lymph node. The sublingual glands were difficult to delineate from the mandibular glands. Anatomical variation of one zygomatic gland (3/4 left-sided) was identified in four small-breed dogs (0.2%). Each atypically located zygomatic gland was tilted at the ventroorostral aspect of the masseter muscle underneath the skin surface. MRI and CT characteristics were not different between typically and atypically located SGs. None of the dogs had clinical signs related with SG disease. It was concluded that, with suspected breed predispositions, incidental unilateral or bilateral anatomical variations of mandibular and zygomatic SGs can be encountered in dogs and an awareness of these possible variations may be important in pre-surgical planning.

Bartonella Species Identified in Rodent and Feline Hosts from Island and Mainland Western Australia.
Dybing NA, Jacobson C, Irwin P, Algar D, Adams PJ
*Vector Borne Zoonotic Dis* (2016) **16**:238-244
Bacteria of the genus Bartonella have been described in multiple mammalian hosts with many species capable of causing disease in humans. Cats and various species of rats have been reported to play a role as vertebrate hosts to a number of Bartonella spp. This study aimed to identify Bartonella spp. in Western Australia, Dirk Hartog Island (DHI), and Christmas Island (CI) and to investigate the presence of potential arthropod vectors. Feral cats were collected from CI (n = 35), DHI (n = 23) and southwest Western Australia (swWA; n = 58), and black rats were collected from CI (n = 48). Individuals were necropsied, ectoparasites were collected by external examination of carcasses, and splenic tissue was collected for polymerase chain reaction analysis to detect Bartonella DNA. Bartonella henselae DNA was detected from two cats and Bartonella koehlerae DNA from one cat in southwest WA, but Bartonella DNA was not identified in cats on DHI or CI. Bartonella phoceensis (28/48 = 58.3%) and a novel Bartonella genotype (8/48 = 16.7%) based on the internal transcribed space region were detected in the spleens of black rats on CI. Detection of Bartonella spp. in each location corresponded to the presence of ectoparasites. Cats from southwest WA harbored four species of fleas, including *Ctenocephalides felis*, and black rats on CI were infested with multiple species of ectoparasites, including mites, fleas, and lice. Conversely, cats on Dirk Hartog and CI were free of ectoparasites. This
study has identified the DNA of Bartonella species from island and mainland swWA with some (B. henselae and B. koehlerae) of known zoonotic importance. This study further extends the geographical range for the pathogenic B. koehlerae. The association of Bartonella with ectoparasites is unsurprising, but little is known about the specific vector competence of the ectoparasites identified in this study.

Clinical Practice of Epidural Puncture in Dogs and Cats Assisted by a Commercial Acoustic Puncture Assist Device-Epidural Locator: Preliminary Results.
Ertelt K, Turković V, Moens Y

The objective of this study was to compare an Acoustic Puncture Assist Device-Epidural Locator (APAD-EL) with the “pop sensation” (POP) and “lack of resistance” (LOR) commonly used to confirm penetration of the ligamentum flavum and to ensure correct epidural placement in dogs and cats. We recruited 38 dogs and cats undergoing surgery and receiving epidural analgesia. Two anesthetists performed epidural puncture using the POP and LOR signs. Simultaneously, APAD-EL was used to collect visual and acoustic confirmation during advancement and placement of the needle tip for post hoc evaluation. A positive APAD-EL sign consists of a sudden pressure drop at the needle tip visible on a display and a concomitant pitch change of an acoustic signal. Failure to record a sudden pressure drop is considered a negative APAD sign. Descriptive statistics were used. In 32 patients with positive POP and LOR, the APAD was also positive. In one patient, POP was positive with a negative LOR and APAD result. Five patients had negative POP but positive LOR. Four patients had APAD positive and one (a dog) APAD negative. The study results showed that the APAD-EL information supports the subjective signs of correct needle placement suggested by positive POP and LOR experienced by trained anesthetists. The technique can be useful to assist difficult epidural puncture and as a training and teaching tool.

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.

Risk Factors for Development of Chronic Kidney Disease in Cats.
Finch NC, Syme HM, Elliott J
BACKGROUND: Identification of risk factors for development of chronic kidney disease (CKD) in cats may aid in its earlier detection. HYPOTHESIS/OBJECTIVES: Evaluation of clinical and questionnaire data will identify risk factors for development of azotemic CKD in cats. ANIMALS: One hundred and forty-eight client-owned geriatric (>9 years) cats. METHODS: Cats were recruited into the study and followed longitudinally for a variable time. Owners were asked to complete a questionnaire regarding their pet at enrollment. Additional data regarding dental disease were obtained when available by development of a dental categorization system. Variables were explored in univariable and multivariable Cox regression models. RESULTS: In the final multivariable Cox regression model, annual/frequent vaccination (P value .003; hazard ratio, 5.68; 95% confidence interval, 1.83-17.64), moderate dental disease (P value .008; hazard ratio, 13.83; 95% confidence interval, 2.01-94.99), and severe dental disease (P value .001; hazard ratio, 35.35; 95% confidence interval, 4.31-289.73) predicted development of azotemic CKD. CONCLUSION: Our study suggests independent associations between both vaccination frequency and severity of dental disease and development of CKD. Further studies to explore the pathophysiological mechanism of renal injury for these risk factors are warranted.

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)
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.

Serum Cobalamin and Methylmalonic Acid Concentrations in Hyperthyroid Cats Before and After Radioiodine Treatment.
Geesaman BM, Whitehouse WH, Viviano KR
BACKGROUND: Hyperthyroidism, the most common endocrine disorder in cats, has been associated with low serum cobalamin concentrations. Whether this is a functional cobalamin deficiency of clinical importance has not been assessed. HYPOTHESIS/OBJECTIVES: Cats with hyperthyroidism experience a functional cobalamin deficiency which correlates with their clinical catabolic state and is reversible with return of the euthyroid state. ANIMALS: Thirty-nine client-owned hyperthyroid cats.
METHODS: Prospective observational study. Serum cobalamin, methylmalonic acid, and clinical scores were determined in each hyperthyroid cat at enrollment and when euthyroid (60 days after radioiodine treatment). RESULTS: Five of the 39 hyperthyroid cats (13%) had a low serum cobalamin concentration ranging from <150 to 290 ng/L. Serum cobalamin concentrations normalized to >350 ng/L in 2 of the hypocobalaminemic cats once euthyroid. None of the hyperthyroid/hypocobalaminemic cats had increased serum methylmalonic acid concentrations (175-601 nmol/L). In cats with clinical and biochemical hyperthyroidism, there was no correlation between serum cobalamin concentrations with total T4 concentration (P = .12) or clinical scores including body weight (P = .11) and BCS (P = .54). CONCLUSIONS AND CLINICAL IMPORTANCE: In this population of hyperthyroid cats, the prevalence of hypocobalaminemia was low. Specifically, hyperthyroid cats, in which concurrent gastrointestinal disease is unlikely. Hypocobalaminemia is not a functional deficiency requiring supplementation in hyperthyroid cats without gastrointestinal disease.

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.

Aglepristone: A review on its clinical use in animals.

Gogny A, Fiéni F
Theriogenology (2016) 85:555-566

Aglepristone (RU 46534) is a competitive progesterone antagonist that is indicated for the treatment of various progesterone-dependent physiological or pathologic conditions. Aglepristone has proven to be an effective means of terminating pregnancy in most species. When used to induce parturition, aglepristone was effective in all cases in the bitch, cow, and goat, with no apparent adverse effects on neonatal health or milk production. When used to schedule an elective cesarean section, aglepristone treatment was deemed safe for dams and puppies, providing that the ovulation date had been accurately assessed at the time of breeding. Irrespective of the stage of pregnancy at injection, treatment with
aglepristone has no apparent negative effects on subsequent fertility. Aglepristone is also a safe and relatively effective means of treating pyometra. However, given the high level of septic risk and the likelihood of rapid deterioration, such therapy is not recommended in emergency situations. Treatment of feline fibroadenomatosis using aglepristone has given promising results, but repeat treatment may be necessary in cats previously treated with long-acting progestagens. The use of aglepristone in other progesterone-dependent diseases has yet to be fully evaluated but may prove valuable, especially in the treatment of insulin-resistant diabetes mellitus, acromegaly, and the treatment of some vaginal tumors in the bitch.

Serum Beta Hydroxybutyrate Concentrations in Cats with Chronic Kidney Disease, Hyperthyroidism, or Hepatic Lipidosis.
Gorman L, Sharkey LC, Armstrong PJ, Little K, Rendahl A
BACKGROUND: Ketones, including beta hydroxybutyrate (BHB), are produced in conditions of negative energy balance and decreased glucose utilization. Serum BHB concentrations in cats are poorly characterized in diseases other than diabetes mellitus. HYPOTHESIS: Serum BHB concentrations will be increased in cats with chronic kidney disease (CKD), hyperthyroidism (HT), or hepatic lipidosis (HL). ANIMALS: Twenty-eight client-owned cats with CKD, 34 cats with HT, and 15 cats with HL; 43 healthy cats. METHODS: Prospective observational study. Serum BHB concentrations were measured at admission in cats with CKD, HT, and HL, for comparison with a reference interval established using healthy cats. Results of dipstick urine ketone measurement, when available, were compared to BHB measurement. RESULTS: Beta hydroxybutyrate was above the reference interval (<0.11 mmol/L) in 6/28 cats (21%) with CKD, 7/34 cats (20%) with HT, and 11/15 cats with HL (73%) with HL, significantly exceeding the expected 2.5% above the reference interval for healthy cats (P <.001 for all groups). Elevations were mild in CKD and HT groups (median BHB 0.1 mmol/L for both groups, 80th percentile 0.12 and 0.11 mmol/L, respectively), but more marked in HL cats (median BHB 0.2 mmol/L, 80th percentile 0.84 mmol/L). None of 11 cats with increased serum BHB concentration having urine dipstick analysis performed within 24 h of sampling for BHB were ketonuric. CONCLUSIONS AND CLINICAL IMPORTANCE: Increases in serum BHB concentrations occur in cats with CKD, HT, and HL, and might provide an useful index of catabolism.

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.

Management of Otic and Nasopharyngeal, and Nasal Polyps in Cats and Dogs.
Grci V, Mortellaro CM
Feline inflammatory polyps are the most common nonneoplastic lesion of ear and nasopharynx in cats. Minimally invasive techniques for polyp removal, such as traction avulsion combined with curettage of the tympanic cavity and per-endoscopic transtympanic traction, have been successful for long-term resolution. Feline nasal hamartomas are benign lesions of the nasopharynx, and most have a good prognosis after surgical removal. Canine aural and nasopharyngeal inflammatory polyps are rare and have a similar clinical presentation as cats with these lesions. In dogs, it is important to achieve an accurate histologic diagnosis of these masses before appropriate surgical treatment can be planned.

Chronic neurokinin-1 receptor antagonism fails to ameliorate clinical signs, airway hyper-responsiveness or airway eosinophilia in an experimental model of feline asthma.
Grobman M, Graham A, Outi H, Dodam JR, Reinero CR
OBJECTIVES: Feline allergic asthma is a common chronic lower airway disease characterized by clinical signs attributed to eosinophilic inflammation, airway hyper-responsiveness (AHR) and airway remodeling. Tachykinins released from sensory nerves and immune cells bind neurokinin-1 (NK-1) receptors in the lung. The resultant neurogenic airway inflammation has been implicated in asthma pathogenesis. In mouse models and spontaneous human asthma, NK receptor antagonists reduce bronchospasm and inflammation. We hypothesized that chronic administration of maropitant, an NK-1 receptor antagonist, would decrease clinical signs of asthma, AHR and eosinophilic inflammation in experimentally asthmatic cats. METHODS: Cats (n = 6) induced to have asthma using Bermuda grass allergen (BGA) were enrolled in a randomized, prospective, placebo-controlled crossover design study. Cats received either oral maropitant (2 mg/kg) or placebo q48h for 4 weeks; following a 2 week washout, cats were crossed-over to the alternate treatment. Study endpoints included subjective clinical scoring systems after BGA challenge, ventilator-acquired pulmonary mechanics to assess AHR after bronchoprovocation with methacholine, and collection of bronchoalveolar lavage fluid to quantify airway eosinophilia. Statistical analysis was performed using a Mann-Whitney rank sum test with P <0.05 considered significant. RESULTS: Administration of maropitant for 1 month in experimentally asthmatic cats produced no significant difference in clinical scoring scheme (P = 0.589 and P = 1.0), AHR (P = 0.818) or airway eosinophilia (P = 0.669) compared with placebo. CONCLUSIONS AND RELEVANCE: Chronic administration of maropitant was ineffective at blunting clinical signs, AHR and airway eosinophilia in experimental feline asthma and thus cannot be recommended as a novel treatment for this disorder.

Diagnostic utility of cerebrospinal fluid immunocytochemistry for diagnosis of feline infectious peritonitis manifesting in the central nervous system.
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.
Gunther I, Raz T, Even Zor Y, Bachowski Y, Klement E
*Front Vet Sci* (2016) 3:21
Cat feeders serve as an important source of available food for free-roaming cats (FRCs) and can play a central role in providing data on FRC distribution, welfare, and health. Data on cat feeder personalities as well as a better understanding of their feeding practices offer relevance for decision making concerning FRC population control strategies. The current study surveyed 222 FRC feeders who responded to a municipal trap-neuter-return (TNR) campaign in an Israeli central urban setting. The aim of the study was to describe their personal characteristics, feeding practices, and the FRC populations they feed. Feeders were divided into four groups according to the number of cats they claimed to feed per day (group 1: fed up to 5 cats, group 2: fed 6-10 cats, group 3: fed 11-20 cats, and group 4: fed ≥21 cats). Most feeders were women (81%), with a median age of 58 years (range 18-81). The feeders reported an overall feeding of 3337 cats in 342 different feeding locations. Feeders of group 4 comprised 15.31% (n = 34) of all feeders but fed 56% (n = 1869) of the FRC in 37.42% (n = 128) of the feeding locations. “Heavy” feeders (groups 3 and 4) reported that they traveled significantly longer distances in order to feed the cats. Commercial dry food consisted of 90% of the food they provided, with 66% of them feeding once a day, with less food per cat per day than the other feeder groups. Interestingly, “heavy” feeders were usually singles, had on average fewer siblings, a clear preference for owning cats as pets, and lived in lower income neighborhoods. According to the feeders’ reports on the FRC populations they fed, 69.7% (2325/3337) cats were neutered and 11.8% (395/3337) were kittens. In addition, they reported that 1.6% (54/3337) of the cats were limping, 2% (67/3337) suffered from a systemic disease, 4% (135/3337) had skin lesions, and 3.9% (130/3337) were suffering from a chronic disability. Abundance of kittens and morbidity rate were significantly and negatively associated with neutering rate. These findings are in accordance with the suggestion that neutering may potentially improve cat welfare by reducing morbidity. Collaboration by the authorities with these heavy feeders, who represent a small number of FRC feeders and feed substantial FRC numbers, may be significant for the control and monitoring of FRC populations and their resources.

Effects of 0.5% Timolol Maleate Ophthalmic Solution on Heart Rate and Selected Echocardiographic Indices in Apparently Healthy Cats.
Gunther-Harrington CT, Ontiveros ES, Hodge TE, Visser LC, Stern JA
BACKGROUND: Echocardiographic assessment of diastolic function is challenging in cats, partially because of transmitral flow pattern fusion associated with high heart rates. With heart rate (HR) reduction, transmitral flow waveforms separate, allowing identification of diastolic dysfunction. Timolol, an ophthalmic, nonselective beta-blocker used in glaucoma is safe and transiently decreases HR in clinical trials. HYPOTHESIS: Administration of timolol ophthalmic solution decreases HR and facilitates echocardiographic assessment of diastolic function in cats without inducing clinically relevant adverse effects. ANIMALS: Twenty-five apparently healthy cats. METHODS: Electrocardiograms and echocardiograms including transmitral flow patterns were evaluated before and 20 minutes after ocular administration of 1 drop of timolol 0.5% solution. Twenty cats underwent treatment with timolol, and 5 different cats served as untreated controls to evaluate the effects of acclimation to the hospital environment on HR. RESULTS: Acclimation to the hospital had no effect on HR in control cats. After timolol administration, a significant median HR reduction of 25 bpm was observed (P <.0001). Timolol had no effect on E/A ratio in cats without E/A fusion (7/20, P =.44).
the 13 cats with E and A waves that were fused before timolol application, separation of these waves was identified in 8 cats (62%) after timolol treatment. No bradycardia was noted after timolol administration, but 2 cats had first-degree atrioventricular block. Timolol resulted in resolution of dynamic outflow tract obstruction in 6 of 6 cats. CONCLUSIONS AND CLINICAL IMPORTANCE: Ocular administration of timolol safely decreases HR in cats and could facilitate assessment of diastolic function.

The Best Model of a Cat Is Several Cats.
Gustafsson C, Vallverdú J
*Trends Biotechnol* (2016) 34:207-213
Modern biotechnology is emerging at the intersection of engineering, biology, physics, and computer science. As such it carries with it history from several disparate fields of research including a strong tradition in deductive reasoning primarily derived from discovery focused molecular biology and physics. Engineering biological systems is a complex undertaking requiring a broader set of epistemic tools and methods than what is usually applied in today’s discovery based research. Inductive reasoning as commonly used in computer science has proven to be a very efficient approach to build knowledge about complex megadimensional datasets, including synthetic biology applications. The authors conclude that the multi-heuristic nature of modern biotechnology makes it an engineering field primed for inductive reasoning to complement the dominating deductive tradition.

Hall CM, Adams NA, Bradley JS et al.
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.

Best practice recommendations forprehospital veterinary care of dogs and cats.

Hanel RM, Palmer L, Baker J et al.

*J Vet Emerg Crit Care (San Antonio)* (2016) **26**:166-233

OBJECTIVE: To examine available evidence on prehospital care in human and veterinary trauma and emergency medicine and develop best practice guidelines for use by both paramedical and nonparamedical personnel in the approach to the prehospital care of dogs and cats. DESIGN: Systematic evaluation of the literature gathered via medical databases searches of Medline, CAB abstracts, and Google Scholar. SYNTHESIS: From a review and systematic evaluation of the available evidence, consensus guidelines on the approach to prehospital care of dogs and cats in 18 scenarios were developed. CONCLUSIONS: Due to the lack of current evidence in the veterinary prehospital arena, best practice guidelines were developed as an initial platform. Recommendations were based on a review of pertinent human and available veterinary literature as well as a consensus of the authors’ professional opinions. It is anticipated that evidence-based additions will be made in the future.

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.

Use and perception of collars for companion cats in New Zealand.
Harrod M, Keown AJ, Farnworth MJ
NZ Vet J (2016) 64:121-124
AIMS: To investigate the use and utility of collars for companion cats in New Zealand, and to explore public perception of collar use. METHODS: An online questionnaire was distributed using emails and social media to members of the general public in New Zealand. The questionnaire collected details of respondents, cat ownership status, and responses to a number of questions regarding collar use in cats. RESULTS: A total of 511 responses were collected. Of these, 393/511 (76.9%) reported owning ≥1 cat at the time of the survey, and 141/393 (35.9%) stated that ≥1 of their cats wore collars and 211/393 (53.7%) had ≥1 of their cats micro-chipped. Of the respondents with a pet cat, 351/393 (89.3%) allowed their cats some outdoor access. Respondents mainly used collars for identification and to reduce predation. Reasons for not using collars included cat intolerance of collars, repeated collar loss and concern over collar safety. Differences were found between cat owners and non-owners regarding whether they agreed that cats were important for pest control (43 vs. 25%, p<0.001); that not all cats will tolerate collars (81 vs. 64%, p<0.001); that cats should be kept indoors at night (37 vs. 58%, p=0.001); or disagreed that well fed cats will not catch birds (60 vs. 70%, p=0.04); and disagreed that a cat without a collar was likely to be a stray (85 vs. 76%, p<0.001). Respondents most trusted veterinarians and the Society for the Prevention of Cruelty to Animals as sources of pet care information. CONCLUSIONS: Collar use within this sample of cat owners in New Zealand appeared to be low, with more using microchips for identification. The majority of cat owners in this study indicated their cats had some outdoor access, with collars being used for cat identification and to reduce hunting behaviour. Significant differences existed in opinions on cat management between cat
owners and non-owners in this study. It should be noted that this preliminary exploration was based on a self-selected group of respondents and so results and conclusions cannot be extrapolated to the wider population. RELEVANCE: As the most trusted source of information about pet care, an enhanced understanding of cat ownership and management may be of use to veterinarians to promote responsible pet ownership and to develop national policies and practices to improve cat welfare.

Diagnostic techniques to detect the epileptogenic zone: Pathophysiological and presurgical analysis of epilepsy in dogs and cats.
Hasegawa D
_Vet J_ (2016)
The use and availability of magnetic resonance imaging (MRI) and other neurosurgical devices is rapidly increasing in the field of veterinarian medicine. Coincident with these technological advances, there is an increased expectation to treat drug resistant epilepsy in dogs and cats by epilepsy surgery. However, the presurgical evaluation of epileptic animals, by using methodologies to detect the epileptogenic zone for example, have yet to become established in common practice. The epileptogenic zone, defined as the minimum amount of cortex to produce seizure freedom, consists of five conceptual cortical abnormal ‘zones’: symptomatogenic, irritative, seizure-onset, structurally abnormal (epileptogenic lesion) and functional deficit. These zones can now be detected by suitable modalities including ictal video monitoring, interictal non-invasive or invasive electroencephalography (EEG), ictal video-EEG, magnetoencephalography, structural and functional MRIs, or nuclear imaging. These diagnostic techniques are essential for selecting both appropriate patients and surgical techniques, and are also important in understanding the pathophysiology of epilepsy. This review describes the diagnostic techniques available for detecting each abnormal zone while considering the current veterinary status to realise future surgery for canine and feline epilepsy.

Indirect arterial blood pressure measurement in healthy anesthetized cats using a device that combines oscillometry with photoplethysmography.
Heishima Y, Hori Y, Chikazawa S, Kanai K, Hoshi F, Itoh N
We investigated the basic characteristics of indirect arterial blood pressure (ABP) measurement using a device that combines oscillometry and photoplethysmography in cats. Dobutamine was infused intravenously in four anesthetized cats. Direct ABP was measured by a catheter. Indirect ABP was measured from the left forelimb. Dobutamine significantly elevated both systolic arterial pressure (SAP) and mean arterial pressure (MAP) in a dose-dependent manner. The indirect SAP, MAP and diastolic arterial pressure (DAP) values were closely correlated with the direct ABP values (r=0.88, 0.89 and 0.83, respectively). The mean bias for SAP, MAP and DAP was 3.4, 0.2 and -2.4 mmHg, respectively. The indirect ABP measured by this device may be used to reliably monitor ABP changes in anesthetized cats.

A novel placement technique for nasogastric and nasoesophageal tubes.
Herring JM
_J Vet Emerg Crit Care (San Antonio)_ (2016)
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.

Differentiation of Cardiac from Noncardiac Pleural Effusions in Cats using Second-Generation Quantitative and Point-of-Care NT-proBNP Measurements.


BACKGROUND: Pleural effusion is a common cause of dyspnea in cats. N-terminal pro-B-type natriuretic peptide (NT-proBNP) measurement, using a first-generation quantitative ELISA, in plasma and pleural fluid differentiates cardiac from noncardiac causes of pleural effusion. HYPOTHESIS/OBJECTIVES: To determine whether NT-proBNP measurements using second-generation quantitative ELISA and point-of-care (POC) tests in plasma and pleural fluid distinguish cardiac from noncardiac pleural effusions and how results compare to the first-generation ELISA. ANIMALS: Thirty-eight cats (US cohort) and 40 cats (UK cohort) presenting with cardiogenic or noncardiogenic pleural effusion. METHODS: Prospective cohort study. Twenty-one and 17 cats in the US cohort, and 22 and 18 cats in the UK cohort were classified as having cardiac or noncardiac pleural effusion, respectively. NT-proBNP concentrations in paired plasma and pleural fluid samples were measured using second-generation ELISA and POC assays. RESULTS: The second-generation ELISA differentiated cardiac from noncardiac pleural effusion with good diagnostic accuracy (plasma: sensitivity, 95.2%, specificity, 82.4%; pleural fluid: sensitivity, 100%, specificity, 76.5%). NT-proBNP concentrations were greater in pleural fluid (719 pmol/L (134-1500)) than plasma (678 pmol/L (61-1500), P = 0.003), resulting in different cut-off values depending on the sample type. The POC test had good sensitivity (95.2%) and specificity (87.5%) when using plasma samples. In pleural fluid samples, the POC test had good sensitivity (100%) but low specificity (64.7%). Diagnostic accuracy was similar between first- and second-generation ELISA assays. CONCLUSIONS AND CLINICAL IMPORTANCE: Measurement of NT-proBNP using a quantitative ELISA in plasma and pleural fluid or POC test in plasma, but not pleural fluid, distinguishes cardiac from noncardiac causes of pleural effusion in cats.

Concise review: Stem cell trials using companion animal disease models.

Hoffman AM, Dow SW
Stem Cells (2016)

Studies to evaluate the therapeutic potential of stem cells in humans would benefit from more realistic animal models. In veterinary medicine, companion animals naturally develop many diseases that resemble human conditions, therefore representing a novel source of pre-clinical models. In order to understand how companion animal disease models are being studied for this purpose, we reviewed the
literature between 2008-2015 for reports on stem cell therapies in dogs and cats, excluding laboratory animals, induced disease models, cancer, and case reports. Disease models included osteoarthritis, intervertebral disc degeneration, dilated cardiomyopathy, inflammatory bowel diseases, Crohn’s fistulas, meningoencephalomyelitis (multiple sclerosis-like), keratoconjunctivitis sicca (Sjogren’s syndrome-like), atopic dermatitis, and chronic (end-stage) kidney disease. Stem cells evaluated in these studies included mesenchymal stem-stromal cells (MSC, 17/19 trials), olfactory ensheathing cells (OEC, 1 trial), or neural lineage cells derived from bone marrow MSC (1 trial), and 16/19 studies were performed in dogs. 13/17 of the MSC studies used adipose tissue derived MSC from either allogeneic (8/13) or autologous (5/13) sources. The majority of studies were open label, uncontrolled studies. Endpoints and protocols were feasible, and the stem cell therapies were reportedly safe and elicited beneficial patient responses in all but 2 of the trials. In conclusion, companion animals with naturally occurring diseases analogous to human conditions can be recruited into clinical trials and provide realistic insight into feasibility, safety, and biologic activity of novel stem cell therapies. However, improvements in the rigor of manufacturing, study design, and regulatory compliance will be needed to better utilize these models. This article is protected by copyright. All rights reserved.

Renal biomarkers in domestic species.
Hokamp JA, Nabity MB

Current conventional tests of kidney damage and function in blood (serum creatinine and urea nitrogen) and urine (urine protein creatinine ratio and urine specific gravity) are widely used for diagnosis and monitoring of kidney disease. However, they all have important limitations, and additional markers of glomerular filtration rate and glomerular and tubular damage are desirable, particularly for earlier detection of renal disease when therapy is most effective. Additionally, urinary markers of kidney damage and function may help localize damage to the affected portion of the kidney. In general, the presence of high- and intermediate-molecular weight proteins in the urine are indicative of glomerular damage, while low-molecular weight proteins and enzymes in the urine suggest tubular damage due to decreased reabsorption of proteins, direct tubular damage, or both. This review aims to discuss many of these new blood and urinary biomarkers in domestic veterinary species, focusing primarily on dogs and cats, how they may be used for diagnosis of renal disease, and their limitations. Additionally, a brief discussion of serum creatinine is presented, highlighting its limitations and important considerations for its improved interpretation in domestic species based on past literature and recent studies.

Post-pandemic Seroprevalence of Human Influenza Viruses in Domestic Cats.
Ibrahim M, Ali A, Daniels JB, Lee CW

The continuous exposure of cats to diverse influenza viruses raises the concern of a potential role of cats in the epidemiology of influenza viruses. Our previous seroprevalence study among domestic cat sera collected during the 2009 H1N1 pandemic wave (September 2009 - September 2010) showed a high prevalence of pandemic H1N1, and seasonal H1N1 and H3N2 human flu virus infection (22.5%, 33.0%, 43.5%, respectively). In this study, we extended the serosurvey of influenza viruses in cat sera collected post-pandemic (June 2011- August 2012). A total of 432 cat sera were tested using hemagglutination inhibition assay. Results showed an increase in pandemic H1N1 prevalence (33.6%) and a significant reduction in both seasonal H1N1 and H3N2 prevalence (10.9% and 17.6%, respectively) compared to our previous survey conducted during pandemic wave. The pandemic H1N1
prevalence in cats showed an irregular seasonality pattern in the post-pandemic phase. Pandemic H1N1 reactivity was more frequent among female cats than male cats. In contrast to our earlier finding, no significant association between clinical respiratory disease and influenza virus infection was observed. Our study highlights a high susceptibility among cats to human influenza virus infection that correlates with the influenza prevalence in the human population.

**Molecular detection and characterization of Cryptosporidium spp. among breeding cattery cats in Japan.**

Ito Y, Itoh N, Kimura Y, Kanai K
*Parasitol Res* (2016) **115**:2121-2123

Cryptosporidium spp. are pathogenic protozoan 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.

**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, capC221, 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, dt11ej, 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.
Determination of mammalian deoxyribonucleic acid (DNA) in commercial vegetarian and vegan diets for dogs and cats.
Kanakubo K, Fascetti AJ, Larsen JA
*J Anim Physiol Anim Nutr (Berl)* (2016)

The determination of undeclared ingredients in pet food using different analytical methods has been reported in recent years, raising concerns regarding adequate quality control, dietary efficacy and the potential for purposeful adulteration. The objective of this study was to determine the presence or absence of mammalian DNA using multiplex polymerase chain reaction (PCR) on diets marketed as vegetarian or vegan for dogs and cats. The diets were tested in duplicate; two samples were purchased approximately 3 to 4 months apart with different lot numbers. Multiplex PCR-targeted mitochondrial DNA with two species-specific primers was used to amplify and sequence two sections of the cytochrome b gene for each of the 11 mammalian species. Half of the diets assessed (7/14) were positive for one or more undeclared mammalian DNA source (bovine, porcine, or ovine), and the result was repeatable for one or more species in six diets. While most of the detected DNA was found at both time points, in some cases, the result was positive only at one time point, suggesting the presence may have been due to unintentional cross-contact with animal-sourced ingredients. DNA from feline, cervine, canine, caprine, equine, murine (mouse and rat) and leporine was not identified in any samples. However, evidence of mammalian DNA does not confirm adulteration by the manufacturer nor elucidate its clinical significance when consumed by animals that may benefit from a vegetarian or vegan diet.

B-cell lymphoma with Mott cell differentiation in a cat.
Kanehara T, Matsui N, Murakami M et al.
*Vet Clin Pathol* (2016)

A 12-year-old, male castrated Domestic Shorthair cat was presented to Animal Medical Center of Gifu University with anorexia and vomiting. Physical examination revealed an enlarged left tonsil and right mandibular lymph node (approximately 2-3× the normal size), and a submucosal mass on the right side of the epiglottis (1.5 × 2.0 cm). On computed tomography images, an enlarged left tonsil, and enlarged right mandibular, right pharyngeal, and left and right cervical lymph nodes were observed. Cytologic examination of smears of tonsil and lymph nodes revealed numerous medium- to large-sized neoplastic lymphoid cells, approximately half of which contained one or several light-blue homogenous globoid cytoplasmic inclusions (5-10 µm), which stained magenta with periodic acid-Schiff (PAS) stain. Histopathologic examination of the left tonsil revealed diffuse proliferation of medium- to large-sized neoplastic lymphoid cells effacing the original lymphoid architecture. Half of the cells contained one or several eosinophilic globoid cytoplasmic inclusions, which stained magenta with PAS and showed positive immunohistochemical reactions for immunoglobulin M (IgM) and λ light chain. Neoplastic lymphoid cells were also CD20(+), Pax5(+), and MUM1(+), and CD3(-). Thus, the neoplastic lymphoid cells expressed a B-cell immunophenotype, and the globoid cytoplasmic inclusions represented an aberrant IgM λ light chain accumulation, similar to Russell bodies. B-cell lymphoma with Mott cell differentiation was diagnosed based on cytologic, histopathologic, and immunohistochemical features. This is the first report of B-cell lymphoma with Mott cell differentiation in a cat.
Evaluation of four portable blood glucose meters in diabetic and non-diabetic dogs and cats.
Kang MH, Kim DH, Jeong IS, Choi GC, Park HM
Vet Q (2016) 36:2-9
BACKGROUND: Monitoring of an animal’s blood glucose concentration is critical for diagnostic and therapeutic decisions. Over the past few decades, portable blood glucose meters (PBGMs) have been used to monitor blood glucose concentrations in animals. Recently, new and improved PBGMs have been made available on the market. OBJECTIVE: The purpose of this study was to evaluate four PBGMs for use in dogs and cats. ANIMALS AND METHODS: A total of 155 venous blood samples of dogs and 85 venous blood samples of cats were tested using four PBGMs. Control solutions from manufacturers were used to determine the precision of each meter. The coefficient of variation was calculated to determine precision during a set of replicates. Pearson’s correlation analysis, Passing-Bablok regression, and Bland-Altman analysis were used to determine the accuracy of four PBGMs against the hexokinase reference method. Error grid analysis was used to evaluate clinical relevance. RESULTS: All PBGMs, except CERA-PET®, were clinically acceptable for monitoring blood glucose concentrations; AlphaTrak® and VetMate® appeared to be the most accurate ones, demonstrating that to use PBGMs for glucose monitoring, it is important to understand the strengths or limitations of each meter. The difference in results between the PBGMs and the reference method increased at high glucose concentration ranges, which were also affected by the hematocrit. CONCLUSIONS: Although readings of the PBGMs and the reference method varied across glycemic ranges (low, normal, and high glucose concentrations), most PBGMs were clinically acceptable for monitoring blood glucose concentrations in dogs and cats.

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.
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 behavioural 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 amphoterich 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.

Role of Feline Immunodeficiency Virus in Lymphomagenesis-Going Alone or Colluding.
ILAR J (2016) 57:24-33
Feline immunodeficiency virus (FIV) is a naturally occurring lentivirus of domestic and nondomestic feline species. Infection in domestic cats leads to immune dysfunction via mechanisms similar to those caused by human immunodeficiency virus (HIV) and, as such, is a valuable natural animal model for acquired immunodeficiency syndrome (AIDS) in humans. An association between FIV and an
increased incidence of neoplasia has long been recognized, with frequencies of up to 20% in FIV-positive cats recorded in some studies. This is similar to the rate of neoplasia seen in HIV-positive individuals, and in both species neoplasia typically requires several years to arise. The most frequently reported type of neoplasia associated with FIV infection is lymphoma. Here we review the possible mechanisms involved in FIV lymphomagenesis, including the possible involvement of coinfections, notably those with gamma-herpesviruses.

**Effect of timolol maleate gel-forming solution on intraocular pressure, pupil diameter, and heart rate in normal and glaucomatous cats.**
Kiland JA, Voss AM, McLellan GJ
*Vet Ophthalmol* (2016)
OBJECTIVE: To determine the effects of once-daily topical treatment with timolol maleate gel-forming solution (GFS) on intraocular pressure (IOP), pupil diameter (PD), and heart rate (HR) in normal cats and cats with feline primary congenital glaucoma (FCG). ANIMALS STUDIED AND PROCEDURES: A single drop of timolol maleate 0.5% GFS was administered topically to one randomly assigned eye of 18 adult cats (8 normal, 10 FCG) at 8 am for 8 days; the opposite eye served as the untreated control. IOP was measured in both eyes (OU) every 2 h (PD and HR were measured every 4 h), for 14 h total, 1 day prior to and on days 1 and 8 of treatment. In a second treatment phase, a single drop of timolol was administered at 8 pm for 3 nights and IOP, PD, and HR were measured, as above, beginning at 8 am on day 4. Slit-lamp examinations were conducted prior to and after treatment phases. Comparisons of mean IOP, PD, and HR were made at each time point and between treated and untreated eyes by repeated-measures ANOVA and Tukey-Kramer post hoc test, with P < 0.05 considered significant. RESULTS: Timolol maleate 0.5% GFS had an inconsistent effect on IOP, with maximum IOP-lowering effect (mean = 5.6 mmHg, 17.4%) observed 6 h post-treatment in FCG. The drug caused significant miosis (from 4 to 8 h post-treatment), but had no effect on HR. CONCLUSION: Once-daily application of timolol maleate 0.5% GFS may be of limited clinical benefit in the management of feline congenital glaucoma.

**Reversal of the Progression of Fatal Coronavirus Infection in Cats by a Broad-Spectrum Coronavirus Protease Inhibitor.**
Coronaviruses infect animals and humans causing a wide range of diseases. The diversity of coronaviruses in many mammalian species is contributed by relatively high mutation and recombination rates during replication. This dynamic nature of coronaviruses may facilitate cross-species transmission and shifts in tissue or cell tropism in a host, resulting in substantial change in virulence. Feline enteric coronavirus (FECV) causes inapparent or mild enteritis in cats, but a highly fatal disease, called feline infectious peritonitis (FIP), can arise through mutation of FECV to FIP virus (FIPV). The pathogenesis of FIP is intimately associated with immune responses and involves depletion of T cells, features shared by some other coronaviruses like Severe Acute Respiratory Syndrome Coronavirus. The increasing risks of highly virulent coronavirus infections in humans or animals call for effective antiviral drugs, but no such measures are yet available. Previously, we have reported the inhibitors that target 3C-like protease (3CLpro) with broad-spectrum activity against important human and animal coronaviruses. Here, we evaluated the therapeutic efficacy of our 3CLpro inhibitor in laboratory cats with FIP. Experimental FIP is 100% fatal once certain clinical and
laboratory signs become apparent. We found that antiviral treatment led to full recovery of cats when treatment was started at a stage of disease that would be otherwise fatal if left untreated. Antiviral treatment was associated with a rapid improvement in fever, ascites, lymphopenia and gross signs of illness and cats returned to normal health within 20 days or less of treatment. Significant reduction in viral titers was also observed in cats. These results indicate that continuous virus replication is required for progression of immune-mediated inflammatory disease of FIP. These findings may provide important insights into devising therapeutic strategies and selection of antiviral compounds for further development for important coronaviruses in animals and humans.

**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.

**High Numbers of Stromal Cancer-Associated Fibroblasts Are Associated With a Shorter Survival Time in Cats With Oral Squamous Cell Carcinoma.**

Klobukowska HJ, Munday JS  
*Vet Pathol* (2016)

Cancer-associated fibroblasts (CAF) are fibroblastic cells that express α-smooth muscle actin and have been identified in the stroma of numerous epithelial tumors. The presence of CAFs within the tumor stroma has been associated with a poorer prognosis in some human cancers, including oral squamous cell carcinomas (SCCs). Cats frequently develop oral SCCs, and although these are generally highly aggressive neoplasms, there is currently a lack of prognostic markers for these tumors. The authors investigated the prognostic value of the presence of CAFs within the stroma of oral SCC biopsy specimens from 47 cats. In addition, several epidemiologic, clinical, and histologic variables were also assessed for prognostic significance. A CAF-positive stroma was identified in 35 of 47 SCCs (74.5%), and the median survival time (ST) of cats with CAF-positive SCCs (35 days) was significantly shorter than that of cats with CAF-negative SCCs (48.5 days) (P =.031). ST was also associated with the location of the primary tumor (P =.0018): the median ST for oropharyngeal SCCs (179 days) was significantly longer than for maxillary (43.5 days; P =.047), mandibular (42 days; P =.022), and sublingual SCCs (22.5 days; P =.0005). The median ST of sublingual SCCs was also shorter compared...
with maxillary SCCs (P = .0017). Furthermore, a significant association was identified between site and the presence of stromal CAFs (P = .025). On the basis of this retrospective study, evaluating the tumor stroma for CAFs in feline oral SCC biopsy specimens may be of potential prognostic value.

Development of a real-time PCR for a sensitive one-step copro-diagnosis allowing both the identification of carnivore feces and the detection of Toxocara spp. and Echinococcus multilocularis.
Knapp J, Umhang G, Poulle ML, Millon L
*Appl Environ Microbiol* (2016)
Studying the environmental occurrence of worrying parasites for humans and animals based on copro-samples is an expanding field of work in epidemiology and ecology of health. Detecting and quantifying in feces Toxocara spp., and Echinococcus multilocularis parasites, two predominant zoonotic helminths circulating in European carnivores, could help to better target measures for prevention. A rapid, sensitive and one-step qPCR allowing E. multilocularis and Toxocara spp. detection was developed here, combined with a host-fecal test based on the identification of three carnivores involved in their life cycle (red fox, dog and cat). A total of 68 copro-samples was collected from identified specimens of Vulpes vulpes, Canis lupus familiaris, C. lupus, Felis s. catus, Meles meles, Martes foina and Martes martes. From copro-DNA samples, real-time PCR was performed in duplex with a qPCR inhibitor control specifically designed for this study. All the copro-sample host identifications were confirmed by qPCR associated with sequencing, and parasites were detected and confirmed (E. multilocularis in red foxes and Toxocara cati in cats, 16% of samples presenting inhibition). By combining parasite detection and quantification, the host fecal test, and a new qPCR inhibitor control, we created a technique of greater sensitivity that could considerably improve environmental studies of pathogens.

In situ detection of GM1 and GM2 gangliosides using immunohistochemical and immunofluorescent techniques for auxiliary diagnosis of canine and feline gangliosidoses.
Kohyama M, Yabuki A, Ochiai K et al.
BACKGROUND: GM1 and GM2 gangliosidoses are progressive neurodegenerative lysosomal storage diseases resulting from the excessive accumulation of GM1 and GM2 gangliosides in the lysosomes, respectively. The diagnosis of gangliosidosis is carried out based on comprehensive findings using various types of specimens for histological, ultrastructural, biochemical and genetic analyses. Therefore, the partial absence or lack of specimens might have resulted in many undiagnosed cases. The aim of the present study was to establish immunohistochemical and immunofluorescent techniques for the auxiliary diagnosis of canine and feline gangliosidoses, using paraffin-embedded brain specimens stored for a long period. RESULTS: Using hematoxylin and eosin staining, cytoplasmic accumulation of pale to eosinophilic granular materials in swollen neurons was observed in animals previously diagnosed with GM1 or GM2 gangliosidosis. The immunohistochemical and immunofluorescent techniques developed in this study clearly demonstrated the accumulated material to be either GM1 or GM2 ganglioside. CONCLUSIONS: Immunohistochemical and immunofluorescent techniques using stored paraffin-embedded brain specimens are useful for the retrospective diagnosis of GM1 and GM2 gangliosidoses in dogs and cats.
Attitudes and perceptions of veterinary paraprofessionals in New Zealand to postoperative pain in dogs and cats.
Kongara K, Squance HE, Topham IA, Bridges JP
_N Z Vet J_ (2016) **64**:112-116

AIM: To survey the attitudes and perceptions of veterinary paraprofessionals in New Zealand to postoperative pain in dogs and cats. METHODS: In December 2011, veterinary paraprofessionals (VP) from throughout New Zealand were invited to participate in an online survey. Eleven questions, which were divided into five sections, were used to determine demographic information, the respondents’ assessment of pain after commonly performed surgeries in dogs and cats, their opinions on provision of analgesia, who had responsibility for pain monitoring and the use of any formal pain scoring system in the practice. RESULTS: Data from 165 respondents were able to be used, and 162 (98%) respondents to the survey were female. According to the respondents’ estimates, fracture repair in dogs and repair of diaphragmatic hernias in cats had the highest pain score following surgery. Neutering procedures involving dogs were scored higher than for cats (p<0.01). All respondents agreed that animals benefit from perioperative analgesia. The veterinary nurse was reported to be predominantly responsible for monitoring pain in animals postoperatively by 116/165 (70.3%) respondents. Of 165 respondents, 154 (93%) considered that their knowledge of pain and assessment of pain could be enhanced.

CONCLUSIONS: This survey reflects the attitudes and perceptions of a sample of VP in New Zealand to postoperative pain in dogs and cats. The results indicate that all respondents believe that surgery results in sufficient pain to warrant analgesic therapy. Routine neutering surgeries were considered to be more painful in dogs than in cats. The current survey also provides information to educators on potential areas of focus, given that 93% of respondents felt that their knowledge of pain and assessment of pain could be enhanced.

Management and monitoring of hyperthyroid cats: a survey of Australian veterinarians.
Kopecny L, Higgs P, Hibbert A, Malik R, Harvey AM

OBJECTIVES: This study sought to evaluate how Australian veterinarians approach management and monitoring of feline hyperthyroidism and compare these results to a similar survey recently performed in the UK. METHODS: An invitation to complete an online survey was sent to veterinarians in all states and territories of Australia. The survey comprised questions relating to management of hyperthyroidism, use of antithyroid drugs vs radioiodine treatment vs surgical thyroidectomy, in addition to demographic information for respondents. RESULTS: A total of 546 clinicians completed the survey. The most commonly preferred treatments for long-term management of feline hyperthyroidism were antithyroid medications (305/546; 56%) and radioiodine (210/546; 38%), with substantially more respondents selecting radioiodine when cost was removed as a consideration (425/546; 78%). However, most respondents had treated or referred few cases for radioiodine (median 2). Most veterinarians (500/546; 92%) used antithyroid medications either long-term or prior to definitive treatment of hyperthyroidism. For medical management, 45% (244/546) of veterinarians used twice-daily carbimazole. Half of respondents (274/546) aimed to maintain the total thyroxine concentration anywhere within the laboratory reference interval in hyperthyroid cats without chronic kidney disease. Blood pressure monitoring was uncommon. Surgical thyroidectomy was rarely performed. CONCLUSIONS AND RELEVANCE: Radioiodine was more frequently preferred by Australian veterinarians compared with those in the UK, likely associated with greater availability, reduced cost and shorter hospitalisation times in this jurisdiction, although antithyroid medications were the most frequently used treatment modality. Barriers remain to its utilisation, however, including
perceived cost, misconceptions with regard to expected success rate and accessibility. Recent changes to recommendations on the management and monitoring of hyperthyroid cats do not appear to have been widely adopted by veterinarians at this time.

PO-01 - Congestive heart failure is an independent risk factor for venous thromboembolism and mortality in cancer patients.
Königsbrügge O, Riedl J, Grilz E et al.
INTRODUCTION: Prediction of venous thromboembolism (VTE) occurrence in cancer patients using individual risk factors may contribute to preventing the burden of disease associated with VTE. Congestive heart failure in patients with cancer may increase the risk of VTE and worsen the prognosis. AIM: We sought to investigate the association of congestive heart failure and occurrence of VTE in cancer patients, specifically with consideration for the poor prognosis in patients with heart failure and cancer. MATERIALS AND METHODS: Hospitalized and ambulatory cancer patients were included in the prospective Vienna Cancer and Thrombosis Study (CATS) in search of risk factors for occurrence of VTE. Cancer entities and comorbidities were recorded at baseline and verified using medical documentation including a diagnosis of congestive heart failure. The occurrence of VTE events was compiled via mail and telephone follow-ups for two years. Risk of VTE occurrence was calculated in the competing risk regression model, considering death as a competing event during follow-up. RESULTS: In the current analysis 1,433 patients (632 women, 44.1%) with a median age of 61 years (25th-75th percentile: 52-75) were included. During the observation period, 108 (7.5%) VTE events and 522 (36.4%) deaths occurred. The median observation time was 729 days (233-731), and 34 patients (2.3%) had diagnosed congestive heart failure at the time of study inclusion, 12 of which had NYHA II-IV and 22 unspecified congestive heart failure. In the group of heart failure patients, 6 had VTE events and 23 died. In univariate competing risk analysis, the risk of VTE occurrence was increased 2.6-fold in patients with heart failure compared to those without a diagnosis of heart failure (SHR 2.58, 95% CI 1.13-5.92, p=0.025). After multivariable adjustment for age, BMI, gender, diabetes, history of myocardial infarction or stroke, use of antiplatelet drugs, cancer site, hypertension, D-Dimer level and peripheral arterial disease, the risk of VTE in heart failure patients was 3-times the risk of patients without heart failure (HR 3.07, 95% CI 1.15-8.19, p=0.025). Further, congestive heart failure was a strong predictor of mortality (HR 1.70, 95% CI 1.10-2.65, p=0.018). CONCLUSIONS: Congestive heart failure is not only a risk factor for mortality in cancer patients, but also an independent predictor of VTE occurrence. In order to prevent VTE and the associated burden, patients with cancer and congestive heart failure may benefit from thromboprophylaxis.

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.

Computed tomography, radiology and echocardiography in cats naturally infected with Aelurostrongylus abstrusus.
Lacava G, Zini E, Marchesotti F et al.
OBJECTIVES: The aims of the study were to describe the radiographic and computed tomographic features in cats naturally infected with Aelurostrongylus abstrusus, and to identify signs of pulmonary hypertension with echocardiography. METHODS: Fourteen cats positive on Baermann test for A abstrusus were included in the study. All cats underwent thoracic radiography, CT and echocardiography. RESULTS: The most common clinical signs were coughing (10/14) and dyspnoea (5/14). Radiographic findings included a generalised unstructured interstitial pulmonary pattern (8/14), mixed bronchointerstitialalveolar pattern (3/14) and bronchointerstitial pattern with bronchial wall thickening (3/14). Sternal lymphadenopathy was detected on thoracic radiographs in six cats. On CT, features were mixed bronchointerstitialalveolar pattern with ground-glass appearance in six cats, interstitialalveolar with multiple pulmonary nodules in five, interstitial ground-glass infiltrates in three, regional lymph node enlargement in 11 (10 sternal, three cranial mediastinal and three tracheobronchial lymph nodes) and subpleural thickening in four. None of the thoracic radiographs revealed subpleural thickening. In all cases, pulmonary vessels were normal for size, shape and attenuation by both radiography and CT. Pulmonary hypertension and cardiac abnormalities were not observed in any cat during echocardiography. CONCLUSIONS AND RELEVANCE: CT provided a more thorough characterisation of pulmonary and mediastinal lesions compared with thoracic radiographs in cats naturally infected with A abstrusus. Although feline aelurostrongylosis has been previously associated with histopathological lesions in lung arteries, in this cohort clinical evidence of pulmonary hypertension was not documented.

PATHOLOGIC BASIS FOR RIM ENHANCEMENT OBSERVED IN COMPUTED TOMOGRAPHIC IMAGES OF FELINE NASOPHARYNGEAL POLYPS.
Lamb CR, Sibbing K, Priestnall SL
Vet Radiol Ultrasound (2016) 57:130-136
In postcontrast computed tomographic (CT) images, feline nasopharyngeal polyps typically demonstrate enhancement of the peripheral rim. Computed tomographic images and histologic specimens of a case series of 22 cats with surgically removed nasopharyngeal polyps were reviewed
retrospectively in an attempt to elucidate the origin of rim enhancement. Polyps were present in the tympanic cavity in 15 (68%) cats (three with extension into the nasopharynx), only in the nasopharynx in four (18%) cats, and only in the external ear canal in the remaining three (14%) cats. All polyps had variable degrees of epithelial injury. Hemorrhage and inflammatory infiltration were significantly more marked in the superficial stroma whereas edema was significantly more marked in the core stroma. In noncontrast CT images (n = 22), the tympanic bulla was thickened in all 15 cats with a polyp in the tympanic cavity and enlarged in eight (53%) of these cats. In postcontrast CT images (n = 15), an outer zone of relatively increased attenuation compatible with a rim was observed in 11 (73%) polyps. The magnitude and extent of rim enhancement in CT images was positively correlated with the histologic grade of inflammation in the superficial stroma and negatively correlated with the grade of edema in the superficial stroma. It appears that inflammation is the major determinant of contrast medium accumulation in feline nasopharyngeal polyps, and the tendency for inflammation to affect predominantly the superficial layers explains the frequent observation of a rim in postcontrast CT images.

Use of veterinary services by Latino dog and cat owners with various degrees of English-language proficiency.

**OBJECTIVE** To characterize patterns of dog and cat ownership and veterinary service use among Latino dog and cat owners with various degrees of English-language proficiency. **DESIGN** Cross-sectional telephone survey. **SAMPLE** Data from 393 Latino pet owners. **PROCEDURES** Telephone surveys were conducted with Latino dog and cat owners from a random sample of US households to determine the number of dogs and cats owned, factors associated with veterinary service use, and satisfaction with veterinary care. **RESULTS** 393 of 1,026 (38.3%) respondents were pet owners. Two hundred fifty-nine of 330 (78.5%) dog owners and 70 of 115 (60.9%) cat owners reported taking their pet to the veterinarian in the past 12 months, most commonly for vaccination or examination or because of illness. Respondents were most satisfied with veterinary care provided, least satisfied with cost, and moderately satisfied with quality of communication. English-language proficiency was not significantly associated with whether owners sought veterinary care. A large proportion of respondents who wanted to receive pet health information in Spanish described themselves as speaking English well or very well. **CONCLUSIONS AND CLINICAL RELEVANCE** Although having limited proficiency in English was not associated with Latino pet owners seeking veterinary care, opportunities exist for veterinary personnel to improve communications with these clients. Personnel can assess their clients’ language needs by asking each about the language in which they would prefer to receive their pet’s health information.

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 quantified: (1) diameter of the bronchi, (2)
tracheobronchial mucociliary transport rate, tracheobronchial mucous secretion, and 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)

A High-Resolution SNP Array-Based Linkage Map Anchors a New Domestic Cat Draft Genome Assembly and Provides Detailed Patterns of Recombination.
Li G, Hillier LW, Grahn R et al.
G3 (Bethesda) (2016)
High-resolution genetic and physical maps are invaluable tools for building accurate genome assemblies, and interpreting results of genome-wide association studies. Previous genetic and physical maps anchored good quality draft assemblies of the domestic cat genome, enabling the discovery of numerous genes underlying hereditary disease and phenotypes of interest to the biomedical science and breeding communities. However these maps lacked sufficient marker density to order thousands of shorter scaffolds in earlier domestic cat genome assemblies, which instead relied heavily on comparative mapping with related species. A high-resolution map would aid in validating and ordering chromosome scaffolds from previous genome assemblies. Here we describe a high-resolution genetic linkage map of the domestic cat genome based on genotyping 453 domestic cats from several multigenerational pedigrees on the Illumina 63K SNP array. The final maps include 58,055 SNP markers placed relative to 6,637 markers with unique positions, distributed across all autosomes and the X chromosome. Our final sex-averaged maps span a total autosomal length of 4,464 cM, the longest described linkage map for any mammal, confirming length estimates from a previous microsatellite-based map. The linkage map was used to order and orient the scaffolds from a substantially more contiguous domestic cat genome assembly (Felis catus v8.0), which incorporated ~20X coverage of Illumina fragment reads. The new genome assembly shows substantial improvements in contiguity, with a nearly four-fold increase in N50 scaffold size to 18 Mbp. We use this map to report probable structural errors in previous maps and assemblies, and to describe features of the recombination landscape, including a massive (~50 Mbp) recombination desert (of virtually zero recombination) on the X chromosome that parallels a similar desert on the porcine X chromosome in both size and physical location.
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)

**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, Buffettong CT, Casey RA, Murray JK
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.

Failure of a single dose of medroxyprogesterone acetate to induce uterine infertility in postnattally treated domestic cats.
Lopez Merlo M, Faya M, Blanco PG, Carranssa A, Barbeito C, Gobello C
_Theriogenology_ (2016) 85:718-723
In mice and sheep, neonatal administration of progesterone or progestins inhibited development of uterine glands. The aims of the present study were (1) to describe uterine gland development on postnatal Days 6 to 8 and (2) to evaluate the effects of a single postnatal administration of a progestin on reproduction and adult uterine glands morphology and function in domestic cats. Necropsy was performed on three 1-week-old female cats which had died unrelated to this study. Ten female kittens were randomly assigned within the first 24 hours of birth to: medroxyprogesterone acetate 10 mg/animal subcutaneously (MPA; n = 6) or placebo (PLC; n = 4) and followed up until puberty when they were mated. Twenty-four days after the end of estrus, ovulation and pregnancy were diagnosed by serum progesterone measurement and ultrasonography, respectively. Then, all the cats were ovariohysterectomized. After necropsy or surgery, the excised organs were histologically evaluated. Seven queens ovulated (4 of 6 MPA and 3 of 4 PLC; P > 0.1) and were pregnant (P > 0.1). Four MPA cats presented endometrial hyperplasia and one of them developed a pyometra. The 1-week-old females presented uterine glands in the stage of budding and incipient penetration of the glandular epithelium into the underlying stroma. The MPA-treated queens revealed that the area occupied by uterine glands per square-micrometer (0.55 ± 0.2 vs. 0.49 ± 0.2; P > 0.1) and the height of the glandular epithelium (µm; 24.5 ± 6.7 vs. 24.4 ± 7.2; P > 0.1) did not differ from those of the PLC group. Neither significant gross nor microscopical differences were also found for ovaries (P > 0.1). It is concluded that 1-week-old kittens had an incipient stage of uterine gland development and that a single postnatal
supraphysiological dose of MPA did not alter uterine adenogenesis in this species. Furthermore, this treatment seemed to predispose to uterine disease without prevention of fertility.

**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. Birman's 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.
Lack of effects of intramuscular medetomidine on intraocular pressure in clinically normal cats.
Malmasi A, Selk Ghaffari M
*J Feline Med Surg* (2016) **18**:315-317

**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.

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 multichoice 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.

Extraterritorial hunting expeditions to intense fire scars by feral cats.
McGregor HW, Legge S, Jones ME, Johnson CN
*Sci Rep* (2016) **6**:22559

Feral cats are normally territorial in Australia’s tropical savannas, and hunt intensively with home-ranges only two to three kilometres across. Here we report that they also undertake expeditions of up to 12.5 km from their home ranges to hunt for short periods over recently burned areas. Cats are especially likely to travel to areas burned at high intensity, probably in response to vulnerability of prey soon after such fires. The movements of journeying cats are highly directed to specific destinations. We argue that the effect of this behaviour is to increase the aggregate impact of cats on vulnerable prey. This has profound implications for conservation, considering the ubiquity of feral cats and global trends of intensified fire regimes.
GnRH-agonist implantation of prepubertal male cats affects their reproductive performance and testicular LH receptor and FSH receptor expression.

Mehl NS, Khalid M, Srisuwatanasagul S, Swangchan-Uthai T, Sirivaidyapong S

*Theriogenology* (2016) 85:841-848

This study was conducted to investigate the effect of GnRH-agonist implantation in prepubertal tomcats on sexual behavior, reproductive performance, and expression of testicular LH receptor (LHR) and FSH receptor (FSHR) and also to compare the testicular characteristics, LHR and FSHR expression between prepubertal and adult tomcats. In experiment 1, 3-month-old tomcats (*n* = 6/group) were either treated with or left without 4.7 mg deslorelin implants. Semen collection and evaluation were performed just before castration at 48 weeks after treatment; removed testes were analyzed for mRNA and protein expression of LHR and FSHR. We were able to collect semen from six non-treated cats, whereas in treated cats, semen was uncollectable. The results revealed that sexual behavior was absent in the implanted cats throughout the study period. Testicular volume was found to decrease from 30 weeks after treatment onward in the implanted cats compared to the controls (*P* < 0.05). Semen production was found only in non-implanted cats. Testicular tissue score, seminiferous tubule diameter, and LHR protein expression were found lower in the implanted cats (*P* < 0.05), but no differences were observed in mRNA expression of LHR and protein expression of FSHR between groups. The mRNA expression of FSHR was higher in the implanted (*P* < 0.05) compared to control cats. In experiment 2, testes from prepubertal (*n* = 6) and adult (*n* = 6) male cats were collected after castration and analyzed for mRNA and protein expression of LHR and FSHR. No differences were observed in the protein expression of LHR and FSHR between the two groups, whereas mRNA expression of FSHR was higher in prepubertal cats (*P* < 0.05). Testicular and epididymal weight, diameter of seminiferous tubules, and the testicular grade were higher in the adult compared to prepubertal cats (*P* < 0.05). In conclusion, deslorelin implants suppressed protein expression of LHR and enhanced mRNA expression of FSHR along with suppression of reproductive function without any adverse effects for at least 48 weeks in male cats.

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.
**Bartonella henselae in Italy: a rare seasonal infection.**
Mennini M, Valentini D, DI Camillo C et al.
*Minerva Pediatr* (2016)

**BACKGROUND:** Symptomatic Bartonella henselae infection is considered rare in Europe. Cat fleas transmit the microorganism between cats, but their role in transmission of B. henselae to humans has not been defined. The aim of our study was to perform a retrospective study of detected cases at our Hospital. **METHODS:** We retrospectively analyzed data of all children showing lymphoadenopathy and a 4-fold increase in specific IgM for B. henselae over the period from June 2010 to May 2015. We therefore examined clinical data, laboratory exams in order to achieve a description of the expression of Bartonella infection in our series: age, geographical area of origin, symptoms, laboratory exams, the seat of the swelling lymph nodes with ultrasound description, and data on biopsy of lymph node when performed. **RESULTS:** We could identify a total of 7 patients (4 females, range of age: mean age 8.75+/−2.87 SD): 3 cases in 2011 and 1 case per year in 2010, 2012, 2013 and 2014 with an average distance between one case and the sequent of 246.16+/−214.54 days. All patients came from small towns with no preference between the inland and coastal areas. The infection was characterized only by lymphadenopathy with nonspecific alterations at blood tests and with no history of cat scratch. **CONCLUSIONS:** By our experience, Bartonella infection presents as a seasonal disease with increased incidence in autumn, with peaks in October, and a decrease after spring. In conclusion, infection with Bartonella henselae is an issue to keep in consideration in all cases of lymphadenopathy, especially in children coming from small towns even without a declared cat scratch.

**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 the effects of long-term pimobendan and benazepril administration in normal cats.**
Miyagawa Y, Machida N, Toda N, Tominaga Y, Takemura N

Pimobendan (PIMO) can cause adverse effects, such as mitral valve degeneration, in dogs; however, it is unclear whether these effects occur in cats. Therefore, we aimed to determine whether PIMO or benazepril produces adverse cardiac effects in healthy cats. This was a blinded, randomized, prospective parallel study. Twelve cats were randomly divided into two groups of six cats, namely, an
angiotensin-converting-enzyme inhibitor group that received benazepril and a PIMO group. Cats were administered their respective treatments for 506 days, and we evaluated cardiac parameters, blood biochemistry and glomerular filtration rates during that time. At the end of the trial, the cats were euthanized, and histopathological examinations were performed by a pathologist who was blinded to the treatment groups. No significant changes were observed in any of the parameters measured in either of the groups. In particular, no significant cardiac lesions were observed in either of the groups. In healthy cats, neither PIMO nor benazepril appears to cause cardiac lesions, but future studies are needed to examine the effects of PIMO in cats with heart disease.

**Novel Feline Leukemia Virus Interference Group Based on the env Gene.**
Miyake A, Watanabe S, Hiratsuka T et al.
*J Virol* (2016) **90**:4832-4837
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.

**Life-threatening perianaesthetic complications in five cats undergoing biliary tract surgery: case series and literature review.**
Monticelli P, Stathopoulou TR, Lee K, Adami C
*J Feline Med Surg* (2016)
CASE SERIES SUMMARY: The aim of this case series was to describe the intra- and early postanaesthetic complications occurring in five cats undergoing major surgeries involving the gallbladder and the biliary tree. The five cases of this series were admitted to the Queen Mother Hospital for Animals between June and December 2015, and were all overseen by the same senior
anaesthesist. Pre-existing pancreatitis was a common finding. Observed life-threatening events were persistent, unresponsive hypotension in the absence of major blood loss, which occurred mainly during surgical manipulation of the biliary tract, and postoperative renal failure. RELEVANCE AND NOVEL INFORMATION: Biliary surgery carries the potential for life-threatening complications in cats. The pathogenesis of such morbidities is likely to be multifactorial. The perianesthetic use of haemoglobin-based oxygen-carrying solution may be considered as an alternative treatment option when hypotension is unresponsive to fluids and traditional positive inotropes and vasopressors.

**Highly pathogenic beta-hemolytic streptococcal infections in cats from an institutionalized hoarding facility and a multi-species comparison.**

Morrow BL, McNatt R, Joyce L et al.

OBJECTIVES: Two hundred and thirty-four cats removed from an institutionalized hoarding facility (IHF) demonstrated severe, atypical pyogenic infections. The objective of this study was to document the various syndromes and determine the etiology of the infections. METHODS: All cats were evaluated initially after removal from the IHF and on a daily basis for at least 15 months. Samples were collected and sent for culture/susceptibility and histopathology to commercial laboratories or stored at -20(o)C. PCR was performed using universal bacterial primers to amplify the 16S-23S rRNA intergenic spacer region. PCR products were sequenced to determine the identity of the bacteria. RESULTS: Multiple pyogenic syndromes were documented, including abscesses of the paws and carpal/tarsal regions in 82 cats, acute rhinitis with profuse purulent nasal discharge in 68 cats and cervical lymphadenitis with abscessation unassociated with any wounding in 51 cats. Many cats exhibited septic arthritis with total joint destruction, necrotizing fasciitis, meningitis, otitis and septic shock, often leading to death. These infections appeared to be caused by beta-hemolytic streptococci (BHS) based on initial culture results (n = 10), though speciation was unclear and some samples (n = 6) produced no growth. Based on PCR results (n = 26), *Streptococcus canis* was the only bacterial species or the dominant species identified in each sample, and was the only species present in all the regions associated with the pyogenic infections. CONCLUSIONS AND RELEVANCE: Horizontal gene transfer and loss of the cell wall may account for the discrepancy between the culture and PCR results and the highly pathogenic nature of *S canis* in this particular population of cats. A large-scale hoarding situation with multiple animal species, overcrowding, stress and mixing of animals from many geographical regions created ideal conditions for these events to occur. The specific virulence factors present may be more useful in predicting the pathophysiology of BHS infections than the species of *Streptococcus* found in the host per se.

**Use of a feline respiratory epithelial cell culture system grown at the air-liquid interface to characterize the innate immune response following feline herpesvirus 1 infection.**

Nelli RK, Maes R, Kiupel M, Hussey GS

Infection with feline herpesvirus-1 (FHV-1) accounts for 50% of viral upper respiratory diseases in domestic cats and is a significant cause of ocular diseases. Despite the clinical significance and high prevalence of FHV-1 infection, currently available vaccines cannot completely protect cats from infection and lifelong latency. FHV-1 infects via the mucous membranes and replicates in respiratory epithelial cells, but very little is known about the early innate immunity at this site. To address questions about immunity to FHV-1, feline respiratory epithelial cells cultured at air-liquid interface
(ALI-FRECs) were established by collecting respiratory tracts from 6 healthy cats after euthanasia. Cells were isolated, cultured and characterized histologically and immunologically before infection with FHV-1. The expression of Toll-like receptors (TLRs), cytokine and chemokine responses were measured by real time PCR. ALI-FRECs morphologically resembled the natural airways of cats with multilayered columnar epithelial cells and cilia. Immunological properties of the natural airways were maintained in ALI-FRECs, as evidenced by the expression of TLRs, cytokines, chemokines, interferons, beta-defensins, and other regulatory genes. Furthermore, ALI-FRECs were able to support infection and replication of FHV-1, as well as modulate transcriptional regulation of various immune genes in response to infection. IL-1β and TNFα were increased in ALI-FRECs by 24hpi, whereas expression levels of IFN-α and TLR9 were not increased until 36hpi. In contrast, TLR3, GM-CSF and TGF-1β expression was down-regulated at 36hpi. The data presented show the development of a system ideal for investigating the molecular pathogenesis and immunity of FHV-1 or other respiratory pathogens.

Microscopic Evaluation of Peritumoral Lesions of Feline Injection Site Sarcomas Identified by Magnetic Resonance Imaging and Computed Tomography.
Nemanic S, Milovancev M, Terry JL, Stieger-Vanegas SM, Lohr CV
OBJECTIVE: Determine whether dual-phase computed tomography angiogram (CTA) or magnetic resonance imaging (MRI) detect more peritumoral lesions of feline injection site sarcoma (FISS) and determine whether CTA or MRI imaging characteristics of peritumoral lesions correspond with microscopic findings. STUDY DESIGN: Prospective clinical study. ANIMALS: Ten client-owned cats with FISS. METHODS: A fiducial marker detectable on CTA and MRI was sutured to the skin over the FISS as a standard reference point. All cats received MRI and CTA of the FISS, immediately followed by wide surgical excision. Targeted microscopic evaluation was performed on tissue with imaging-identified lesions and on the surgical margins. RESULTS: A total of 87 imaging-identified peritumoral lesions were examined microscopically (median 4 per cat, range 3-9) with 17/87 (20%) categorized as neoplastic, 51/87 (59%) as nonneoplastic, and 19/87 (22%) as equivocal. In 25 instances, peritumoral lesions were seen on both imaging modalities at the same location. Unique imaging characteristics were seen in 5/17 neoplastic peritumoral lesions (4 cats; all different lesions; 1 CTA, 4 MRI). The CTA and MRI appearances of the remaining 12/17 neoplastic lesions were nonspecific, being observed across more than 1 microscopic category. CONCLUSION: CTA and MRI identified a similar number of peritumoral lesions. The extensive overlap between imaging features of neoplastic and nonneoplastic lesions precludes definitive identification of neoplastic peritumoral FISS lesions using CTA or MRI.

Ocular manifestation of lymphoma in newly diagnosed cats.
Nerschbach V, Eule JC, Eberle N, Hoenghaus R, Betz D
Vet Comp Oncol (2016) 14:58-66
Ocular manifestations of lymphoma are described in humans and dogs but rarely in cats. In this prospective study, cats with newly diagnosed and treatment-naive lymphoma were evaluated concerning clinical stage and ophthalmologic findings. Twenty-six cats were included. In 12 cats (48%), ocular changes were documented. Uveitis anterior and posterior were predominant findings, being present in 58% of affected individuals. Other findings included exophthalmos, corneal surface lesions and chemosis. Eight cats received chemotherapy, two of which had ocular involvement. In these two cats, a complete remission of an anterior and a partial remission of a posterior uveitis were
documented. Due to the detection of ocular involvement, a stage migration from stage IV to V occurred in four patients. In the light of these findings, an ophthalmological examination may be considered as an important part of staging in feline lymphoma as well as of follow-up examination in affected cats.

**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
*J Feline Med Surg* (2016)

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.
Characterization of feline cytochrome P450 2B6.
Okamatsu G, Komatsu T, Ono Y et al.
Xenobiotica (2016) 1-10
1. Little is known about drug metabolism in carnivores. Although the domestic cat (Felis catus) is an obligate carnivore and is the most common companion animal, usage and dosage of many drugs are determined according to information obtained from humans and dogs. We determined the complete cDNA sequence of CYP2B6 from the feline lung. 2. Feline CYP2B6 consists of 494 deduced amino acids, showing highest identity with the dog CYP2B ortholog, followed by those of horse, pig, primate and human. 3. Feline CYP2B6 transcripts were expressed predominantly in the lung and slightly in the small intestine but not in the liver without significant sex-dependent differences. Western blot analysis with an anti-human CYP2B6 antibody confirmed the presence of CYP2B protein in the lung but not in the liver. 4. Feline CYP2B6 proteins heterologously expressed in Escherichia coli metabolized several substrates specific to human CYP2B6, including 7-ethoxy-4-(trifluoromethyl) coumarin (EFC). The metabolic activity was strongly inhibited by medetomidine and atipamezole, potent inhibitors of canine CYP2B11 (now officially CYP2B6) as well as by ticlopidine and sertraline, inhibitors selective to human CYP2B6. 5. The results suggest that feline CYP2B6 is a functional CYP2B ortholog that plays a role in the local defense mechanism in the cat respiratory system and intestine.

Tolerability of toceranib phosphate (Palladia) when used in conjunction with other therapies in 35 cats with feline oral squamous cell carcinoma: 2009-2013.
Olmsted GA, Farrelly J, Post GS, Smith J
OBJECTIVES: Squamous cell carcinoma (SCC) is the most common oral tumor in cats and typically carries a poor prognosis with current treatment options. The objective of this study was to evaluate the toxicity of toceranib phosphate (Palladia; Pfizer) in cats with oral SCC in combination with other treatment modalities. METHODS: In this study, 35 cats were retrospectively evaluated to determine toxicity when treated with toceranib in combination with other treatment modalities. Cats received toceranib at a median dose of 2.75 mg/kg (range 1.9-4.17 mg/kg) 3 days a week. Cats also underwent additional therapies, including surgical excision, radiation therapy, chemotherapy and/or non-steroidal anti-inflammatory drugs. RESULTS: Toxicity was seen in six cats with five cases of low-grade GI toxicity and one case of metabolic toxicity. Toceranib was discontinued in one cat and two cats received dose reductions. None of the cats required treatment delays or hospitalization due to toxicity. Median toceranib treatment duration was 77 days (range 7-741 days). CONCLUSIONS AND RELEVANCE: This study revealed that toceranib was well tolerated by the majority of cats with five cases of low-grade GI toxicity and one case of metabolic toxicity. Given the favorable toxicity profile, future studies further evaluating the safety and efficacy of toceranib for cats with oral SCC should be considered.

Comparison of Serum Spec fPL(TM) 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 assays 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.

Polymethylmethacrylate orbital implants with interconnecting channels. A retrospective study following enucleation in dogs and cats.

Oriá AP, de Souza MR, Dórea Neto FA et al.


PURPOSE: This study describes the use of polymethylmethacrylate implants with interconnecting channels (PIIC) to fill the orbit following enucleation in 31 dogs and 11 cats. METHOD: Seven channels were drilled into the implant. A central channel, running from the PIIC pole to its flat surface, was used to pass sutures anchoring the PIIC to the orbital fascia, minimizing the likelihood of extrusion. Six more channels allowed ingrowth of fibrovascular tissue into the PIIC, which reduces the risk of extrusion. Patients were evaluated 3, 10, and 30 days postoperatively, with 15 of 42 patients followed for 6-20 months. Ultrasound examination was performed in seven patients 15-510 days postoperatively, and two implants were studied histopathologically. RESULTS: Implants were well tolerated and prevented skin concavity, leading to good cosmetic results. Blood flow was imaged in vessels growing into the channels, and histopathologically a collagenous, fibrovascular capsule was seen surrounding the PIIC and invading its channels. CONCLUSIONS: PIICs are a safe and cosmetic solution to anophthalmic orbits, allowing ingrowth of blood vessels and fibrovascular tissue.

Natural resistance to experimental feline infectious peritonitis virus infection is decreased rather than increased by positive genetic selection.

Pedersen NC, Liu H, Durden M, Lyons LA


A previous study demonstrated the existence of a natural resistance to feline infectious peritonitis virus (FIPV) among 36% of randomly bred laboratory cats. A genome wide association study (GWAS) on this population suggested that resistance was polygenic but failed to identify any strong specific associations. In order to enhance the power of GWAS or whole genome sequencing to identify strong genetic associations, a decision was made to positively select for resistance over three generations. The
inbreeding experiment began with a genetically related parental (P) population consisting of three toms and four queens identified from among the survivors of the earlier study and belonging to a closely related subgroup (B). The subsequent effects of inbreeding were measured using 42 genome-wide STR markers. P generation cats produced 57 first filial (F1) kittens, only five of which (9.0%) demonstrated a natural resistance to FIPV infection. One of these five F1 survivors was then used to produce six F1/P-backcrosses kittens, only one of which proved resistant to FIP. Six of eight of the F1 and F1/P survivors succumbed to a secondary exposure 4-12 months later. Therefore, survival after both primary and secondary infection was decreased rather than increased by positive selection for resistance. The common genetic factor associated with this diminished resistance was a loss of heterozygosity.

A novel corneal explant model system to evaluate antiviral drugs against feline herpesvirus type 1 (FHV-1).
Pennington MR, Fort MW, Ledbetter EC, Van de Walle GR
J Gen Virol (2016)
Feline herpesvirus type-1 (FHV-1) is the most common viral cause of ocular surface disease in cats. Many antiviral drugs are used to treat FHV-1, but require frequent topical application and most lack well-controlled in vivo studies to justify their clinical use. Therefore, better validation of current and novel treatment options are urgently needed. Here, we report on the development of a feline whole corneal explant model that supports FHV-1 replication and thus can be used as a novel model system to evaluate the efficacy of antiviral drugs. The anti-herpes nucleoside analogues cidofovir and acyclovir, which are clinically used to treat ocular herpesvirus infection in cats and have previously been evaluated in traditional 2-dimensional feline cell cultures in vitro, were evaluated in this explant model. Both drugs suppressed FHV-1 replication when given every 12 h, with cidofovir showing greater efficacy. In addition, the potential efficacy of the retroviral integrase inhibitor raltegravir against FHV-1 was evaluated both in cell culture as well as in the explant model. Raltegravir was not toxic to feline cells or corneas and most significantly inhibited FHV-1 replication at 500 µM in both systems. Importantly, this drug was effective when given only once every 24 h. Taken together, our data indicate that the whole feline corneal explant model is a useful tool for the evaluation of antiviral drugs and, furthermore, that raltegravir appears a promising novel antiviral drug to treat ocular herpesvirus infection in cats.

Can Scat Analysis Describe the Feeding Habits of Big Cats? A Case Study with Jaguars (Panthera onca) in Southern Pantanal, Brazil.
Perilli ML, Lima F, Rodrigues FH, Cavalcanti SM
Large cats feeding habits have been studied through two main methods: scat analysis and the carcasses of prey killed by monitored animals. From November 2001 to April 2004, we studied jaguar predation patterns using GPS telemetry location clusters on a cattle ranch in southern Pantanal. During this period, we recorded 431 carcasses of animals preyed upon by monitored jaguars. Concurrently, we collected 125 jaguar scats opportunistically. We compared the frequencies of prey found through each method. We also compared the prey communities using Bray-Curtis similarity coefficient. These comparisons allowed us to evaluate the use of scat analysis as a means to describe jaguar feeding habits. Both approaches identified prey communities with high similarity (Bray-Curtis coefficient > 70). According to either method, jaguars consume three main prey: cattle (Bos taurus), caiman (Caiman yacare) and peccaries (Tayassu pecari and Pecari tajacu). The two methods did not differ in the
frequency of the three main prey over dry and wet seasons or years sampled. Our results show that scat analysis is effective and capable of describing jaguar feeding habits.

Feline hip dysplasia: A challenge to recognise and treat.
Perry K
_J Feline Med Surg_ (2016) **18:**203-218

**PRACTICAL RELEVANCE:** The reported incidence of hip dysplasia (HD) in cats varies dramatically between studies, but the condition is likely more common than we realise. There is little doubt that cats with HD and associated osteoarthritis (OA) suffer pain, and this warrants appropriate therapy.

**DIAGNOSTIC CHALLENGES:** Clinical signs of HD in cats are often gradual in onset, making them difficult to appreciate, but may include inactivity, pelvic limb lameness, difficulty jumping and climbing stairs, and reluctance to squat to defecate. Often lameness is bilateral, and can be particularly difficult to recognise. The most common radiographic finding is an abnormally shallow acetabulum. Subluxation, however, is not consistently associated with OA in cats and therefore the role that joint laxity plays in disease progression remains uncertain. Degenerative changes of the femoral head and neck seem to develop later than in the dog, and are less marked.

**THERAPEUTIC CHALLENGES:** The majority of cats respond to non-surgical management with environmental modulation, physical therapy, dietary modulation, weight loss, nutraceuticals and drug therapy. Should non-surgical management not provide sufficient relief, two salvage surgical options are available: femoral head and neck excision (FHNE) and total hip replacement (THR). While there is a risk of complications with micro-THR, the positive outcomes that have been reported indicate that it should be considered in the treatment of coxofemoral pathology in cats in the same way that THR is considered for larger dogs, especially given the inconsistent results associated with FHNE. Monitoring the effect of treatment is challenging as the assessment of pain in cats is complex and there is no validated scoring system or owner-completed questionnaire yet available for cats.

**EVIDENCE BASE:** There is a paucity of clinical reports focusing solely on HD in cats. The author draws on a combination of published studies, in cats, dogs and humans, as well as personal clinical experience.

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
_Vet Radiol Ultrasound_ (2016)

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) TcO(4) 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 ($r = 0.62$ 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.

**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.

**Nutritional analysis and microbiological evaluation of commercially available enteral diets for cats.**
OBJECTIVE: To determine the prevalence of nutrients less than or greater than accepted standards in commercially available enteral diets for cats, and to identify contamination incidence in enteral diets for cats. DESIGN: Prospective cross-sectional study. SETTING: University teaching hospital. SAMPLES: Seven commercial enteral diets for cats. INTERVENTIONS: Labels were evaluated to determine if diets were intended to be nutritionally complete and balanced. One diet under storage techniques partially representative of clinical conditions was sampled on days 0, 1, 3, 5, and 7 of storage for aerobic bacterial culture. MEASUREMENTS AND MAIN RESULTS: All 7 diets were analyzed for key nutrients and results were compared to Association of American Feed Control Officials (AAFCO) Nutrient Profiles for Adult Cats for maintenance and National Research Council recommended allowance (NRC-RA). From label information, 4 diets were classified as complete and balanced and 3 diets were classified as not complete and balanced. All 7 diets had at least 1 nutrient less than the AAFCO minimums and the NRC-RA. The total number of nutrients less than AAFCO minimums ranged from 3 to 9 (median = 4), with iron, potassium, and manganese being the most common. Concentrations of some nutrients were undetectable. None of the samples tested had a positive aerobic culture at baseline (day 0) or on subsequent samples from days 1, 3, 5, and 7 under any storage condition. CONCLUSIONS: None of the diets analyzed met all of the minimum nutrient concentrations. While short-term feeding may not be of concern for an individual patient, clinicians should be aware of potential nutritional limitations when feeding enteral diets to ill or injured cats.
A cross-sectional study of Tritrichomonas foetus infection in feral and shelter cats in Prince Edward Island, Canada.
Raab O, Greenwood S, Vanderstichel R, Gelens H
*Can Vet J* (2016) **57**:265-270
A cross-sectional study examined the occurrence of Tritrichomonas foetus, and other intestinal parasites, in feral and shelter cats in Prince Edward Island (PEI). Fecal samples were collected from 100 feral cats, 100 cats from the PEI Humane Society, and 5 cats from a private residence. The occurrence of T. foetus, based on fecal culture, was 0% in feral and shelter cats. A single positive sample was obtained from an owned Abyssinian cat that was imported to PEI. Intestinal parasites were identified via fecal flotation in 76% of feral cats and 39% of cats from the humane society. Feral cats had a higher incidence of *Toxocara cati* than cats from the humane society (*P* < 0.001), conversely, shelter cats had a higher incidence of *Cystoisospora* spp. (*P* < 0.001). These results suggest that while T. foetus is not of importance in feral and shelter cats in PEI, imported cats could serve as reservoirs. Abstract available from the publisher.

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.

Evaluation of 18F-FDG PET/CT as a diagnostic imaging and staging tool for feline oral squamous cell carcinoma.
Randall EK, Kraft SL, Yoshikawa H, LaRue SM
*Vet Comp Oncol* (2016) **14**:28-38
18F-fluorodeoxyglucose positron emission tomography combined with computed tomography (18FDG-PET/CT) has been shown to be effective for staging human oral squamous cell carcinoma (SCC) but its application for cats with oral SCC is unknown. Twelve cats with biopsy-proven oral SCC were imaged with whole body 18FDG-PET/CT to determine its value as a diagnostic imaging and staging tool and fine needle aspirates were obtained of accessible regional lymph nodes. All tumors were FDG avid and conspicuous on 18FDG-PET/CT images, with an average of the maximum standardized uptake value 9.88 ± 5.33 SD (range 2.9-24.9). Soft tissue infiltrative tumors that were subtle and ill defined on CT were highly visible and more extensive on FDG-PET/CT. Tumors invading the osseous structures were more similar in extent on 18FDG-PET/CT and CT although they were more conspicuous on PET images. Three cytologically confirmed metastases were hypermetabolic on PET, while two of those metastases were equivocal on CT.
Practical urinalysis in the cat: 1: Urine macroscopic examination ‘tips and traps’.
Reppas G, Foster SF

SERIES OUTLINE: This is the first article in a two-part series on urinalysis in the cat. The focus of Part 1 is urine macroscopic examination. Part 2, to appear in the May 2016 issue, discusses urine microscopic examination. PRACTICAL RELEVANCE: Urinalysis is an essential procedure in feline medicine but often little attention is paid to optimising the data yielded or minimising factors that can affect the results. CLINICAL CHALLENGES: For the best results, appropriately collected urine should be prepared promptly by specialist laboratory personnel for the relevant tests and assessed by a clinical pathologist. This is invariably impractical in clinical settings but careful attention can minimise artefacts and allow maximum useful information to be obtained from this seemingly simple process. AUDIENCE: Clinical pathologists would be familiar with the information provided in this article, but it is rarely available to general or specialist practitioners, and both can potentially benefit. EQUIPMENT: Most of the required equipment is routinely available to veterinarians. However, instructions have been provided to give practical alternatives for specialist procedures in some instances. EVIDENCE BASE: Evidence for much of the data on urinalysis in cats is lacking. Validation of the human equipment used routinely, such as dipsticks, is also lacking. As such, the evidence base for feline urinalysis is quite poor and information has largely been extrapolated from the human literature. Information from feline studies has been included where available. In addition, practical clinicopathological and clinical observations are provided.

Clinical and laboratory features of cats with feline infectious peritonitis - a retrospective study of 231 confirmed cases (2000-2010).
Rieper 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.

Confirmatory field study for the evaluation of ciclosporin at a target dose of 7.0 mg/kg (3.2 mg/lb) in the control of feline hypersensitivity dermatitides.
Roberts ES, Speranza C, Friberg C et al.
*J Feline Med Surg* (2016)
OBJECTIVES: This study was designed to confirm the efficacy and tolerability of a daily dose of 7.0 mg/kg (3.2 mg/lb) ciclosporin in the treatment of feline hypersensitivity dermatitides (HD), as these are some of the most frequently suspected skin diseases in cats and recent publications have reported the successful use of ciclosporin in the treatment of feline HD. METHODS: In total, 217 cats with feline HD were treated q24h for 42 days with a target dose of 7 mg/kg ciclosporin (n = 144) or a placebo control (n = 73) administered either in the food or directly in the mouth following feeding. Clinical and dermatological evaluations were conducted on days 0, 21 and 42, or study exit. Safety was evaluated through physical examinations, clinical pathology and the monitoring of adverse events (AEs). RESULTS: Administration of ciclosporin at 7.0 mg/kg provided a significant improvement in the total lesion score (P <0.0001). The average reduction from visit 1 to visit 3 was 65.1% in the ciclosporin group (9.2% for the placebo). In addition, owners assessed 78.3% of the cases in the ciclosporin group as a success. Statistically significant recoveries were also seen in extent of lesions, investigator assessment of overall improvement, and mean improvement in both the investigators’ and owners’ assessment of pruritus. Mild gastrointestinal disorders were the most common AEs but did not require cessation of therapy. CONCLUSIONS AND RELEVANCE: Results confirm that 7.0 mg/kg ciclosporin dosed q24h in food or orally for up to 6 weeks is effective and well tolerated by cats with feline HD.

Cutaneous Lymphoma at Injection Sites: Pathological, Immunophenotypical, and Molecular Characterization in 17 Cats.
Feline primary cutaneous lymphomas (FPCLs) account for 0.2% to 3% of all lymphomas in cats and are more frequently dermal non-epitheliotropic small T-cell tumors. Emergence of FPCL seems unrelated to feline leukemia virus (FeLV) serological positivity or to skin inflammation. A total of 17 cutaneous lymphomas with a history of vaccine injection at the site of tumor development were selected from 47 FPCLs. Clinical presentation, histology, immunophenotype, FeLV p27 and gp70 expression, and clonality were assessed. A majority of male (12/17), domestic short-haired (13/17) cats with a mean age of 11.3 years was reported. Postinjection time of development ranged from 15 days to approximately 9 years in 5 cats. At diagnosis, 11 of 17 cats had no evidence of internal disease. Lymphomas developed in interscapular (8/17), thoracic (8/17), and flank (1/17) cutaneous regions; lacked epitheliotropism; and were characterized by necrosis (16/17), angiocentricity (13/17), angioinvasion (9/17), angiodestruction (8/17), and peripheral inflammation composed of lymphoid aggregates (14/17). FeLV gp70 and/or p27 proteins were expressed in 10 of 17 tumors. By means of World Health Organization classification, immunophenotype, and clonality, the lesions were categorized as large B-cell lymphoma (11/17), anaplastic large T-cell lymphoma (3/17), natural killer cell-like (1/17) lymphoma, or peripheral T-cell lymphoma (1/17). Lineage remained uncertain in 1 case. Cutaneous lymphomas at injection sites (CLIS) shared some clinical and pathological features with feline injection site sarcomas and with lymphomas developing in the setting of subacute to chronic inflammation reported in human beings. Persistent inflammation induced by the injection and by reactivation of FeLV expression may have contributed to emergence of CLIS.

Non-invasive evaluation of the haemodynamic effects of high-dose medetomidine in healthy cats for semen collection.

Romagnoli N, Zambelli D, Cunto M, Lambertini C, Ventrella D, Baron Toaldo M

*J Feline Med Surg* (2016) **18**:337-343

**OBJECTIVES:** This study aimed to assess non-invasively the cardiovascular effects of high-dose medetomidine on healthy male cats undergoing semen collection. **METHODS:** Haemodynamic evaluations were assessed on the basis of clinical examination, systolic arterial pressure (SAP) and transthoracic echocardiographic examination. Eight client-owned, male domestic shorthair cats were sedated with a bolus of medetomidine intramuscularly (IM; 0.13 mg/kg), and semen collection was performed. A second transthoracic echocardiographic examination and SAP measurement were carried out 15 mins after sedation. At the end of the examination, the patients received a bolus of atipamezole (0.3 mg/kg) IM. **RESULTS:** The cats were deeply sedated, relaxed and laterally recumbent during the entire procedure. No rhythm abnormalities were observed during the examinations and no significant increase in SAP was recorded. Heart rate dropped from 200 ± 33 to 92 ± 13.1 beats per min after sedation. There was a significant increase in left ventricular dimensions and the left atrial area. The parameters of left ventricular systolic function were reduced, as were systemic and pulmonary cardiac outputs. Peak diastolic wave velocities were significantly reduced, while isovolumic contraction and relaxation time of the left ventricle were prolonged. Aortic valve insufficiency was recorded for all cats, while mitral valve insufficiency was noted in five cats. None of the subjects developed systolic anterior motion of the mitral valve. **CONCLUSIONS AND RELEVANCE:** The protocol allowed us to collect good semen samples in healthy cats. However, high-dose medetomidine induces significant haemodynamic effects on the feline heart, mainly due to a reduced heart rate, an increased cardiac preload and impaired systolic function. The animals recovered from the anaesthesia, after antagonist administration, without showing any clinically relevant consequences.
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.

Insecticide Resistance in Fleas.
Rust MK
*Insects* (2016) 7

Fleas are the major ectoparasite of cats, dogs, and rodents worldwide and potential vectors of animal diseases. In the past two decades the majority of new control treatments have been either topically applied or orally administered to the host. Most reports concerning the development of insecticide resistance deal with the cat flea, Ctenocephalides felis felis. Historically, insecticide resistance has developed to many of the insecticides used to control fleas in the environment including carbamates, organophosphates, and pyrethroids. Product failures have been reported with some of the new topical treatments, but actual resistance has not yet been demonstrated. Failures have often been attributed to operational factors such as failure to adequately treat the pet and follow label directions. With the addition of so many new chemistries additional monitoring of flea populations is needed.

Efficacy of a topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel (Broadline®) against naturally acquired infections with cestodes of the genus *Joyeuxiella* in cats.
Schuster RK, Mustafa MB, Baskar JV, Rosentel J, Chester ST, Knaus M
*Parasitol Res* (2016)

Cats are host to dipylidiid cestodes of the genera Diplopylidium, Dipylidium and *Joyeuxiella*. Broadline®, a topical broad-spectrum combination parasiticide containing fipronil (8.3 % w/v), (S)-methoprene (10 % w/v), eprinomectin (0.4 % w/v) and the cestocide praziquantel (8.3 % w/v), has previously been shown to be efficacious against Dipylidium caninum and Diplopylidium spp. in cats. To evaluate its efficacy against *Joyeuxiella* species, a blinded clinical efficacy study was conducted according to GCP. All cats had evidence for naturally acquired dipylidiid cestode infection as confirmed by pre-treatment examination. Cats were allocated randomly to two groups of 13 cats each
based on bodyweight: Control (untreated) and Broadline® at 0.12 mL/kg bodyweight administered once topically. Based on the comparison of helminth counts in the treated and untreated cats seven days post treatment, Broadline® demonstrated >99 % efficacy (p < 0.01) against mature J. fuhrmanni and J. pasqualei, with 11 and 13 of the untreated cats harbouring 1 to 102 or 2 to 95 cestodes, respectively. In addition, parasite counts indicated 95.9 % efficacy (p = 0.006) against the rictularoid nematode Pterygodermatites cahirensis.


Myasthenia gravis and congenital myasthenic syndromes in dogs and cats: A history and mini-review.
Shelton GD
Neuromuscul Disorder (2016) 26:331-334
Myasthenia gravis (MG) is a disorder of neuromuscular transmission in which muscle weakness results from an autoantibody mediated depletion of acetylcholine receptors (AChRs) at the neuromuscular junction. Myasthenia gravis occurs spontaneously in dogs and cats, and as in human MG, an autoimmune response against nicotinic AChRs has been demonstrated and autoantibodies against AChRs implicated in the pathogenesis. While both species are affected with MG, there are distinct differences in clinical presentations and frequency of spontaneous remission. Congenital myasthenic syndromes (CMSs) are hereditary disorders of neuromuscular transmission resulting in structural or functional defects of the neuromuscular junction. The clinical presentation and pathogenesis of a CMS in Jack Russell terriers was first described in the 1970’s and 1980s and has since been reported in a few other breeds. Mutations have been reported in CHRNE, COLQ and CHAT in canine CMS. A form of COLQ deficient CMS has recently been reported in cats.

Antinociceptive effects of intravenous administration of hydromorphone hydrochloride alone or followed by buprenorphine hydrochloride or butorphanol tartrate to healthy conscious cats.
Simon BT, Steagall PV, Monteiro BP, Troncy E, Lizarraga I
OBJECTIVE To evaluate antinociceptive effects of IV administration of hydromorphone alone or followed by buprenorphine or butorphanol to cats. ANIMALS 6 healthy adult cats. PROCEDURES In a randomized, blinded crossover design, cats received each of 4 treatments in which 2 IV injections were given 30 minutes apart: 2 of saline (0.9% NaCl) solution (Sal-Sal) or 1 each of hydromorphone HCl and saline solution (H-Sal), hydromorphone and buprenorphine HCl (H-Bupre), or hydromorphone and butorphanol tartrate (H-Butor). Skin temperature and thermal threshold were recorded before (baseline) and for 12 hours after the first injection. Percentage of maximum possible effect (%MPE) and thermal excursion (TE) were compared among treatments and measurement points. RESULTS Compared with baseline values, skin temperature was higher from 0.75 to 2 hours after the first injection for H-Sal; at 0.5, 1, 3, and 4 hours for H-Bupre; from 0.5 to 3 hours for H-Butor; and from 0.5 to 1 hours for Sal-Sal. Thermal excursion was higher than at baseline from 0.25 to 2 hours for H-Sal and H-Bupre and 0.25 to 0.75 hours for H-Butor; %MPE increased from 0.25 to 2 hours for H-Sal, 0.25 to 3 hours for H-Bupre, and 0.25 to 0.75 hours for H-Butor. Results were similar for comparisons with Sal-Sal, except TE was greater for H-Sal versus Sal-Sal and TE and %MPE were
greater for H-Bupe versus Sal-Sal from 0.25 to 1 hours after the first injection. CONCLUSIONS AND CLINICAL RELEVANCE Butorphanol administration decreased the duration of antinociception achieved with hydromorphone administration in cats. This opioid interaction and its impact on pain management require additional investigation.

St Gallen molecular subtypes in feline mammary carcinoma and paired metastases-disease progression and clinical implications from a 3-year follow-up study.
Soares M, Correia J, Peleteiro MC, Ferreira F
Tumour Biol (2016) 37:4053-4064
Considering that scarce data are available on disease progression of feline mammary carcinoma (FMC), this study aimed to analyze the clinical, pathological, and immunophenotypic features collected from 61 queens with FMC and to compare the concordance ratios of the expression levels of five molecular markers (ER, PR, fHER2, CK5/6, and Ki-67) between primary tumors (PT) and metastatic lesions. The results showed that cats with luminal A mammary carcinomas (MC) had higher overall survival (924.6 days, p = 0.001) and longer disease-free period (385.4 days, p = 0.005) compared to the ones with other MC subtypes. In fact, queens with triple negative/basal-like MC showed the lowest survival (mean 156.2 days) and the shortest disease-free survival (mean 28 days) among the molecular subtypes of MC. The lung was the organ most frequently affected by metastases, and animals with lung and/or pleural metastases were more likely to display metastases at three or more locations (p = 0.039). A large heterogeneity in protein expression levels was found between PT and paired metastases, with both estrogen and progesterone receptors more likely to be downregulated in metastases. Paired metastases frequently had higher Ki-67 index than PT, whereas fHER2 overexpression was seen in 46 samples (30 %) and CK5/6 expression was found in 50.7 % of metastases (36/71). Results also revealed that disease progression leads to a high percentage of triple negative/basal-like metastases (9/23; 39.1 %) associated with the absence of luminal A subtype in distant metastases (0/23). This study highlights the prognostic importance of immunophenotyping of MC in cats, although the modified protein expression identified in metastases contributes to justify why possible targeted therapies may fail in some animals with metastatic disease. Altogether, the results obtained also demonstrate that FMC can be used as a model to study human breast cancer.

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 Chlamyphila 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.
ISFM Consensus Guidelines on the Diagnosis and Management of Feline Chronic Kidney Disease.
Sparkes AH, Caney S, Chalhoub S et al.
*J Feline Med Surg* (2016) **18**:219-239
PRACTICAL RELEVANCE: Chronic kidney disease (CKD) is one of the most commonly diagnosed diseases in older cats. In most cats, CKD is also a progressive disease and can be accompanied by a wide range of clinical and clinicopathological changes. These ISFM Consensus Guidelines have been developed by an independent panel of clinicians and academics to provide practical advice on the diagnosis and management of this complex disease. CLINICAL CHALLENGES: Although CKD is a common clinical problem in cats, the manifestations of disease vary between individuals. Thus there is a need for careful and repeat evaluation of cats with CKD and adjustment of therapy according to individual needs. In addition to addressing problems arising from CKD and improving quality of life (QoL) for the patient, therapy may also target slowing the underlying progression of disease and hence prolonging life. While maintaining QoL is of paramount importance in our patients, this can be challenging when multiple therapies are indicated. In some cases it is necessary to prioritise therapy, given an understanding of what is likely to most benefit the individual patient. EVIDENCE BASE: In preparing these Guidelines, the Panel has carefully reviewed the existing published literature, and has also graded the quality of evidence for different interventions to help to provide practical recommendations on the therapeutic options for feline CKD. This is a field of veterinary medicine that has benefited from some excellent published clinical research and further research findings will undoubtedly modify the recommendations contained in these Guidelines in the future.

The Population Origins and Expansion of Feral Cats in Australia.
Spencer PB, Yurchenko AA, David VA et al.
*J Hered* (2016) **107**:104-114
The historical literature suggests that in Australia, the domestic cat (Felis catus) had a European origin (~200 years before present (ybp)), but it is unclear if cats arrived from across the Asian land bridge contemporaneously with the dingo (4000 ybp), or perhaps immigrated ~40000 ybp in association with Aboriginal settlement from Asia. The origin of cats in Australia is important because the continent has a complex and ancient faunal assemblage that is dominated by endemic rodents and marsupials and lacks the large placental carnivores found on other large continents. Cats are now ubiquitous across the entire Australian continent and have been implicit in the range contraction or extinction of its small to medium sized (<3.5kg) mammals. We analyzed the population structure of 830 cats using 15 short tandem repeat (STR) genomic markers. Their origin appears to come exclusively from European founders. Feral cats in continental Australia exhibit high genetic diversity in comparison with the low diversity found in populations of feral cats living on islands. The genetic structure is consistent with a rapid westerly expansion from eastern Australia and a limited expansion in coastal Western Australia. Australian cats show modest if any population structure and a close genetic alignment with European feral cats as compared to cats from Asia, the Christmas and Cocos (Keeling) Islands (Indian Ocean), and European wildcats (F. silvestris silvestris).

Use of an ophthalmic formulation of megestrol acetate for the treatment of eosinophilic keratitis in cats.
Stiles J, Coster M  
*Vet Ophthalmol* (2016)

**OBJECTIVE:** To evaluate a compounded ophthalmic formulation of 0.5% megestrol acetate to treat eosinophilic keratitis in cats.  
**STUDY DESIGN:** Prospective study.  
**ANIMALS STUDIED:** Seventeen client owned cats with eosinophilic keratitis in one or both eyes.  
**METHODS:** Eosinophilic keratitis was confirmed by cytology. At each visit, fluorescein staining and photography were performed. Cats were initially treated q 8-12 h with 0.5% megestrol acetate in an aqueous base. Serum glucose was measured at the first or second reexamination.  
**RESULTS:** Fifteen of 17 (88%) cats had a positive response to treatment, with 6 of 17 (35%) having complete resolution at the first reexamination (2-4 weeks). Two of 17 (12%) cats did not respond to treatment. Most cats required a treatment frequency of once daily to once weekly to maintain remission of disease. No ocular irritation or systemic side effects were noted in any cat.  
**CONCLUSIONS AND CLINICAL RELEVANCE:** The use of an ophthalmic formulation of 0.5% megestrol acetate is a viable option for treating feline eosinophilic keratitis.

**Validation of an enzyme-linked immunosorbent assay for measurement of feline haptoglobin.**  
Stiller J, Jasensky AK, Hennies M, Einspanier R, Kohn B  

Haptoglobin is a positive moderate acute phase protein (APP) in cats. Measurement of haptoglobin can be used in the diagnosis, prognosis, and monitoring of systemic inflammatory disease, especially by creating profiles with major APPs. The aim of our study was to validate a sandwich enzyme-linked immunosorbent assay (ELISA) for measurement of feline haptoglobin. The validation included an assessment of precision, accuracy, detection limit, method comparison with a spectrophotometric assay, and evaluation of the overlap performance. The concentration of haptoglobin was measured in serum from 27 healthy and 23 sick cats. The coefficients of variation were 2.5-4.7% for intra-assay variability and 7.1-11.6% for interassay variability. The ratio of observed to expected dilutional parallelism of 4 serum samples was 108.1-118.4%. The ratio of observed to expected spike recovery of 4 serum samples was 90.8-94.0%. The lower detection limit was 0.19 g/L. Method comparison revealed a positive correlation (rs = 0.949, P < 0.0001) and a proportional bias between the methods of -38.9%. Agreement between the methods was not clinically acceptable. Overlap performance of the ELISA was deemed satisfactory. The sandwich ELISA measures feline haptoglobin with an analytical and overlap performance acceptable for clinical purposes. Given the observed bias, the ELISA cannot be used interchangeably with the spectrophotometric assay.

**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.

**Mother-offspring recognition in the domestic cat: Kittens recognize their own mother’s call.**
Szneci P, Bánszegi O, Urrutia A, Faragó T, Hudson R  
*Dev Psychobiol* (2016)

Acoustic communication can play an important part in mother-young recognition in many mammals. This, however, has still only been investigated in a small range mainly of herd- or colony-living species. Here we report on the behavioral response of kittens of the domestic cat, a typically solitary carnivore, to playbacks of “greeting chirps” and “meows” from their own versus alien mothers. We found significantly stronger responses to the chirps from kittens’ own mother than to her meows or to the chirps or meows of alien mothers. Acoustic analysis revealed greater variation between vocalizations from different mothers than for vocalizations from the same mother. We conclude that chirps emitted by mother cats at the nest represent a specific form of vocal communication with their young, and that kittens learn and respond positively to these and distinguish them from chirps of other mothers and from other cat vocalizations while still in the nest. © 2016 Wiley Periodicals, Inc. Dev Psychobiol 9999: 1-10, 2016.

**Small animal disease surveillance: respiratory disease.**
Sánchez-Vizcaíno F, Daly JM, Jones PH et al.  
*Vet Rec* (2016) **178**:361-364

Presentation for respiratory disease comprised 1.7 per cent, 2.3 per cent and 2.5 per cent of canine, feline and rabbit consultations, respectively, between January 2014 and December 2015. Coughing was the most frequent respiratory sign reported in dogs (71.1 per cent of consultations); in cats it was sneezing (42.6 per cent). Mean percentage of samples testing positive for feline calicivirus (FCV) was 30.1 per cent in 2014 and 27.9 per cent in 2015. January was the month with the highest percentage of FCV-positive samples in both 2014 and 2015.

**Pharmacokinetic and pharmacodynamic evaluation of high doses of buprenorphine delivered via high-concentration formulations in cats.**
Taylor PM, Luangdilok CH, Sear JW  
*J Feline Med Surg* (2016) **18**:290-302

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.

Is Serum Total LDH Evaluation Able to Differentiate between Alimentary Lymphoma and Inflammatory Bowel Disease in a Real World Clinical Setting.
Terragni R, Morselli-Labate AM, Vignoli M, Bottero E, Brunetti B, Saunders JH
CONTEXT: An increase in enzyme lactate dehydrogenase (LDH) in serum is a negative prognostic factor for survival in cats affected by lymphoma. Measuring LDH at the time of diagnosis has been studied for differentiating neoplastic disease from non-neoplastic disease in dogs. Inflammatory bowel disease (IBD) and alimentary lymphoma are common diseases in cats. OBJECTIVE: The aim of this study was to determine whether elevation of total LDH occurred in cats with alimentary lymphoma and non-neoplastic gastrointestinal disease, such as IBD, and to evaluate whether this enzyme is useful in supporting the differential diagnosis of these specific diseases. MATERIALS AND METHODS: A prospective non-randomized controlled study was carried-out in a real world setting of three Italian private veterinary clinics. Seventy-one client-owned cats with a history of chronic gastrointestinal symptoms were enrolled; 33 cats were histologically diagnosed as having alimentary lymphoma and 38 cats as having IBD. Serum samples of total LDH analysis were measured. RESULTS: Gender (P = 0.016) and age (P = 0.046) were found to be significant factors influencing the differentiation of serum total LDH between cats with alimentary lymphoma and those with IBD. Despite low diagnostic accuracy in the overall population (63%), a cut-off value of serum total LDH ranging from 0.85- to 1.04-times the upper reference limit showed good capability (accuracy >80%) of differentiating these two conditions in neutered males and cats younger than 8 years of age (AUC: 0.805, 0.833; sensitivities: 76.9%, 83.3%; specificities: 80.0%, 76.5%; PPV: 76.9%, 55.6%; NPV: 80.0%, 92.9%; respectively). CONCLUSIONS: Although our study showed that gender and age are significant factors in differentiating serum total LDH between cats with alimentary lymphoma and those with IBD, this test had poor diagnostic accuracy in differentiating between these two conditions in the overall population.

Anti-platelet therapy in small animal medicine.
Thomason J, Lunsford K, Mackin A
Thromboembolism is a significant complication in many commonly encountered diseases, and can be a
devastating sequel to otherwise treatable conditions. Platelets play an essential role in the hemostatic process and, consequently, are associated with thrombus formation. Platelets adhere to denuded vascular subendothelium, recruit additional platelets and cells, aggregate, and provide the catalytic surface for thrombin production and fibrin formation. Therapy to prevent unwanted thrombus formation and thromboembolic crises is essential in the management of hypercoagulable patients. Unfortunately, many of the medications used in veterinary medicine that inhibit or modulate coagulation factors, such as the heparins, are cost prohibitive, only effective when administered by injection or require frequent drug monitoring, and are therefore poor choices for long term at home therapy. While the role of the platelet in pathologic thrombus formation is not fully understood, veterinarians often resort to anti-platelet therapy in the management of patients at risk for thromboembolic complications, because many anti-platelet medications are inexpensive, require minimal drug monitoring, and can be given orally. The aim of this review is to discuss the anti-platelet therapies that are currently being used or being considered for use to inhibit platelet function and reduce thromboembolic complications in hypercoagulable dogs and cats.

A review of antiviral drugs and other compounds with activity against feline herpesvirus type 1.
Thomasy SM, Maggs DJ
*_Vet Ophthalmol* (2016)
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.

Mechanisms of Tritrichomonas foetus Pathogenicity in Cats with Insights from Venereal Trichomonosis.
Tolbert MK, Gookin JL
Almost 20 years has passed since trichomonosis was first recognized as a potential cause of diarrhea in domestic cats. Despite progress in confirming disease causation, developing means for diagnosis, and identifying approaches to treatment of the infection, we still know very little about how this parasite causes diarrhea. With increasing recognition of resistance of trichomonosis to treatment with 5-nitroimidazole drugs, new treatment strategies based on an understanding of disease pathogenesis are needed. In this review, lessons learned from the pathogenesis of venereal trichomonosis in people and cattle are applied to clinical observations of trichomonosis in cats in effort to generate insight into areas where further research may be beneficial.

Pharmacokinetics of minocycline in domestic cats.
Tynan 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 (t(1/2)), 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(1/2) 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.

OCCURRENCE OF LUNGWORMS IN EUROPEAN WILDCATS (FELIS SILVESTRIS SILVESTRIS) OF CENTRAL ITALY.
Veronesi F, Traversa D, Lepri E et al.
J Wildl Dis (2016) 52:270-278
The increasing focus on infections in domestic cats (Felis catus) has raised questions about lungworm distribution in wild hosts. To enhance knowledge of the occurrence of lungworms in enzootic regions of central Italy, we examined the carcasses of 16 European wildcats (Felis silvestris silvestris). Adult nematodes, feces, respiratory flushings, and pulmonary tissues were collected at necropsy and then microscopically and genetically analyzed. Fourteen wildcats had single or mixed lungworm species. Aelurostrongylus abstrusus was the most common parasite retrieved, followed by Troglostrongylus brevior. In addition, three specimens of Angiostrongylus chabaudi were found in the pulmonary arteries of one wildcat. Histologically, the most common lesions were a mild-to-severe chronic catarrhal bronchitis and a chronic interstitial pneumonia with smooth muscle hypertrophy, associated with T. brevior and A. abstrusus, respectively. These results demonstrate that the European wildcats may harbor several species of lungworms that may impair their health and welfare. Also, F. s. silvestris is a potential reservoir for respiratory nematodes in domestic 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.

First report of Polycystic kidney disease occurrence in Persian cats in Serbia.
Vucicevic M, Slijepcevic D, Davitkov D et al.
Vet Ital (2016) 52:51-56
Polycystic kidney disease (PKD) is an inherited autosomal disorder in cats, mostly diagnosed in Persian cats. Renal cysts can be diagnosed by ultrasound, but cats must be at least 16 weeks old. The goals of this study were to assess the occurrence of PKD in Serbia using a randomly selected group of Persian cats, to compare the diagnostic efficacy of ultrasound and genetic tests, and to measure haematological and selected biochemical parameters. We examined 70 cats of Persian breed, between 4 months and 8 years of age. Complete blood count and selected biochemical parameters were measured, renal ultrasound was performed. Swabs of the oral cavity were obtained for genetic testing. Percentage of PKD positive cats identified by genetic testing was 48.6%, whilst only 18.6% were detected through ultrasound. Animals that were polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) positive and ultrasound negative ranged from 4 months to 3.5 years. All haematological and biochemical parameters were within the normal range values in all examined cats. Genetic methods proved to be the most effective for reliable and early diagnosis of PKD in Persian cats. DNA analysis can be used right after birth, and excludes the need for other diagnostic procedures, such as ultrasound.

In vitro development and evaluation of a polyacrylic acid-silicone device intended for gradual occlusion of portosystemic shunts in dogs and cats.
Wallace ML, Ellison GW, Batich C, Case JB, Kim SE
OBJECTIVE To develop a device intended for gradual venous occlusion over 4 to 6 weeks. SAMPLE Silicone tubing filled with various inorganic salt and polyacrylic acid (PAA) formulations and mounted within a polypropylene or polyether ketone (PEEK) outer ring. PROCEDURES 15 polypropylene prototype rings were initially filled with 1 of 5 formulations and placed in PBSS. In a second test, 10 polypropylene and 7 PEEK prototype rings were filled with 1 formulation and placed in PBSS. In a third test, 2 formulations were loaded into 6 PEEK rings each, placed in physiologic solution, and incubated. In all tests, ring luminal diameter, outer diameter, and luminal area were measured over 6
weeks. RESULTS In the first test, 2 formulations had the greatest changes in luminal area and diameter, and 1 of those had a greater linear swell rate than the other had. In the second test, 6 of 7 PEEK rings and 6 of 10 polypropylene rings closed to a luminal diameter < 1 mm within 6 weeks. Polypropylene rings had a greater increase in outer diameter than did PEEK rings between 4.5 and 6 weeks. In the third test, 11 of 12 PEEK rings gradually closed to a luminal diameter < 1 mm within 6 weeks. CONCLUSIONS AND CLINICAL RELEVANCE A PAA and inorganic salt formulation in a prototype silicone and polymer ring resulted in gradual occlusion over 4 to 6 weeks in vitro. Prototype PEEK rings provided more reliable closure than did polypropylene rings.

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 compressive 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.

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.

**Gastrointestinal dysmotility disorders in critically ill dogs and cats.**
Whitehead K, Cortes Y, Eirmann L
*J Vet Emerg Crit Care (San Antonio)* (2016) **26**:234-253

OBJECTIVE: To review the human and veterinary literature regarding gastrointestinal (GI) dysmotility disorders in respect to pathogenesis, patient risk factors, and treatment options in critically ill dogs and cats. ETIOLOGY: GI dysmotility is a common sequela of critical illness in people and small animals. The most common GI motility disorders in critically ill people and small animals include esophageal dysmotility, delayed gastric emptying, functional intestinal obstruction (ie, ileus), and colonic motility abnormalities. Medical conditions associated with the highest risk of GI dysmotility include mechanical ventilation, sepsis, shock, trauma, systemic inflammatory response syndrome, and multiple organ failure. The incidence and pathophysiology of GI dysmotility in critically ill small animals is incompletely understood. DIAGNOSIS: A presumptive diagnosis of GI dysmotility is often made in high-risk patient populations following detection of persistent regurgitation, vomiting, lack of tolerance of enteral nutrition, abdominal pain, and constipation. Definitive diagnosis is established via radioscintigraphy; however, this diagnostic tool is not readily available and is difficult to perform on small animals. Other diagnostic modalities that have been evaluated include abdominal ultrasonography, radiographic contrast, and tracer studies. THERAPY: Therapy is centered at optimizing GI perfusion, enhancement of GI motility, and early enteral nutrition. Pharmacological interventions are instituted to promote gastric emptying and effective intestinal motility and prevention of complications. Promotility agents, including ranitidine/nizatidine, metoclopramide, erythromycin, and cisapride are the mainstays of therapy in small animals. PROGNOSIS: The development of complications related to GI dysmotility (eg, gastrolesophageal reflux and aspiration) have been associated with increased mortality risk. Institution of prophylactic therapy is recommended in high-risk patients, however, no consensus exists regarding optimal timing of initiating prophylactic measures, preference of treatment, or duration of therapy. The prognosis for affected small animal patients remains unknown.

**Evaluation and comparison of xylazine hydrochloride and dexmedetomidine hydrochloride for the induction of emesis in cats: 47 cases (2007-2013).**
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.

Williams TL, Archer J
J Small Anim Pract (2016) 57:122-129
OBJECTIVES: Evaluation of urine albumin:creatinine ratio, urine cystatin C:creatinine ratio, urine protein:creatinine ratio and urine specific gravity as screening tests for azotaemic chronic kidney disease in cats. METHODS: A group of cats over eight years old were defined as either (i) healthy non-azotaemic (n=40) if they had serum creatinine concentration <153 µmol/L and no history of apparent disease or (2) having azotaemic chronic kidney disease (n=12) if they had serum creatinine concentration >153 µmol/L with urine specific gravity <1·035. Urine albumin:creatinine ratio, urine cystatin C:creatinine ratio, urine protein:creatinine ratio and urine specific gravity were compared between the two groups. RESULTS: Urine cystatin C:creatinine ratio was significantly lower in cats with azotaemic chronic kidney disease than that in healthy cats [3·7 (1·4, 4·3)×10(-6) versus 13·9 (6·3, 24·7)×10(-6) ; P=0·011]. Urine specific gravity was also significantly lower in the azotaemic chronic kidney disease group than that in the healthy group [1·022 (1·017, 1·028) versus 1·043 (1·034, >1·050); P<0·001]. Urine albumin:creatinine ratio and urine protein:creatinine ratio were not significantly different between the groups (P=0·075 and P=0·965, respectively). CLINICAL SIGNIFICANCE: Urine cystatin C:creatinine ratio and urine specific gravity were significantly lower in cats with azotaemic chronic kidney disease than that in healthy cats; however, neither biomarker was an adequate sole screening test for azotaemic chronic kidney disease.

Validation of an automated enzyme immunoassay for the measurement of serum total thyroxine in cats.
Williams TL, Archer J
BACKGROUND: Hyperthyroidism is common in older cats, which necessitates frequent screening of serum total thyroxine (TT4) concentrations. Fast, cheap, and reliable methods to measure TT4 in cats are needed. OBJECTIVES: The purpose of the study was the validation of a human TT4 enzyme immunoassay (EIA) for use with feline serum, and derivation of a TT4 reference interval (RI) for cats aged 9 years and older. METHODS: Assay precision, reproducibility, and linearity were evaluated. Interference by hemolysis was also assessed. Method comparison studies between the human EIA and a previously validated radioimmunoassay (RIA) and chemiluminescent-enzyme immunoassay (CEIA) were performed. Healthy cats (> 9 years) were recruited from 3 UK first opinion practices. RESULTS: The human TT4 EIA demonstrated good precision and reproducibility, and adequate linearity. Hemolysis did not significantly alter measured TT4 concentrations until HGB > 8 g/L. Method
comparison revealed proportional and constant errors between EIA and RIA/CEIA. The TT4 RI for cats (> 9 years) was calculated as 7.1-45.1 nmol/L (n = 49). CONCLUSIONS: The human TT4 EIA was successfully validated for use with feline serum and offers a rapid, cheap, and reliable method for determination of serum TT4 concentrations in cats.

Use of a percutaneously controlled hydraulic occluder for treatment of refractory urinary incontinence in three female cats.
Wilson KE, Berent AC, Weisse CW

CASE DESCRIPTION 3 cats were referred for evaluation of chronic urinary incontinence. CLINICAL FINDINGS A presumptive diagnosis of urethral sphincter mechanism incompetence (USMI) was made in all 3 cats. Preoperatively, incontinence was mild in 1 cat (incontinence during sleep) and moderate to severe (incontinence while awake and at rest) in 2. Structural abnormalities noted during cystoscopy included urethrovaginal junction stenosis (n = 1), vaginal stenosis (1), short urethra (1), and intrapelvic bladder (1). TREATMENT AND OUTCOME All 3 cats were treated by means of implantation of an inflatable silicone hydraulic occluder (HO) via a ventral midline celiotomy. Immediately prior to HO implantation, patients underwent cystoscopy to detect any anatomic abnormalities and confirm the absence of ureteral ectopia. Following surgery, all 3 patients attained complete continence, needing 0 or 1 inflation of the device. Complications included cystoscopy-associated urethral tear (n = 1), constipation (1), stranguria (1), hematuria (2), and urinary tract infection (2). Device explantation was performed 14 weeks after surgery in 1 cat because of postoperative constipation. Constipation persisted and urinary incontinence recurred but was markedly improved following device removal in this cat (leakage of urine only when sleeping at follow-up 29 months after surgery [26 months after device explantation]). At the time of last follow-up, 2 of the 3 cats remained fully continent approximately 3 and 6 years after device implantation. CLINICAL RELEVANCE Findings suggested that implantation of an HO may be a safe and effective long-term treatment for some cats with USMI. Further studies are necessary to evaluate the potential for treatment-related complications and the long-term outcome.

Wormser C, Clarke DL, Aronson LR

OBJECTIVE To evaluate and compare outcomes in cats following ureteral surgery or ureteral stent placement. DESIGN Retrospective case series. ANIMALS 117 cats. PROCEDURES Data regarding signalment, history, concurrent disease, clinical signs, clinicopathologic tests, surgical procedures, and perioperative complications (including death) were recorded. Follow-up data, including presence of signs of chronic lower urinary tract disease, chronic urinary tract infection, reobstruction, and death, if applicable, were obtained by records review or telephone contact with owners. Variables of interest were compared statistically between cats treated with and without stent placement. Kaplan-Meier analysis and Cox regression were performed to assess differences in survival time between cats with and without ureteral stents. RESULTS Perioperative complications referable to the urinary tract were identified in 6 of 43 (14%) cats that had ≥1 ureteral stent placed and 2 of 74 (3%) cats that underwent ureteral surgery without stenting. Perioperative mortality rates were similar between cats with (4/43 [9%]) and without (6/74 [8%]) stents. After surgery, signs of chronic lower urinary tract disease and chronic urinary tract infection were significantly more common among cats with than cats without
stents. Nineteen of 87 (22%) cats with follow-up information available had recurrent obstruction; incidence of reobstruction did not differ between cats with and without stents. Median survival time did not differ between the 2 groups. CONCLUSIONS AND CLINICAL RELEVANCE The potential for signs of chronic lower urinary tract disease and chronic infection, particularly among cats that receive ureteral stents, warrants appropriate client counseling. Judicious long-term follow-up for detection of reobstruction is recommended.

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 Spirocerca 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.

In vitro antiviral effect of germacrone on feline calicivirus.
Wu H, Liu Y, Zu S et al.
Arch Virol (2016)
Feline calicivirus (FCV) often causes respiratory tract and oral disease in cats and is a highly contagious virus. Widespread vaccination does not prevent the spread of FCV. Furthermore, the low fidelity of the RNA-dependent RNA polymerase of FCV leads to the emergence of new variants, some of which show increased virulence. Currently, few effective anti-FCV drugs are available. Here, we found that germacrone, one of the main constituents of volatile oil from rhizoma curcuma, was able to effectively reduce the growth of FCV strain F9 in vitro. This compound exhibited a strong anti-FCV effect mainly in the early phase of the viral life cycle. The antiviral effect depended on the concentration of the drug. In addition, germacrone treatment had a significant inhibitory effect against two other reference strains, 2280 and Bolin, and resulted in a significant reduction in the replication of strains WZ-1 and HRB-SS, which were recently isolated in China. This is the first report of antiviral effects of germacrone against a calicivirus, and extensive in vivo research is needed to evaluate this drug as an antiviral therapeutic agent for FCV.

Genotypes of Cryptosporidium spp., Enterocytozoon bieneusi and Giardia duodenalis in dogs and cats in Shanghai, China.
Xu H, Jin Y, Wu W et al.
Parasit Vectors (2016) 9:121

BACKGROUND: Controversies exist on the potential role of companion animals in the transmission of enteric pathogens in humans. This study was conducted to examine the genotype distribution of Cryptosporidium spp., Enterocytozoon bieneusi, and Giardia duodenalis in companion animals in Shanghai, China, and to assess their zoonotic potential. METHODS: Fecal specimens from 485 dogs and 160 cats were examined for the occurrence and genotype distribution of the three pathogens by PCR. PCR products were sequenced to determine the species and genotypes. The $\chi^2$ test was used to compare differences in infection rates between living conditions or age groups. RESULTS: Cryptosporidium spp., E. bieneusi and G. duodenalis were found in 39 (8.0%), 29 (6.0%) and 127 (26.2%) of dogs, and 6 (3.8%), 9 (5.6%) and 21 (13.1%) of cats, respectively. Infection rates of the pathogens in dogs from pet shops and a clinic were higher than those in household dogs, and higher in cats from one animal shelter than from pet shops. No significant differences in infection rates were detected among age groups. Cryptosporidium canis and C. felis were the only Cryptosporidium species found in dogs and cats, respectively. Enterocytozoon bieneusi genotype PtEb IX was the dominant genotype in dogs, whereas Type IV and D were the most common ones in cats. Multi-locus sequence typing at the glutamate dehydrogenase, $\beta$-giardin, and triosephosphate isomerase loci revealed the presence of G. duodenalis assemblages A ($n=23$), B ($n=1$), C ($n=26$), and D ($n=58$) in dogs (only A in household dogs) and assemblages A ($n=2$), B ($n=6$), C ($n=2$), D ($n=1$), and F ($n=7$) in cats. Co-infection was detected in 24 dogs and 5 cats, especially those living in crowded conditions. CONCLUSIONS: Living condition is a major risk factor affecting the occurrence of enteric protists in companion animals in China, and although dogs and cats can be potential sources of human infections, the different distribution of pathogen species and genotypes between dogs and cats suggests that interspecies transmission of these pathogens is probably rare in the study area.

Management of traumatic tarsal luxations with transarticular external fixation in cats.
Yardmcı C, Özak A, Önyay T, İnal KS
Vet Comp Orthop Traumatol (2016) 29

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.
Assessment of predictive molecular variables in feline oral squamous cell carcinoma treated with stereotactic radiation therapy.
Yoshikawa H, Ehrhart EJ, Charles JB, Custis JT, LaRue SM
*Vet Comp Oncol* (2016) **14**:39-57
This study evaluated molecular characteristics that are potentially prognostic in cats with oral squamous cell carcinoma (SCC) that underwent stereotactic radiation therapy (SRT). Survival time (ST) and progression-free interval (PFI) were correlated with mitotic index, histopathological grades, Ki67 and epidermal growth factor receptor expressions, tumour microvascular density (MVD), and tumour oxygen tension (pO2). Median ST and PFI were 106 and 87 days, respectively (n = 20). Overall response rate was 38.5% with rapid improvement of clinical symptoms in many cases. Patients with higher MVD or more keratinized SCC had significantly shorter ST or PFI than patients with lower MVD or less keratinized SCC (P = 0.041 and 0.049, respectively). Females had significantly longer PFI and ST than males (P ≤ 0.016). Acute toxicities were minimal. However, treatment-related complications such as fractured mandible impacted quality of life. In conclusion, SRT alone should be considered as a palliative treatment. MVD and degree of keratinization may be useful prognostic markers.

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 also 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 performe 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)
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.

Cross-Sectional Study of Characteristics of Owners and Nonowners Surrendering Cats to Four Australian Animal Shelters.
Zito S, Morton J, Paterson M et al.
*J Appl Anim Welf Sci* (2016) 19:126-143
Unwanted cats surrendered to nonhuman animal shelters are generally categorized as either “owned” or “stray.” This classification is misleading because “stray” cats may include many “semiowned” cats, for which people provide care but who are not perceived as being owned. This differentiation is important because effective strategies designed to reduce cat admissions to, and euthanasia rates in, shelters rely on accurate information about cat populations contributing to shelter intake; cat semiowners will likely respond to different strategies than people with no relationship with the cats they surrender. People surrendering cats to four Australian animal shelters were surveyed to identify factors associated with perception of ownership. Many self-classified nonowners had fed the cats they surrendered, often for a considerable period of time. The factor most strongly associated with ownership perception was an increasing association time with the cat. These findings confirm that enduring relationships between surrenderers and cats, consistent with cat semiownership, are common for cats surrendered to Australian animal shelters. This finding should be taken into account when planning education messages and cat population management strategies aimed at reducing cat admissions.

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.