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.
Complications of Percutaneous Endoscopic Gastrostomy in Dogs and Cats Receiving Corticosteroid Treatment.
Aguiar J, Chang YM, Garden OA
BACKGROUND: Corticosteroid treatment is commonly required in veterinary patients for treatment of inflammatory, immune-mediated, neurologic, and neoplastic diseases, which also may require assisted enteral nutrition via percutaneous endoscopic gastrostomy (PEG). OBJECTIVE: To evaluate complications associated with PEG use in dogs and cats receiving corticosteroid treatment. ANIMALS: Forty-two animals were included in the study: 12 dogs and 2 cats in the steroid group and 26 dogs and 2 cats in the control group. METHODS: Medical records, between January 2006 and March 2015, were reviewed. Patients were included if the PEG tube was in use for at least 24 hours and if complete medical records were available. Patients were assigned to the control group if they were not treated with corticosteroids during PEG use or to the steroid group if they had received corticosteroids during PEG tube use. Complications were classified as minor, moderate, and major in severity. Maximum severity complication rate was compared between groups. RESULTS: The general prevalence of complications was found to be similar between groups (P = .306), but in the steroid group, 43% of the cases developed a major severity complication compared with 18% of the control group (P = .054). CONCLUSION AND CLINICAL IMPORTANCE: Owners of dogs and cats receiving corticosteroids, in which PEG is planned, should be counseled about possible complications beyond those associated with PEG tube usage alone.

In vitro effects of 6% hydroxyethyl starch 130/0.42 solution on feline whole blood coagulation measured by rotational thromboelastometry.
Albrecht NA, Howard J, Kovacevic A, Adamik KN
*BMC Vet Res* (2016) **12**:155
BACKGROUND: The artificial colloid, hydroxyethyl starch (HES), is recommended for intravascular volume expansion and colloid-osmotic pressure enhancement in dogs and cats. A well-known side effect of HES solutions in humans and dogs is coagulopathy. However, HES-associated coagulopathy has thus far not been investigated in cats. The goal of this study was to assess the in vitro effects of 6% HES 130/0.42 on feline whole blood samples using rotational thromboelastometry (ROTEM). A further goal was to develop feline reference intervals for ROTEM at our institution. In this in vitro experimental study, blood samples of 24 adult healthy cats were collected by atraumatic jugular phlebotomy following intramuscular sedation. Baseline ROTEM analyses (using ex-tem, in-tem and fib-tem assays) were performed in duplicate. Additionally, ROTEM analyses were performed on blood samples after dilution with either Ringer’s acetate (RA) or 6% HES 130/0.42 (HES) in a 1:6 dilution (i.e. 1 part solution and 6 parts blood). RESULTS: Coefficients of variation of duplicate measures were below 12% in all ex-tem assays, 3 of 4 in-tem assays but only 1 of 3 fib-tem assays. Reference intervals were similar albeit somewhat narrower than those previously published. Dilution with both solutions lead to significantly prolonged CT (in-tem), CFT (ex-tem and in-tem), and reduced MCF (ex-tem, in-tem, and fib-tem) and alpha (ex-tem and in-tem). Compared to RA, dilution with HES caused a significant prolongation of CT in fib-tem (P = 0.016), CFT in ex-tem (P = 0.017) and in-tem (P = 0.019), as well as a reduction in MCF in in-tem (P = 0.032) and fib-tem (P = 0.020), and alpha in ex-tem (P = 0.014). However, only a single parameter (CFT in ex-tem) was outside of the established reference interval after dilution with HES. CONCLUSIONS: In vitro hemodilution of feline blood with RA and HES causes a small but significant impairment of whole blood coagulation, with HES leading to a significantly greater effect on coagulation than RA. Further studies are necessary to evaluate the in vivo effects and the clinical significance of these findings.
Stress in owned cats: behavioural changes and welfare implications.
Amat M, Camps T, Manteca X
*J Feline Med Surg* (2016) **18**:577-586
Domestic cats are exposed to a variety of stressful stimuli, which may have a negative effect on the cats’ welfare and trigger a number of behavioural changes. Some of the stressors most commonly encountered by cats include changes in environment, inter-cat conflict, a poor human-cat relationship and the cat’s inability to perform highly motivated behaviour patterns. Stress is very likely to reduce feed intake, and stress-related anorexia may contribute to the development of potentially serious medical conditions. Stress also increases the risk of cats showing urine marking and some forms of aggression, including redirected aggression. A number of compulsive disorders such as over-grooming may also develop as a consequence of stressful environments. Some of the main strategies to prevent or reduce stress-related behavioural problems in cats are environmental enrichment, appropriate management techniques to introduce unfamiliar cats to each other and the use of the synthetic analogue of the feline facial pheromone. As the stress response in cats depends, to a large extent, on the temperament of the animal, breeding and husbandry strategies that contribute to the cat developing a well-balanced temperament are also very useful.

Levels of Toxocara infections in dogs and cats from urban Vietnam together with associated risk factors for transmission.
Anh NT, Thuy DT, Hoan DH, Hop NT, Dung DT
*J Helminthol* (2016) **90**:508-510
The aims of the present study were to assess the prevalence of Toxocara infection in household cats and dogs, together with the presence of anti-Toxocara IgG antibodies in humans and the level of egg contamination in soil and vegetable samples from the local environment. Prevalence values of 47.8% of 253 cats and 37.7% of 284 dogs were recorded, together with 35.8% of eggs in soil samples, 25.0% in garden vegetables and in 56.3% of 16 dog-hair samples. The risk of the infection was higher for dogs and cats in households with egg-contaminated soil compared to those without evidence of soil contamination. The high prevalence of dog and cat Toxocara infection and their indiscriminate defecation behaviour contribute to a significant risk of transmission to humans as 58.7% of human blood samples were seropositive for Toxocara. Anthelminthic treatment of dogs and cats, plus educating household members, must be emphasized in any prevention programme in Vietnam.

The Association of Shelter Veterinarians’ 2016 Veterinary Medical Care Guidelines for Spay-Neuter Programs.
Association OSVVTFTAS-N, Griffin B, Bushby PA et al.
As community efforts to reduce the overpopulation and euthanasia of unwanted and unowned cats and dogs have increased, many veterinarians have increasingly focused their clinical efforts on the provision of spay-neuter services. Because of the wide range of geographic and demographic needs, a wide variety of spay-neuter programs have been developed to increase delivery of services to targeted populations of animals, including stationary and mobile clinics, MASH-style operations, shelter services, community cat programs, and services provided through private practitioners. In an effort to promote consistent, high-quality care across the broad range of these programs, the Association of Shelter Veterinarians convened a task force of veterinarians to develop veterinary medical care guidelines for spay-neuter programs. These guidelines consist of recommendations for general patient
care and clinical procedures, preoperative care, anesthetic management, surgical procedures, postoperative care, and operations management. They were based on current principles of anesthesiology, critical care medicine, infection control, and surgical practice, as determined from published evidence and expert opinion. They represent acceptable practices that are attainable in spay-neuter programs regardless of location, facility, or type of program. The Association of Shelter Veterinarians envisions that these guidelines will be used by the profession to maintain consistent veterinary medical care in all settings where spay-neuter services are provided and to promote these services as a means of reducing sheltering and euthanasia of cats and dogs.

**Surgical outcome of cats treated for aqueous humor misdirection syndrome: a case series.**
Atkins RM, Armour MD, Hyman JA

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.

**Epidemiology of systemic inflammatory response syndrome and sepsis in cats hospitalized in a veterinary teaching hospital.**
Babyak JM, Sharp CR

OBJECTIVE To describe the epidemiology of the systemic inflammatory response syndrome (SIRS) and sepsis in cats hospitalized in a veterinary teaching hospital. DESIGN Observational study. ANIMALS 246 client-owned cats. PROCEDURES During a 3-month period, daily treatment records were evaluated for all hospitalized cats. Information extracted included signalment, temperature, heart rate, respiratory rate, diagnostic test results, diagnosis, duration of hospitalization, and outcome (survival or death). Cats were classified into 1 of 4 disease categories (sepsis [confirmed infection and SIRS], infection [confirmed infection without SIRS], noninfectious SIRS [SIRS without a confirmed infection], and no SIRS [no SIRS or infection]). RESULTS Of the 246 cats, 26 and 3 were hospitalized 2 and 3 times, respectively; thus, 275 hospitalizations were evaluated. When SIRS was defined as the presence of ≥2 of 4 SIRS criteria, 17 cats had sepsis, 16 had infections, 81 had noninfectious SIRS, and 161 were classified in the no SIRS category at hospital admission. The prevalence of sepsis at hospital admission was 6.2 cases/100 admissions. Four cats developed sepsis while hospitalized,
resulting in a sepsis incidence rate of 1.5 cases/100 hospital admissions. Four of 17 cats with sepsis at hospital admission and 3 of 4 cats that developed sepsis while hospitalized died or were euthanized, resulting in a mortality rate of 33.3% for septic cats; 239 hospitalizations resulted in survival, 28 resulted in euthanasia, and 8 resulted in death. **CONCLUSIONS AND CLINICAL RELEVANCE** Results indicated that many hospitalized cats have evidence of SIRS and some have sepsis. In cats, sepsis is an important clinical entity with a high mortality rate.

**Determination of reference intervals and comparison of venous blood gas parameters using standard and non-standard collection methods in 24 cats.**

Bachmann K, Kutter AP, Schefer RJ, Marly-Voquer C, Sigrist N

*J Feline Med Surg* (2016)

**OBJECTIVES:** The aim of this study was to determine in-house reference intervals (RIs) for venous blood analysis with the RAPIDPoint 500 blood gas analyser using blood gas syringes (BGSs) and to determine whether immediate analysis of venous blood collected into lithium heparin (LH) tubes can replace anaerobic blood sampling into BGSs. **METHODS:** Venous blood was collected from 24 healthy cats and directly transferred into a BGS and a LH tube. The BGS was immediately analysed on the RAPIDPoint 500 followed by the LH tube. The BGSs and LH tubes were compared using paired t-test or Wilcoxon matched-pairs signed-rank test, Bland-Altman and Passing-Bablok analysis. To assess clinical relevance, bias or percentage bias between BGSs and LH tubes was compared with the allowable total error (TEa) recommended for the respective parameter. **RESULTS:** Based on the values obtained from the BGSs, RIs were calculated for the evaluated parameters, including blood gases, electrolytes, glucose and lactate. Values derived from LH tubes showed no significant difference for standard bicarbonate, whole blood base excess, haematocrit, total haemoglobin, sodium, potassium, chloride, glucose and lactate, while pH, partial pressure of carbon dioxide and oxygen, actual bicarbonate, extracellular base excess, ionised calcium and anion gap were significantly different to the samples collected in BGSs (P <0.05). Furthermore, pH, partial pressure of carbon dioxide and oxygen, extracellular base excess, ionised calcium and anion gap exceeded the recommended TEa. **CONCLUSIONS AND RELEVANCE:** Assessment of actual and standard bicarbonate, whole blood base excess, haematocrit, total haemoglobin, sodium, potassium, chloride, glucose and lactate can be made based on blood collected in LH tubes and analysed within 5 mins. For pH, partial pressure of carbon dioxide and oxygen, extracellular base excess, anion gap and ionised calcium the clinically relevant alterations have to be considered if analysed in LH tubes.

**Major Parasitic Zoonoses Associated with Dogs and Cats in Europe.**

Baneth G, Thamsborg SM, Otranto D et al.

*J Comp Pathol* (2016) **155:**S54-74

Some of the most important zoonotic infectious diseases are associated with parasites transmitted from companion animals to man. This review describes the main parasitic zoonoses in Europe related to dogs and cats, with particular emphasis on their current epidemiology. Toxoplasmosis, leishmaniasis, giardiosis, echinococcosis, dirofilariosis and toxocariosis are described from the animal, as well as from the human host perspectives, with an emphasis on parasite life cycle, transmission, pathogenicity, prevention and identification of knowledge gaps. In addition, priorities for research and intervention in order to decrease the risks and burden of these diseases are presented. Preventing zoonotic parasitic infections requires an integrated multidisciplinary ‘One Health’ approach involving collaboration between veterinary and medical scientists, policy makers and public health officials.
Feline Epitheliotropic Mastocytic Conjunctivitis in 15 Cats.
Beckwith-Cohen B, Dubielzig RR, Maggs DJ, Teixeira LB
*Vet Pathol* (2016)
Mast cell infiltration occurs in malignant, inflammatory (e.g., allergic, infectious), and idiopathic disease processes in humans and animals. Here, we describe the clinical and histological features of a unique proliferative conjunctivitis occurring in 15 cats. Ocular specimens were examined histologically, and polymerase chain reaction (PCR) for feline herpesvirus 1 (FHV-1) was performed on ocular tissues obtained from 10 cats. Cats had a median age of 8 years (range: 7 months-17.5 years). The known median duration of ocular lesions prior to biopsy was 4 months (range: 1 week-3 years). Ocular disease was unilateral in 12 cats, and 9 cats had coexisting corneal disease. Clinically and histologically, proliferative or nodular conjunctival lesions were noted in 13 cats. The nictitating membrane was affected in 10 cats. Histologically, lesions were characterized by mixed inflammatory infiltrates with an abundance of Giemsa-positive and toluidine blue-positive intraepithelial and subepithelial mast cells, marked edema, and papillary epithelial hyperplasia. Feline herpesvirus 1 was demonstrated by PCR in 1 of 10 cats tested. Follow-up information was available for 14 cats: 8 had no recurrence during a median follow-up period of 17.5 months (range: 4.5-30 months), 2 underwent orbital exenteration, 3 had recurrence that was medically managed, and 1 cat had diffuse conjunctivitis at the time of biopsy and recurrence was deemed irrelevant. Various ocular medications were administered before and after surgical biopsy. This condition was designated as feline epitheliotropic mastocytic conjunctivitis, with intraepithelial mast cells being an essential feature and papillary epithelial proliferation being characteristic but not diagnostic alone. The condition appears to be uncommon and benign. Although the cause is unknown, an allergic component is possible.

Aging in cats: Common physical and functional changes.
Bellows J, Center S, Daristotle L et al.
PRACTICAL RELEVANCE: Aged pets comprise a significant proportion of the small animal veterinarian’s patient population; in the USA, for example, it was estimated that over 20% of pet cats were 11 years of age or older in 2011. Certain changes associated with aging are neither positive nor negative, but others are less desirable, associated with illness, changes in mobility or the development of unwanted behaviors. These changes can greatly affect the health and wellbeing of the cat and have a tremendous impact on the owner. CLINICAL CHALLENGES: Regular veterinary examinations are essential for evaluating the health of older patients and for providing owners with guidance regarding optimal care. With the exception of overt disease, however, it is difficult to definitively determine if a cat is displaying changes that are appropriate for age or if they reflect an abnormal process or condition. GOALS: This is the first of two review articles in a Special Issue devoted to feline healthy aging. The goals of the project culminating in these publications included developing a working definition for healthy aging in feline patients and identifying clinical methods that can be used to accurately classify healthy aged cats. This first review provides a thorough, systems-based overview of common health-related changes observed in cats as they age. EVIDENCE BASE: There is a paucity of research in feline aging. The authors have drawn on expert opinion and available data in both the cat and other species.

Evaluating aging in cats: How to determine what is healthy and what is disease.
Bellows J, Center S, Daristotle L et al.
PRACTICAL RELEVANCE: Many of the changes that occur with aging are not considered pathologic
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and do not negatively affect overall wellness or quality of life. Ruling out disease is essential, however, when attempting to determine whether an aged cat can be considered ‘healthy’. A clear understanding of the normal and abnormal changes that are associated with aging in cats can help practitioners make decisions regarding medical management, feeding interventions and additional testing procedures for their aged patients. CLINICAL CHALLENGES: It can be difficult to determine if a cat is displaying changes that are appropriate for age. For example, healthy aged cats may have hematologic or serum biochemistry changes that differ from those of the general feline population. Assessment of behavioral health and cognitive changes, as well as auditory, olfactory and visual changes, can also be challenging in the aged patient. GOALS: This is the second of two review articles in a Special Issue devoted to feline healthy aging. The goals of the project culminating in these publications included developing a working definition for healthy aging in feline patients and identifying clinical methods that can be used to accurately classify healthy aged cats. This second review proposes criteria for assessing ‘healthy aged cats’. EVIDENCE BASE: There is a paucity of research in feline aging. The authors draw on expert opinion and available data in both the cat and other species.

Reduction of Surgical Complications in Dogs and Cats by the Use of a Surgical Safety Checklist.
Bergström A, Dimopoulou M, Eldh M
OBJECTIVE: To examine whether the use of a surgical safety checklist (SSC) could reduce the incidence of complications after small animal surgery. STUDY DESIGN: Prospective clinical study. ANIMALS: Client-owned dogs and cats (n = 520). METHODS: Consecutive cases were enrolled in the study, the first 300 cases without implementation of the surgical checklist (SSC-), followed by 220 cases with implementation of the checklist (SSC+). The checklist was adapted from the WHO surgical checklist and consisted of three different check points: (1) before induction of anaesthesia (sign in), (2) before surgical incision (time out), and (3) before recovery (sign out). In-hospital outcomes were prospectively recorded, and complications within 6 weeks were retrospectively recorded by reviewing medical records and by telephone interviews with owners. The severity of each recorded complication was graded as minor, moderate, or severe. Comparisons were made between SSC- and SSC+ outcomes. RESULTS: There were significantly more complications in SSC- animals than SSC+ animals (SSC- 52/300 vs. SSC+ 15/220, P = .0003). There was a significantly higher frequency of SSI (P = .045) and wound healing complications (P = .0006) for SSC- animals than SSC+ animals. CONCLUSION: The frequency and severity of postoperative complications was significantly decreased after introduction of a surgical checklist. All veterinary hospitals should consider using a surgical checklist. Compliance with implementation of the checklist is important for success.

Epidemiology of animal poisoning: An overview on the features and spatio-temporal distribution of the phenomenon in the north-eastern Italian regions.
Bille L, Toson M, Mulatti P et al.
Forensic Sci Int (2016) 266:440-448
In the present paper we analyze and discuss about the records referring to animal poisonings and poisoned baits cases covering the period between 2007 and 2013 and submitted for diagnostic investigations to the Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe), which is the public veterinary health institute competent for the north eastern Italian regions. All data were gathered by a passive surveillance system based on voluntary reporting, which became mandatory in 2009 after a decree of the Italian Ministry of Health had come into force. This prohibited the use and detention of poisoned baits and ordered to selected institutions and professionals to carry out standardized surveys to assess suspect and/or confirmed reported cases; all the necessary anatomopathological and
toxicological investigations to confirm the reported cases were then performed for free by public veterinary health institutes whenever a veterinarian diagnosis or clinical suspicion were provided. Totally, 1831 suspected animals poisoning and 698 cases of supposed poisoned baits recovery episodes were registered. 642/1831 (35.1%) animal poisoning cases were confirmed and the presence of toxic agents was verified in 292/698 baits (41.8%). The most severely affected territories were the ones with the highest level of urbanization and those most densely populated in the study area. Dogs and cats seemed to be greatly affected by poisoning cases and a characteristic seasonal trend was noticed, with an increase of episodes in late Winter/early Spring and in Autumn. Carbamate insecticides resulted to be the main cause for animal poisoning, while anticoagulants rodenticides played a primary role among toxicants found in poisoned baits. The presented results emphasize that malicious animal poisoning is a widespread problem in north-eastern Italy. The still relevant number of reported poisoning events caused by some banned pesticides poses the problem of identifying where these substances come from and brings to light the popular knowledge about the high toxicity of these compounds. Moreover, the noticeable increase of the number of episodes registered in 2009 pointed out how the above mentioned decree may have contributed to reveal a number of hidden cases which had not been investigated before, probably due to economic reasons related to the costs of toxicological analyses.

2016 AAHA Oncology Guidelines for Dogs and Cats.
Biller B, Berg J, Garrett L et al. 
J Am Anim Hosp Assoc (2016) 52:181-204
All companion animal practices will be presented with oncology cases on a regular basis, making diagnosis and treatment of cancer an essential part of comprehensive primary care. Because each oncology case is medically unique, these guidelines recommend a patient-specific approach consisting of the following components: diagnosis, staging, therapeutic intervention, provisions for patient and personnel safety in handling chemotherapy agents, referral to an oncology specialty practice when appropriate, and a strong emphasis on client support. Determination of tumor type by histologic examination of a biopsy sample should be the basis for all subsequent steps in oncology case management. Diagnostic staging determines the extent of local disease and presence or absence of regional or distant metastasis. The choice of therapeutic modalities is based on tumor type, histologic grade, and stage, and may include surgery, radiation therapy, chemotherapy, immunotherapy, and adjunctive therapies, such as nutritional support and pain management. These guidelines discuss the strict safety precautions that should be observed in handling chemotherapy agents, which are now commonly used in veterinary oncology. Because cancer is often a disease of older pets, the time of life when the pet-owner relationship is usually strongest, a satisfying outcome for all parties involved is highly dependent on good communication between the entire healthcare team and the client, particularly when death or euthanasia of the patient is being considered. These guidelines include comprehensive tables of common canine and feline cancers as a resource for case management and a sample case history.

Feline non-regenerative immune-mediated anaemia: features and outcome in 15 cases.
Black V, Adamantos S, Barfield D, Tasker S 
OBJECTIVES: Pure red cell aplasia (PRCA) and non-regenerative immune-mediated haemolytic anaemia (NRIMHA) are uncommon causes of non-regenerative anaemia affecting the bone marrow in the cat. This retrospective study aimed to describe the clinical features, treatment and outcome (remission and survival) of cats with these disorders. METHODS: Cases of PRCA and NRIMHA presenting between 2009 and 2013 were retrieved. Clinical features including signalment, history,
clinical signs and diagnostic investigations were recorded, as well as treatment(s) used and outcome (remission and survival). Outcome was compared for PRCA and NRIMHA. RESULTS: Fifteen cats met inclusion criteria: seven with PRCA and eight with NRIMHA. The majority (12/15) were younger than 3 years of age. Volume overload was common (8/11). Treatment with whole blood transfusions with or without Oxyglobin was necessary in most cats (14/15) and resulted in congestive heart failure in one cat. Most cats (11/15) achieved remission 12-42 days after starting immunosuppressive treatment. Treatment protocols associated with remission were glucocorticoids alone (remission in 6/7 cats), glucocorticoids and chlorambucil (remission in 3/6 treated cats), glucocorticoids and ciclosporin (one cat only) and ciclosporin alone (one cat only). Relapse was observed in 3/11 cats, and 8/11 cats were still receiving treatment at the time of follow-up. Outcome (remission and survival) did not differ between PRCA and NRIMHA. CONCLUSIONS AND RELEVANCE: PRCA and NRIMHA are uncommon causes of anaemia in predominantly young cats. The prognosis is reasonable, with a mortality rate of 27%, and it can take at least 6 weeks before remission is observed. Following clinical remission, gradual withdrawal of immunosuppressive treatments should be attempted, with close monitoring for relapse; some cats may require long-term treatment. This study is the first to report the use of chlorambucil as an adjunctive immunosuppressant in these cases. Outcome did not differ for PRCA and NRIMHA.

Uveal cysts in domestic cats: a retrospective evaluation of thirty-six cases.
Blacklock BT, Grundon RA, Meehan M, Tetas Pont R, Hartley C
Vet Ophthalmol (2016) 19 Suppl 1:56-60
OBJECTIVE: The aim of this retrospective study was to investigate uveal cysts in domestic cats by identifying prevalence, predispositions, location, presumed etiologies, and sequela. ANIMALS STUDIED: The clinical databases of two referral hospitals (The Animal Health Trust in the UK and Animal Eye Care in Australia) were searched to identify cats that had been diagnosed with uveal cysts, either as an incidental finding or as the reason for referral. Thirty-six cases were found. PROCEDURES: The signalment of the patients was recorded, along with any relevant previous clinical history, treatment, follow-up, and sequela. The data were compared with the unaffected feline populations examined by ophthalmologists in the two hospitals over the same 10-year time period. RESULTS: Thirty-six cats were affected, from a total examined population of 5017 (prevalence 0.72%). Twenty-one of the 36 cats were Burmese. The two centers examined 516 Burmese cats in the same time period, giving an incidence in Burmese cats of 4.1%. The mean age of affected cats at presentation was 10.25 years (SD = 4.12 years), and female cats accounted for 23 of 36 of the cases. Only 2 of 36 cats had concurrent intraocular disease. CONCLUSIONS: Uveal cysts in domestic cats are rare ophthalmic findings, and in most cases, they do not cause any clinical problems. The Burmese breed is overrepresented in the data, with a relatively high prevalence of uveal cysts.

Histological and immunohistochemical characterization of feline renal cell carcinoma: a case series.
Bonsembiante F, Benali SL, Trez D, Aresu L, Gelain ME
Four feline renal cell carcinomas (RCCs) were examined using histopathological and immunohistochemical procedures. Specimens were classified by predominant histological pattern according to WHO criteria. A panel of antibodies including β-catenin, C-KIT, VEGF and VEGF-R2 and double immunostaining for vimentin/cytokeratin and for E-cadherin/CD10 was selected to characterize the tumors. Neoplasms were classified as tubular (3/4) and papillary (1/4). Neoplastic epithelial cells were cytokeratin, vimentin, E-cadherin, VEGF-R2 positive and C-KIT negative; 3 cases
were β-catenin positive, whereas only 2 tumors were CD10 and VEGF positive. No correlation with histotype was evident. Our results confirm the low frequency of RCCs in cats and suggest a histological pattern similar to canine RCCs. In contrast, a peculiar immunohistochemical profile different from both canine and human RCCs is identified.

Cerebrospinal Fluid Calbindin D Concentration as a Biomarker of Cerebellar Disease Progression in Niemann-Pick Type C1 Disease.
Bradbury A, Bagel J, Sampson M et al.
*J Pharmocol Exp Ther* (2016) **358**:254-261
Niemann-Pick type C (NPC) 1 disease is a rare, inherited, neurodegenerative disease. Clear evidence of the therapeutic efficacy of 2-hydroxypropyl-β-cyclodextrin (HPβCD) in animal models resulted in the initiation of a phase I/IIa clinical trial in 2013 and a phase IIb/III trial in 2015. With clinical trials ongoing, validation of a biomarker to track disease progression and serve as a supporting outcome measure of therapeutic efficacy has become compulsory. In this study, we evaluated calcium-binding protein calbindin D-28K (calbindin) concentrations in the cerebrospinal fluid (CSF) as a biomarker of NPC1 disease. In the naturally occurring feline model, CSF calbindin was significantly elevated at 3 weeks of age, prior to the onset of cerebellar dysfunction, and steadily increased to >10-fold over normal at end-stage disease. Biweekly intrathecal administration of HPβCD initiated prior to the onset of neurologic dysfunction completely normalized CSF calbindin in NPC1 cats at all time points analyzed when followed up to 78 weeks of age. Initiation of HPβCD after the onset of clinical signs (16 weeks of age) resulted in a delayed reduction of calbindin levels in the CSF. Evaluation of CSF from patients with NPC1 revealed that calbindin concentrations were significantly elevated compared with CSF samples collected from unaffected patients. Off-label treatment of patients with NPC1 with miglustat, an inhibitor of glycosphingolipid biosynthesis, significantly decreased CSF calbindin compared with pretreatment concentrations. These data suggest that the CSF calbindin concentration is a sensitive biomarker of NPC1 disease that could be instrumental as an outcome measure of therapeutic efficacy in ongoing clinical trials.

Prevalence of Platynosomum fastosum infection in free roaming cats in northeastern Brazil: Fluke burden and grading of lesions.
Braga RR, Teixeira AC, Oliveira JA, Cavalcanti LP
*Vet Parasitol* (2016) **227**:20-25
The objective of this paper was to investigate prevalence and parasite load of the trematode Platynosomum fastosum infection and the risk of developing cholangitis/cholangiohepatitis among infected domestic cats in a city of northeastern Brazil, and to characterize the influence of fluke burden in the formation of lesions in liver and gallbladder. A total of 141 cats was necropsied and examined for the presence of *P. fastosum*. The observed prevalence was 42.6% (60/141, 95% CI=34.2-50.9). Parasite load varied from 1 to 219 flukes per animal. Adult cats were more frequently infected than kittens (p<0.01). Risk of cholangitis was about three times higher in infected animals (RR=3.23, 95% CI=2.01-5.07, p<0.01). Centrolobular congestion, portal cholangitis and cholestasis was significantly more common in infected as compared to non-infected cats (p<0.01). Similarly, fibrosis, cholangitis and mucous gland hyperplasia were significantly more prevalent in the bile duct of infected animals (p<0.01). Mild fibrosis and cholecystitis were observed principally in infected cats. Hyperplastic precursor lesions of cholangiocarcinoma were observed, but no solid tumor was diagnosed. These results reveal high prevalence of *P. fastosum* in free roaming cats in northeastern Brazil, with increased risk of liver disease.
Early Clinical Experience with a Newly Designed Interlocking Nail System-Targon(®) Vet.
Brückner M, Unger M, Spies M
Vet Surg (2016) 45:754-763
OBJECTIVE: To describe early clinical experience with a newly designed interlocking nail system (Targon(®) Vet) in diaphyseal fractures in cats and small dogs. STUDY DESIGN: Retrospective case series. ANIMALS: Client-owned cats (n=49) and dogs (n=8). METHODS: Fifty-seven consecutive cases (49 cats, 8 dogs) with 60 long bone fractures were included in the study. Follow-up radiographs were scheduled at 4 and 8 weeks and again 6 months postoperatively. The end point for each case was determined radiographically by a healed fracture. Complications were defined as minor or major. Clinical outcome was subjectively assessed by a full orthopedic examination and follow-up radiographs. Descriptive data are reported. RESULTS: Median age of cats was 18 months (range, 3-220 months) and of dogs was 28 months (range, 7-115 months). Median body weight was 3.7 kg (range, 1.67-8.41 kg) for cats and 8.15 kg (range, 2.68-13.6 kg) for dogs. Median radiographic follow-up was 16 weeks. All fractures with follow-up radiographs available (n=46) were healed with no infections reported. A total of 12 postoperative complications occurred: 3 minor (slippage of the locking screws) and 9 major (5 femoral-irritation of the sciatic nerve, stress protection, fracture because of a missed fissure, femoral neck fracture, intra-operative revision with a rod and plate; 4 tibial-3 with protrusion of the distal locking screw through the skin and 1 with in-growth of the intramedullary nail). CONCLUSION: Implantation of the Targon(®) Vet System was feasible in all cases. It provides an alternative system for diaphyseal fracture repair in cats and small dogs.

Characterisation of antimicrobial usage in cats and dogs attending UK primary care companion animal veterinary practices.
Buckland EL, O’Neill D, Summers J et al.
Vet Rec (2016)
There is scant evidence describing antimicrobial (AM) usage in companion animal primary care veterinary practices in the UK. The use of AMs in dogs and cats was quantified using data extracted from 374 veterinary practices participating in VetCompass. The frequency and quantity of systemic antibiotic usage was described. Overall, 25 per cent of 963,463 dogs and 21 per cent of 594,812 cats seen at veterinary practices received at least one AM over a two-year period (2012-2014) and 42 per cent of these animals were given repeated AMs. The main agents used were aminopenicillin types and cephalosporins. Of the AM events, 60 per cent in dogs and 81 per cent in cats were AMs classified as critically important (CIAs) to human health by the World Health Organisation. CIAs of highest importance (fluoroquinolones, macrolides, third-generation cephalosporins) accounted for just over 6 per cent and 34 per cent of AMs in dogs and cats, respectively. The total quantity of AMs used within the study population was estimated to be 1473 kg for dogs and 58 kg for cats. This study has identified a high frequency of AM usage in companion animal practice and for certain agents classified as of critical importance in human medicine. The study highlights the usefulness of veterinary practice electronic health records for studying AM usage.

Effects of ketamine and alfaxalone on application of a feline pain assessment scale.
Buisman M, Wagner MC, Hasiuik MM, Prebble M, Law L, Pang DS
OBJECTIVES: The objective of this study was to compare the effects of ketamine and alfaxalone on the application of a validated feline-specific multidimensional composite pain scale (UNESP-Botucatu
MCPS). METHODS: In a prospective, randomized, blinded, crossover trial, 11 adult cats (weight 4.4 ± 0.6 kg) were given dexmedetomidine (15 µg/kg) and hydromorphone (0.05 mg/kg) with either alfaxalone (2 mg/kg) or ketamine (5 mg/kg) as a single intramuscular injection for the induction of general anesthesia. After orotracheal intubation, general anesthesia (without surgery) was maintained for 32 mins with isoflurane, followed by atipamezole. The following parameters were recorded at baseline, 1-8 h and 24 h post-extubation: pain (pain expression and psychomotor subscales) and sedation scale scores. Alfaxalone treatment injection sites were examined for inflammation at baseline, postinjection, and 8 h and 24 h post-extubation. RESULTS: Psychomotor scores were higher with ketamine at hours 1 (3.5 [0-5.0], P <0.0001), 2 (2.5 [0-4.0], P <0.0001) and 3 (0.5 [0-4.0], P = 0.009) post-extubation compared with alfaxalone (hour 1, 0 [0-2]; hour 2, 0 [0-0]; hour 3, 0 [0-0]). Six cats in the ketamine group crossed the analgesic intervention threshold. In contrast, pain expression scores did not differ significantly between treatments at any time (P >0.05); one cat from each group crossed the analgesic intervention threshold. Sedation was greater with ketamine (1 [0-3], P = 0.02) than alfaxalone (0 [0-1]) 1 h post-extubation. No cats had visible inflammation at the injection sites at any time.

CONCLUSIONS AND RELEVANCE: Ketamine has a confounding effect on the psychomotor subscale of the pain scale studied, which may lead to erroneous administration of rescue analgesia. In contrast, alfaxalone was not associated with significant increases in either pain subscale. These effects of ketamine should be considered when evaluating acute postoperative pain in cats.

Use of cefovecin in a UK population of cats attending first-opinion practices as recorded in electronic health records.
Burke S, Black V, Sánchez-Vizcaíno F, Radford A, Hibbert A, Tasker S
OBJECTIVES: The objective was to use electronic health records to describe the use of cefovecin (Convenia; Zoetis UK), a third-generation long-acting injectable antimicrobial, in a UK population of cats attending first-opinion practices, and to compare the use of Convenia to the licensed uses described on the UK Convenia datasheet. METHODS: Data were obtained as an Excel database from the Small Animal Veterinary Surveillance Network for all feline consultations containing the word Convenia and/or cefovecin from 1 September 2012 to 23 September 2013 inclusive. Entries were classified according to body system treated, confirmation or suspicion of an abscess, evidence of microbiological evaluation being performed, any concurrent therapies given and whether any reason was given for use of Convenia over alternative antimicrobials. Data were exported to IBM SPSS Statistics and descriptive analysis performed. RESULTS: In total, 1148 entries were analysed. The most common body system treated was skin in 553 (48.2%) entries, then urinary (n = 157; 13.7%) and respiratory (n = 112; 9.8%). Microbiological evaluation was recorded in 193 (16.8%) entries, with visible purulent material most commonly cited in 147 (12.8%) entries. A reason for prescribing Convenia over alternative antimicrobials was given in 138 (12.0%) entries; the most cited was an inability to orally medicate the cat in 77 (55.8%) of these entries. Excluding 131 entries where no body system or multiple body systems were described, the use of Convenia complied with a licensed use in the UK datasheet in 710 (69.8%) of 1017 entries. CONCLUSIONS AND RELEVANCE: Most administrations were licensed uses; however, most entries did not describe any microbiological evaluation, or a reason for prescribing Convenia over alternative antimicrobials. Further education of the public and the veterinary profession is needed to promote antimicrobial stewardship in the UK. Health records provide a valuable tool with which to monitor both locally and at scale the use of important therapeutics like antimicrobials. Information relevant to decision-making should be recorded in individual animal health records.

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

A Cross-Sectional Survey to Estimate the Cat Population and Ownership Profiles in a Semirural Area of Central Italy.
Carvelli A, Iacoponi F, Scaramozzino P
Understanding animal population size and its demographic features is essential to address Public Health policies as well as to provide valuable information to pet industries and veterinary practitioners. Nevertheless, official data on feline population are not available worldwide. In the present study, the owned cat population size, its demographic attributes, and the ownership profiles have been investigated through a face-to-face questionnaire in a semirural area of Central Italy. The human : cat ratio was equal to 6.8 (95% CI: 5.7-7.5); 29.3% of households own at least one cat. The majority of cats were living in a rural area (67.8%) and outdoors, were neutered (70.5%), and were fed with commercial food (54.8%) and they visited a veterinarian 1-2 times a year (43.3%). The cat ownership was strongly associated with people living in a rural area and owning another pet. As the cat owned population was mainly kept outdoors in rural areas, the possible relation between the owned and the stray animals is worthy to be monitored in future researches. Our study revealed that the feline owned population was larger than expected and that social and economic human factors do not influence the cat ownership. Health Authorities and veterinary practitioners should promote responsible ownership to
increase the veterinary care, to intensify the official identification, and to properly manage the outdoor lifestyle.

**Pectus excavatum: computed tomography and medium-term surgical outcome in a prospective cohort of 10 kittens.**
Charlesworth TM, Schwarz T, Sturgess CP  
OBJECTIVES: The objective of this study was to report the use of computed tomography (CT) in conjunction with clinical signs to assess the severity of pectus excavatum (PE) in kittens and to guide surgical decision-making; also to report medium-term outcome in a prospective cohort of kittens undergoing surgical correction. METHODS: This was a prospective study of 10-15-week-old kittens (n = 10) diagnosed with moderate/severe PE. RESULTS: CT provides additional information that is useful for selecting patients for surgical correction and for planning the surgery. Traditional radiographic indices (vertebral, frontosagittal) provide reasonable approximations of the CT-determined dimensions but these seem to correlate poorly with the severity of clinical signs. Kittens commonly have lateralised deformities, which are associated with less severe clinical signs, while those with midline deformities are associated with more severe clinical signs. Six of seven kittens with severe PE that had a ventral splint applied for 4 weeks had excellent medium-term outcomes. CONCLUSIONS AND RELEVANCE: Restriction of diastolic filling by midline sternal deviation may be an important cause of exercise intolerance in cats with PE. CT can be used to assess affected kittens and to plan surgery when indicated.

**A review of anaemia of inflammatory disease in dogs and cats.**
Chikazawa S, Dunning MD  
*J Small Anim Pract* (2016) 57:348-353  
Anaemia of inflammatory disease is a common cause of anaemia in routine veterinary practice. It is most often mild to moderate, normocytic, normochromic and non-regenerative. Shortened red cell life span, inhibition of iron metabolism and impaired bone marrow response to erythropoietin all contribute to its development. Although anaemia of inflammatory disease is a well-known cause of anaemia in dogs and cats, there is a lack of epidemiological information because specific diagnostic criteria have not been established in veterinary species. Anaemia of inflammatory disease is associated with a poor outcome in various disease states in human medicine; however, its clinical significance and treatment in veterinary medicine are not well understood. This review article describes anaemia of inflammatory disease in dogs and cats and considers its potential significance.

**Treatment of feline intermediate- to high-grade lymphoma with a modified university of Wisconsin-Madison protocol: 119 cases (2004-2012).**
Collette SA, Allstadt SD, Chon EM et al.  
CHOP-based (cyclophosphamide, doxorubicin, vinca alkaloid, prednisolone) chemotherapy protocols are often recommended for treatment of feline lymphoma. While maintenance-free CHOP-based protocols have been published and readily used in dogs, there is limited literature regarding similar maintenance-free protocols in cats. The purpose of this study was to describe the outcome of cats with intermediate- to high-grade lymphoma that were prescribed a modified 25-week University of Wisconsin-Madison (UW-25) chemotherapy protocol. A secondary objective was examination of potential prognostic factors. One hundred and nineteen cats from five institutions treated with a UW-
25-based protocol were included. The Kaplan-Meier median progression-free interval (PFI) and survival time (MST) were 56 and 97 (range 2-2019) days, respectively. Cats assessed as having a complete response (CR) to therapy had significantly longer PFI and MST than those with partial or no response (PFI 205 versus 54 versus 21 days, respectively, P < 0.0001 and MST 318 versus 85 versus 27 days, respectively, P < 0.0001).

**Veterinary clinical nutrition: success stories: an overview.**
Davies M
*Proc Nutr Soc* (2016) 75:392-397

In this overview of success stories in veterinary clinical nutrition topics in cats and dogs reviewed include the dietary management of chronic kidney disease, dissolution of urinary tract uroliths by dietary modification, the recognition that taurine and L-carnitine deficiencies can cause dilated cardiomyopathy; that clinical signs associated with feline hyperthyroidism (caused by a benign adenoma) can be controlled by a low-iodine diet alone; that dietary management of canine osteoarthritis can also reduce non-steroidal anti-inflammatory drug doses; and that disease-free intervals and survival times can be statistically longer in dogs with Stage III lymphoma managed with diet. As we discover more about nutrigenetics and nutrigenomics, and as we expand our basic understanding of idiopathic diseases we are bound to identify more nutritionally related causes, and be able to develop novel dietary strategies to manage disease processes, including the formulation of diets designed to alter gene expression to obtain beneficial clinical outcomes.

**Safety and efficacy of cognitive training plus epigallocatechin-3-gallate in young adults with Down’s syndrome (TESDAD): a double-blind, randomised, placebo-controlled, phase 2 trial.**
de la Torre R, de Sola S, Hernandez G et al.
*Lancet Neurol* (2016) 15:801-810

BACKGROUND: Early cognitive intervention is the only routine therapeutic approach used for amelioration of intellectual deficits in individuals with Down’s syndrome, but its effects are limited. We hypothesised that administration of a green tea extract containing epigallocatechin-3-gallate (EGCG) would improve the effects of non-pharmacological cognitive rehabilitation in young adults with Down’s syndrome. METHODS: We enrolled adults (aged 16-34 years) with Down’s syndrome from outpatient settings in Catalonia, Spain, with any of the Down’s syndrome genetic variations (trisomy 21, partial trisomy, mosaic, or translocation) in a double-blind, placebo-controlled, phase 2, single centre trial (TESDAD). Participants were randomly assigned at the IMIM-Hospital del Mar Medical Research Institute to receive EGCG (9 mg/kg per day) or placebo and cognitive training for 12 months. We followed up participants for 6 months after treatment discontinuation. We randomly assigned participants using random-number tables and balanced allocation by sex and intellectual quotient. Participants, families, and researchers assessing the participants were masked to treatment allocation. The primary endpoint was cognitive improvement assessed by neuropsychologists with a battery of cognitive tests for episodic memory, executive function, and functional measurements. Analysis was on an intention-to-treat basis. This trial is registered with ClinicalTrials.gov, number NCT01699711. FINDINGS: The study was done between June 5, 2012, and June 6, 2014. 84 of 87 participants with Down’s syndrome were included in the intention-to-treat analysis at 12 months (43 in the EGCG and cognitive training group and 41 in the placebo and cognitive training group). Differences between the groups were not significant on 13 of 15 tests in the TESDAD battery and eight of nine adaptive skills in the Adaptive Behavior Assessment System II (ABAS-II). At 12 months, participants treated with EGCG and cognitive training had significantly higher scores in visual recognition memory (Pattern Recognition Memory test immediate recall, adjusted mean difference:
6.23 percentage points [95% CI 0.31 to 12.14], \(p=0.039\); d 0.4 [0.05 to 0.84]), inhibitory control (Cats and Dogs total score, adjusted mean difference: 0.48 [0.02 to 0.93], \(p=0.041\); d 0.28 [0.19 to 0.74]; Cats and Dogs total response time, adjusted mean difference: -4.58 s [-8.54 to -0.62], \(p=0.024\); d -0.27 [-0.72 to -0.20]), and adaptive behaviour (ABAS-II functional academics score, adjusted mean difference: 5.49 [2.13 to 8.86], \(p=0.002\); d 0.39 [-0.06 to 0.84]). No differences were noted in adverse effects between the two treatment groups. INTERPRETATION: EGCG and cognitive training for 12 months was significantly more effective than placebo and cognitive training at improving visual recognition memory, inhibitory control, and adaptive behaviour. Phase 3 trials with a larger population of individuals with Down’s syndrome will be needed to assess and confirm the long-term efficacy of EGCG and cognitive training. FUNDING: Jérôme Lejeune Foundation, Instituto de Salud Carlos III FEDER, MINECO, Generalitat de Catalunya.

Establishment of normal anatomical radial angles in cats.
De Lima Dantas B, Durand A, Parkin T, Broome C
OBJECTIVES: 1) To describe a radiographic method for determination of joint orientation lines and anatomical joint angles in orthogonal planes of feline radii; 2) to establish a range of normal radial joint orientation angles and anatomical axes in a feline population; and 3) to assess the repeatability and reliability of this methodology. METHODS: The radial anatomical axis, elbow and carpal joint reference lines, and the intersecting angles of each: anatomical medial proximal (aMPRA) and lateral distal radial angles (aLDRA), anatomical caudal proximal (aCdPRA) and distal radial angles (aCdDRA), and sagittal procurvatum (SP) were determined on the orthogonal radiographs of 14 feline limbs. Intra- and inter-observer agreement was determined based on repeated independent readings by two observers using Bland-Altman plots. RESULTS: The mean ± standard deviation (SD) and 95% confidence interval (CI) for the feline radii were: aMPRA 70.97 ± 3.38° (70.07 - 71.88°), aLDRA 91.72 ± 3.26° (90.84 - 92.59°), aCdPRA 100.5 ± 3.14° (99.62 - 101.3°), aCdDRA 79.95 ± 3.77° (78.94 - 80.96°) and SP 11.07 ± 1.87° (10.57 - 11.58°). The highest mean bias found for both observers was -1.6 to -1.8° for the angle aCdDRA. Sagittal procurvatum had the lowest mean bias for intra- and inter-observer. CLINICAL SIGNIFICANCE: The results obtained showed that the methodology used in our study was repeatable and reliable. The values established for the normal radial anatomical angles are relevant for future use as a reference for surgical treatment of angular deformities, malunions, non-unions, comminuted fractures, and future orthopaedic research.

Characterization of pica and chewing behaviors in privately owned cats: a case-control study.
Demontigny-Bédard I, Beauchamp G, Bélanger MC, Frank D
OBJECTIVES: The aim of this study was to characterize pica behavior in cats. METHODS: Cat owners were recruited to participate in a questionnaire survey on pica behavior exhibited by their cats. Emphasis was put on the type of item ingested. Questions on early history and environment, as well as general health and gastrointestinal signs, were asked. Owners of healthy cats not showing pica were also recruited into a control group. Associations between variables and groups were statistically tested. RESULTS: Pica was directed most commonly at shoelaces or threads, followed by plastic, fabric, other items, rubber, paper or cardboard and wood. Some cats ingested specific items but only chewed others. A significant positive association was found between sucking and ingesting fabric (\(P = 0.002\)). Ad libitum feeding was significantly lower in the pica group than the control group (\(P = 0.01\)). Prevalence of self-sucking behavior was significantly higher in the pica group than the control group (\(P = 0.001\)). Cats with pica vomited significantly more often than control cats (\(P = 0.01\)). CONCLUSIONS AND
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RELEVANCE: Pica, the ingestion of inedible items, does not seem to be the consequence of a suboptimal environment or early weaning. Cats with pica were less commonly fed ad libitum than healthy cats. As frequently reported, pica and vomiting were related, but the causative association is not well established and thus warrants further investigation.

**Clinical, histological and prognostic features of a novel nail-bed lesion of cats: 41 cases.**
Dobromylskyyj MJ, Fernandes RA, French A, Pocknell AM, Smith KC
*J Feline Med Surg* (2016)

OBJECTIVES: There is a distinct subset of lesions arising on the digits of cats, located at or close to the nail-bed epithelium, which are typically composed of proliferative fibroblast-like cells, multinucleate giant cells and areas of osseous metaplasia, but currently there is no published literature detailing the clinical or histological features of these lesions. METHODS: This study identified 41 such cases from two large commercial diagnostic laboratories and assessed various histological and clinical features; 22 cases had additional follow-up data available. RESULTS: All masses in this study were exophytic, variably inflamed, contained large numbers of spindle cells and had areas of capillary formation. The majority also had areas of ulceration, multinucleate giant cells and osseous metaplasia. The mitotic count was variable, but mitoses were confined to the fibroblast-like cells. Male cats appeared predisposed and the second digit was the most commonly affected. CONCLUSIONS AND RELEVANCE: These distinctive lesions arising on the digits of cats had potential for local recurrence but metastasis was not reported. Based on these clinical and histological features, the masses in this study appear most similar to giant cell reparative granulomas, and trauma, injury to the nail or nail-bed and nail-bed infections, may potentially contribute to their development.

**Evaluation of dermoscopy in the diagnosis of naturally occurring dermatophytosis in cats.**
Dong C, Angus J, Scarampella F, Neradilek M

BACKGROUND: A rapid, accurate screening test for dermatophytosis in cats is desirable in clinical and shelter medicine. In human dermatology, dermoscopy is used to identify dermatophyte-infected hairs by their characteristic comma hair appearance. Similar “comma-like” hairs have been observed in infected cats. HYPOTHESIS/OBJECTIVES: The purpose of this study was to evaluate the usefulness of dermoscopy for the diagnosis of naturally occurring dermatophytosis compared to fungal culture. ANIMALS: A total of 67 cats were enrolled. METHODS: This was a descriptive field study. All cats were evaluated by dermoscopy and fungal culture. Dermoscopy was performed with a hand held nonpolarized light dermoscope. RESULTS: Three dermatophyte pathogens were isolated via fungal cultures in 36 cats: Microsporum canis (n = 31), Microsporum gypseum (n = 3) and Trichophyton mentagrophytes (n = 2). Dermoscopy was positive in 21 of 36 cats with culture-confirmed dermatophytosis. CONCLUSIONS AND CLINICAL IMPORTANCE: Dermoscopy may be a useful point-of-care-test to identify infected hairs to sample for dermatophyte cultures, but a definitive diagnosis for dermatophytosis should be based on clinical signs and the results of multiple diagnostic tests.

**Urinary tract infections in cats. Prevalence of comorbidities and bacterial species, and determination of antimicrobial susceptibility to commonly used antimicrobial agents.**
*Tierarzt Prax Ausg K Kleintiere Heimtiere* (2016) 44:227-236

OBJECTIVE: To investigate the prevalence of comorbidities (CM) in cats with urinary tract infections
(UTIs), as well as the prevalence of bacterial species in cats with different CM and their antimicrobial susceptibility to the commonly used antibacterial agents doxycycline, trimethoprim-sulfamethoxazole (TMS), amoxicillin-clavulanic acid (AMC), cephalothin, and enrofloxacin. MATERIAL AND METHODS: A retrospective analysis of cats with positive urine cultures in the years 2003 to 2009 was performed. Cats were assigned to one of four groups: cats with systemic comorbidities (sCM), cats with indwelling urinary catheters (iUC), cats with local comorbidities (ICM), or cats without CM. To evaluate the potential effectiveness of the antibiotics the antibacterial impact factors were calculated. RESULTS: A total of 194 cats with 219 isolates were included in the study. In 78.4% (152/194) of cats, a CM was identified; 49.5% had a sCM and 28.9% (56/194) had an iUC or an ICM. Cats with sCM were significantly older than cats in all other groups, and the proportion of female animals was higher in cats with sCM than in cats with iUC or ICM. More than half of the cats with sCM did not show clinical signs of lower urinary tract disease. The most commonly isolated bacteria species were Escherichia (E.) coli, Streptococcus spp., Staphylococcus spp., and Enterococcus spp. with a significantly higher proportion of E. coli isolates in cats with sCM and significantly higher proportions of Streptococcus and Staphylococcus spp. isolates in cats with iUC and other ICM. According to the antimicrobial impact factors bacterial isolates in cats with any CM were most likely susceptible to AMC and TMS. Isolates from cats with iUC and ICM had a lower likelihood to be susceptible to the tested antimicrobials than cats with sCM and cats without CM. CONCLUSION AND CLINICAL RELEVANCE: Relevant comorbidities for bacterial urinary tract infection were identified in the majority of cats in the present study. AMC and TMS were the antimicrobial agents with the highest antimicrobial impact factor in this population of cats.

Updates on feline aelurostrongylosis and research priorities for the next decade.
Elsheikha HM, Schnyder M, Traversa D, Di Cesare A, Wright I, Lacher DW
Parasit Vectors (2016) 9:389
Feline aelurostrongylosis, caused by the metastrongylid nematode Aelurostrongylus abstrusus, is an important gastropod-borne parasitic lung disease in cats. Infection with A. abstrusus is widespread globally, but the increasing awareness of this parasite and the advent of more sensitive diagnostics have contributed to the apparent increase in its prevalence and geographic expansion. Clinical features may range in severity from subclinical to life-threatening respiratory disease. Parasitological standard techniques, such as visualization of the nematode first larval stage in faecal and respiratory (bronchial mucus or pleural fluid) samples, remain the mainstays of diagnosis. However, diagnosis is evolving with recent advances in serological and molecular testing, which can improve the time to initiation of effective anthelmintic therapy. Despite numerous anthelmintics that are now available as treatment options, the role of host immunity and lifestyle factors in selecting cats that may benefit from more targeted anthelmintic prophylaxis or treatment practice remains unclear and is likely to guide therapeutic choices as newer data become available. This review summarizes the biology, epidemiology, pathophysiology, diagnosis and treatment options currently available for feline aelurostrongylosis.

Clinical effect of four different ointment bases on healthy cat eyes.
Eördögh R, Schwendenwein I, Tichy A, Loncaric I, Nell B
Vet Ophthalmol (2016) 19 Suppl 1:4-12
OBJECTIVE: To describe the effects of long-term treatment with four different eye ointment bases (OBs) in cats. ANIMALS STUDIED: Ten healthy cats. PROCEDURES: The study was performed in two periods. Four different OBs were tested. Hundred grams of OB contained the following: OB-A:
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35.17 g liquid paraffin (lp), 64.83 g white petrolatum (wp); OB-B: 10.03 g lp, 84.95 g wp 5.02 g lanolin; OB-C: 18.34 g lp, 51.40 g wp, 25.00 mg KH2 PO4, 57.00 mg K2 HPO4, 18.90 g eucerinum anhydricum, 11.28 g water for injections; and OB-D: 70 g unguentum lanalcoli, 20 g lp, 10 g aqua conservans. One eye was treated, and the other served as a negative control. Cats received the OBs TID for 28 days. The two study periods were separated by a 4-month washout phase. Samples for conjunctival impression cytology, swabs for bacteriologic and mycologic examination, and cytobrush samples for FHV-1 and Chlamydophila felis PCR detection were obtained. Both eyes were examined daily. Severity of ocular symptoms was scored using a modified Draize eye irritation test. A total of five eyes were treated with OB-A, five with OB-B, four with OB-C, and five with OB-D. RESULTS: Treated eyes had significantly higher clinical scores. Eyes receiving OB-A had the highest overall clinical score. The results of bacteriologic and mycologic examination concur with the previously published data. All samples tested were negative for FHV-1 and Chlamydophila felis. There was no significant difference between treated and control eyes upon cytological examination. CONCLUSION: The application of OBs resulted in clinical symptoms in treated eyes. The long-term use of ointments is not well tolerated in cats and may lead to ocular irritation.

Flat Feline Faces: Is Brachycephaly Associated with Respiratory Abnormalities in the Domestic Cat (Felis catus).  
Farnworth MJ, Chen R, Packer RM, Caney SM, Gunn-Moore DA  
There has been little research into brachycephalism and associated disorders in cats. A questionnaire aimed at cat owners was used to determine the relationship between feline facial conformation and owner-reported cat management requirements and respiratory abnormalities. Owner-submitted photographs of cats were used to develop novel measures of skull conformation. One thousand valid questionnaires were received. Within these there were 373 valid photographs that allowed measurement of muzzle ratio (M%) and 494 that allowed nose position ratio (NP%). The data included 239 cats for which both measurements were available. Owners reported lifestyle factors (e.g. feeding type, grooming routine, activity level), physical characteristics (e.g. hair length) and other health characteristics of their cat (e.g. tear staining, body condition score). A composite respiratory score (RS) was calculated for each cat using their owner’s assessment of respiratory noise whilst their cat was asleep and then breathing difficulty following activity. Multivariate analyses were carried out using linear models to explore the relationship between RS and facial conformation, and lifestyle risk factors. The results showed that reductions in NP% and M% were significantly associated with RS (P < 0.001 and P = 0.026, respectively) and that the relationship was significantly negatively correlated (r = -0.56, P < 0.001 for both). Respiratory score was also significantly associated with increased presence of tear staining (P < 0.001) and a sedentary lifestyle (P = 0.01). This study improves current knowledge concerning cats with breeding-related alterations in skull confirmation and indicates that brachycephalism may have negative respiratory implications for cat health and welfare, as has been previously shown in dogs.

Evaluation of intranasal vaccine administration and high-dose interferon- α2b therapy for treatment of chronic upper respiratory tract infections in shelter cats.  
Fenimore A, Carter K, Fankhauser J, Hawley JR, Lappin MR  
Clinical signs of upper respiratory tract infection can be hard to manage in cats, particularly those in shelters. In this study, clinical data were collected from chronically ill (3-4 weeks’ duration) cats with suspected feline herpesvirus-1 (FHV-1) or feline calicivirus (FCV) infections after administration of
one of two novel therapies. Group A cats were administered a commercially available formulation of human interferon-α2b at 10,000 U/kg subcutaneously for 14 days, and group B cats were administered one dose of a FHV-1 and FCV intranasal vaccine. Molecular assays for FHV-1 and FCV were performed on pharyngeal samples, and a number of cytokines were measured in the blood of some cats. A clinical score was determined daily for 14 days, with cats that developed an acceptable response by day 14 returning to the shelter for adoption. Those failing the first treatment protocol were entered into the alternate treatment group. During the first treatment period, 8/13 cats in group A (61.5%) and all 12 cats in group B (100%) had apparent responses. The seven cats positive for nucleic acids of FHV-1 or FCV responded favorably, independent of the treatment group. There were no differences in cytokine levels between cats that responded to therapy or failed therapy. Either protocol assessed here may be beneficial in alleviating chronic clinical signs of suspected feline viral upper respiratory tract disease in some cats that have failed other, more conventional, therapies. The results of this study warrant additional research involving these protocols.

Validation of an electrophoretic method to detect albuminuria in cats.
Ferlizza E, Dondi F, Andreani G, Bucci D, Archer J, Isani G
OBJECTIVES: The aims of this study were to validate a semi-automated high-resolution electrophoretic technique to quantify urinary albumin in healthy and diseased cats, and to evaluate its diagnostic performance in cases of proteinuria and renal diseases. METHODS: Urine samples were collected from 88 cats (healthy; chronic kidney disease [CKD]; lower urinary tract disease [LUTD]; non-urinary tract diseases [OTHER]). Urine samples were routinely analysed and high-resolution electrophoresis (HRE) was performed. Within-assay and between-assay variability, linearity, accuracy, recovery and the lowest detectable and quantifiable bands were calculated. Receiver operating curve (ROC) analysis was also performed. RESULTS: All coefficients of variation were <10%, percentage recovery was between 97% and 109% with a high linearity (r = 0.99). HRE allowed the visualisation of a faint band of albumin and a diffused band between alpha and beta zones in healthy cats, while profiles from diseased cats were variable. Albumin (mg/dl) and urine albumin:creatinine ratio (UAC) were significantly (P <0.05) different between healthy and diseased cats. After ROC analysis, UAC values of 0.035 and 0.074 had a high sensitivity and high specificity, respectively, to classify proteinuria and identify borderline proteinuric cats. Moreover, an UAC of 0.017 had a high sensitivity in distinguishing between healthy and diseased cats. However, UAC was not able to distinguish between renal (CKD) and non-renal diseases (LUTD/OTHER), probably owing to the pathophysiology of CKD in cats, which is characterised by low-grade proteinuria and less glomerular involvement than in dogs. CONCLUSIONS AND RELEVANCE: HRE is an accurate and precise method that could be used to measure albuminuria in cats. UAC was useful to correctly classify proteinuria and to discriminate between healthy and diseased cats. HRE might also provide additional information on urine proteins with a profile of all proteins (albumin and globulins) to aid clinicians in the diagnosis of diseases characterised by proteinuria.

Limited sampling pharmacokinetics of subcutaneous ondansetron in healthy geriatric cats, cats with chronic kidney disease, and cats with liver disease.
Fitzpatrick RL, Wittenburg LA, Hansen RJ, Gustafson DL, Quimby JM
Ondansetron, a 5-HT3 receptor antagonist, is an effective anti-emetic in cats. The purpose of this study was to compare pharmacokinetics of subcutaneous (SQ) ondansetron in healthy geriatric cats to cats with chronic kidney disease (CKD) or liver disease using a limited sampling strategy. 60 cats
participants; 20 per group. Blood was drawn 30 and 120 min following one 2 mg (mean 0.49 mg/kg, range 0.27-1.05 mg/kg) SQ dose of ondansetron. Ondansetron concentrations were measured by liquid chromatography coupled to tandem mass spectrometry. Drug exposure represented as area under the curve (AUC) was predicted using a limited sampling approach based on multiple linear regression analysis from previous full sampling studies, and clearance (CL/F) estimated using noncompartmental methods. Kruskal-Wallis anova was used to compare parameters between groups. Mean AUC (ng/mL·h) of subcutaneous ondansetron was 301.4 (geriatric), 415.2 (CKD), and 587.0 (liver). CL/F (L/h/kg) of SQ ondansetron was 1.157 (geriatric), 0.967 (CKD), and 0.795 (liver). AUC was significantly higher in liver and CKD cats when compared to geriatric cats (P < 0.05). CL/F in liver cats was significantly decreased (P < 0.05) compared to geriatric cats. In age-matched subset analysis, AUC and CL/F in liver cats remained significantly different from geriatric cats.

Hypersomatotropism in 3 Cats without Concurrent Diabetes Mellitus.
Fletcher JM, Scudder CJ, Kiupel M et al.

Prevalence and Clinicopathological Features of Triaditis in a Prospective Case Series of Symptomatic and Asymptomatic Cats.
Fragkou FC, Adamama-Moraitou KK, Poutahidis T et al.

BACKGROUND: The term triaditis designates the concurrent presence of idiopathic inflammatory bowel disease (IBD), cholangitis, and pancreatitis in cats. HYPOTHESIS/OBJECTIVES: The histopathology of concurrent, but often subclinical, inflammatory processes in the small intestine, liver, and pancreas of cats is poorly described. We aimed to investigate the frequency of enteritis, cholangitis, pancreatitis, or some combination of these in symptomatic and asymptomatic cats, compare clinicopathological features, and correlate histopathological with laboratory findings. ANIMALS: Domestic cats (27 symptomatic, 20 asymptomatic, and 8 normal). METHODS: Prospective study. Physical examination, laboratory variables (CBC, serum biochemistry profile, serum thyroxine concentration, serum feline trypsin-like immunoreactivity [fTLI], feline lipase immunoreactivity [fPLI, as measured by Spec fPL(®) ], urinalysis, and fecal analysis), imaging, and histopathological examinations were conducted. Feline liver, pancreas, and small intestine were biopsied during laparotomy. RESULTS: Inflammatory lesions were detected in 47 cats (27 symptomatic, 20 asymptomatic). In total, 20 cats had histopathologic lesions of IBD (13/47, 27.7%), cholangitis (6/47, 12.8%), or pancreatitis (1/47, 2.1%) alone, or inflammation involving >1 organ (27/47, 57.4%). More specifically, 16/47 cats (34.0%) had concurrent lesions of IBD and cholangitis, 3/47 (6.4%) of IBD and pancreatitis, and 8/47 cats (17%) of triaditis. Triaditis was identified only in symptomatic cats (8/27, 29.6%). A mild, positive correlation was detected between the severity (score) of IBD lesions and the number of comorbidities (rho = +0.367, P =.022). CONCLUSIONS AND CLINICAL IMPORTANCE: Histopathological evidence of IBD or IBD with comorbidities was detected in both symptomatic and asymptomatic cats. The possibility of triaditis should be considered in symptomatic cats with severe IBD.

Evaluation of Weight Loss Over Time in Cats with Chronic Kidney Disease.
Freeman LM, Lachaud MP, Matthews S, Rhodes L, Zollers B

BACKGROUND: Thin body condition and weight loss are common in cats with chronic kidney
disease (CKD). However, the time course and progression of weight loss before and after diagnosis have not been thoroughly evaluated. HYPOTHESIS/OBJECTIVES: To describe weight loss in cats with CKD before and after diagnosis and its relationship to survival. ANIMALS: A total of 569 cats (55.5% females and 44.5% males) with CKD from 6 US veterinary practices for which International Renal Interest Society (IRIS) stage, age, date of CKD diagnosis, and at least two body weight measurements were available. METHODS: Body weight measurements were analyzed by time windows and polynomial growth curve analysis. Survival analysis was performed by Kaplan-Meier curves and log-rank tests. RESULTS: Median age at diagnosis was 14.9 years (range, 5.0-22.8 years). Cats were categorized at diagnosis as IRIS stage 1 (n = 34 [6%]), stage 2 (n = 345 [61%]), stage 3 (n = 141 [25%]), and stage 4 (n = 49 [9%]). Median body weight at diagnosis was 4.2 kg (range, 1.6-9.9 kg). Cats lost a median of 8.9% of body weight in the 12 months before diagnosis, but weight loss was already present 3 years before diagnosis and accelerated after diagnosis of CKD. Cats ≤4.2 kg at the time of diagnosis had significantly shorter survival time compared to cats ≥ 4.2 kg at diagnosis (P <.0001). CONCLUSIONS AND CLINICAL IMPORTANCE: Weight loss can be detected in cats before diagnosis of CKD, accelerates after diagnosis, and is associated with shorter survival. Tracking body weight may help clinicians in earlier diagnosis of CKD.

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.

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

The Effect of Moderate Dietary Protein and Phosphate Restriction on Calcium-Phosphate Homeostasis in Healthy Older Cats.
Geddes RF, Biourge V, Chang Y, Syme HM, Elliott J
BACKGROUND: Dietary phosphate and protein restriction decreases plasma PTH and FGF-23 concentrations and improves survival time in azotemic cats, but has not been examined in cats that are not azotemic. HYPOTHESIS: Feeding a moderately protein- and phosphate-restricted diet decreases PTH and FGF-23 in healthy older cats and thereby slows progression to azotemic CKD. ANIMALS: A total of 54 healthy, client-owned cats (≥ 9 years). METHODS: Prospective double-blinded randomized placebo-controlled trial. Cats were assigned to test diet (protein 76 g/Mcal and phosphate 1.6 g/Mcal) or control diet (protein 86 g/Mcal and phosphate 2.6 g/Mcal) and monitored for 18 months. Changes in variables over time and effect of diet were assessed by linear mixed models. RESULTS: A total of 26 cats ate test diet and 28 cats ate control diet. There was a significant effect of diet on urinary fractional excretion of phosphate (P = 0.045), plasma PTH (P = 0.005), and ionized calcium concentrations (P = 0.018), but not plasma phosphate, FGF-23, or creatinine concentrations. Plasma PTH concentrations did not significantly change in cats fed the test diet (P = 0.62) but increased over time in cats fed the control diet (P = 0.001). There was no significant treatment effect of the test diet on development of azotemic CKD (3 of 26 (12%) test versus 3 of 28 (11%) control, odds ratio 1.09 (95% CI 0.13-8.94), P = 0.92). CONCLUSIONS AND CLINICAL IMPORTANCE: Feeding a moderately protein- and phosphate-restricted diet has effects on calcium-phosphate homeostasis in healthy older cats and is well tolerated. This might have an impact on renal function and could be useful in early chronic kidney disease.

Geno- and seroprevalence of Felis domesticus Papillomavirus type 2 (FdPV2) in dermatologically healthy cats.
Geisseler M, Lange CE, Favrot C, Fischer N, Ackermann M, Tobler K
BACKGROUND: Papillomaviruses can cause proliferative skin lesions ranging from benign hyperplasia to squamous cell carcinoma (SCC). However, asymptomatic infection is also possible. Several groups have detected Felis domesticus Papillomavirus type 2 (FdPV2) DNA in association with feline Bowenoid in situ carcinoma (BISC). Therefore, a causative connection has been suggested. However, the knowledge about FdPV2 epidemiology is limited. The aim of this study was to describe the genoprevalence and seroprevalence of FdPV2 in healthy cats. For this purpose an FdPV2-specific quantitative (q)PCR assay was developed and used to analyse Cytobrush samples collected from 100
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dermatologically healthy cats. Moreover, an ELISA was established to test the sera obtained from the same cats for antibodies against the major capsid protein (L1) of FdPV2. RESULTS: The genoprevalence of FdPV2 was to 98%. Surprisingly, the quantities of viral DNA detected in some samples from the healthy cats exceeded the amounts detected in control samples from feline BISC lesions. The seroprevalence was much lower, amounting to 22%. The concentrations of antibodies against FdPV2 were relatively low in healthy cats, whereas they were very high in control cats with BISC. CONCLUSION: These observations suggest that FdPV2 is highly prevalent, even among healthy cats. However, cats that carry it on their skin mount in most instances no antibody response. It might be hypothesized that FdPV2 is only rarely productively replicating or its replication is only rarely exposed to the immune system.

Evaluation of Cystatin C for the Detection of Chronic Kidney Disease in Cats.
Ghys LF, Paepe D, Lefebvre HP et al.
BACKGROUND: Serum cystatin C (sCysC) and urinary cystatin C (uCysC) are potential biomarkers for early detection of chronic kidney disease (CKD) in cats. An in-depth clinical validation is required.
OBJECTIVES: To evaluate CysC as a marker for CKD in cats and to compare assay performance of the turbidimetric assay (PETIA) with the previously validated nephelometric assay (PENIA).
ANIMALS: Ninety cats were included: 49 CKD and 41 healthy cats. METHODS: Serum CysC and uCysC concentrations were prospectively evaluated in cats with CKD and healthy cats. Based on plasma exo-ihexol clearance test (PexICT), sCysC was evaluated to distinguish normal, borderline, and low GFR. Sensitivity and specificity to detect PexICT < 1.7 mL/min/kg were calculated. Serum CysC results of PENIA and PETIA were correlated with GFR. Statistical analysis was performed using general linear modeling. RESULTS: Cats with CKD had significantly higher mean ± SD sCysC (1.4 ± 0.5 mg/L) (P < .001) and uCysC/urinary creatinine (uCr) (291 ± 411 mg/mol) (P < .001) compared to healthy cats (sCysC 1.0 ± 0.3 and uCysC/uCr 0.32 ± 0.97). UCysC was detected in 35/49 CKD cats. R(2) values between GFR and sCysC or sCr were 0.39 and 0.71, respectively (sCysC or sCr = μ + GFR + ε). Sensitivity and specificity were 22 and 100% for sCysC and 83 and 93% for sCr. Serum CysC could not distinguish healthy from CKD cats, nor normal from borderline or low GFR, in contrast with sCr. CONCLUSION: Serum CysC is not a reliable marker of reduced GFR in cats and uCysC could not be detected in all CKD cats.

Serum and urinary cystatin C in cats with feline immunodeficiency virus infection and cats with hyperthyroidism.
Ghys LF, Paepe D, Taffin ER et al.
OBJECTIVES: The objective of this study was to investigate serum cystatin C (sCysC) and urinary cystatin C (uCysC) in cats with hyperthyroidism and cats with feline immunodeficiency virus (FIV).
METHODS: Thirty cats with FIV, 26 hyperthyroid cats and 28 healthy cats were included. sCysC and uCysC:creatinine (uCysC/uCr) ratio were measured with a human particle-enhanced nephelometric immunoassay, previously validated for feline CysC measurement. Routine renal variables (serum creatinine [sCr], urine specific gravity, urinary protein:creatinine ratio [UPC]) were also measured in the three groups. RESULTS: Cats with hyperthyroidism had significantly higher sCysC and higher uCysC/uCr ratio, lower sCr and a higher UPC than healthy cats. Cats with FIV infection did not show a significantly higher sCysC concentration but had a significantly higher sCr and UPC than healthy cats. uCysC could be detected in only four of them. CONCLUSIONS AND RELEVANCE: This study demonstrated that sCysC is increased in cats with hyperthyroidism, in contrast with sCr, but not in cats.
with FIV. Many hyperthyroid cats, but only four cats with FIV, had an elevated uCysC/uCr ratio. Further studies may reveal if uCysC might be a valuable marker for tubular dysfunction in cats.

**What’s in a Name? Classification of Diabetes Mellitus in Veterinary Medicine and Why It Matters.**

Gilor C, Niessen SJ, Furrow E, DiBartola SP


Diabetes Mellitus (DM) is a syndrome caused by various etiologies. The clinical manifestations of DM are not indicative of the cause of the disease, but might be indicative of the stage and severity of the disease process. Accurately diagnosing and classifying diabetic dogs and cats by the underlying disease process is essential for current and future studies on early detection, prevention, and treatment of underlying disease. Here, we review the current etiology-based classification of DM and definitions of DM types in human medicine and discuss key points on the pathogenesis of each DM type and prediabetes. We then review current evidence for application of this etiology-based classification scheme in dogs and cats. In dogs, we emphasize the lack of consistent evidence for autoimmune DM (Type 1) and the possible importance of other DM types such as DM associated with exocrine pancreatic disease. While most dogs are first examined because of DM in an insulin-dependent state, early and accurate diagnosis of the underlying disease process could change the long-term outcome and allow some degree of insulin independence. In cats, we review the appropriateness of using the umbrella term of Type 2 DM and differentiating it from DM secondary to other endocrine disease like hypersomatotropism. This differentiation could have crucial implications on treatment and prognosis. We also discuss the challenges in defining and diagnosing prediabetes in cats.

**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.

**Use of a Boari flap and renal descensus as treatment for proximal ureteral rupture in a cat.**
CASE DESCRIPTION A 6-year-old neutered male domestic shorthair cat was evaluated because of signs of abdominal pain and anuria of 12 hours’ duration after vehicular trauma. CLINICAL FINDINGS Lethargy, mydriasis, bradycardia, abdominal distension, and signs of pain on abdominal palpation were observed. Abdominal ultrasonography revealed moderate urinary bladder distension without evidence of free abdominal fluid; hematologic evaluation revealed leukocytosis with high BUN and serum creatinine concentrations. TREATMENT AND OUTCOME The patient was hospitalized, medical stabilization was attempted, and an indwelling urinary catheter was placed. Urinary output was < 1 mL/kg/h (< 0.45 mL/lb/h), and signs of abdominal pain persisted despite treatment. The next day, ultrasonographic examination revealed fluid in the retroperitoneal space, and ureteral rupture was suspected. Exploratory laparotomy confirmed retroperitoneal fluid accumulation; a large hematoma surrounded the right kidney and perirenal structures. An abdominal drain was placed to aid patient stabilization. Three days later, IV pyelography revealed rupture of the proximal part of the right ureter. Ureteroneocystostomy was performed with elongated cystoplasty through a Boari flap and caudal transposition of the right kidney (renal descensus). On follow-up examination 18 months after treatment, the cat was free of clinical signs, and results of ultrasonography, CBC, and serum biochemical analysis were unremarkable. CLINICAL RELEVANCE Results suggested that a Boari flap procedure with renal descensus could be a feasible alternative in the management of proximal ureteral rupture in cats, but research is needed in this area.

**Effects of topical corticosteroid administration on intraocular pressure in normal and glaucomatous cats.**

Gosling AA, Kiland JA, Rutkowski LE, Hoefs A, Ellinwood NM, McLellan GJ


OBJECTIVE: The objective of this study was to determine the effect of topical corticosteroid (CCS) therapy on intraocular pressure (IOP) in normal cats and cats with primary feline congenital glaucoma (FCG). ANIMALS STUDIED: Five normal and 11 FCG cats were studied in two cohorts. PROCEDURES: IOP was measured by a single, masked observer, once daily, 3-5 days/week throughout the course of CCS treatment and for up to 11 days after treatment discontinuation. One eye per cat was randomly assigned for treatment twice daily with CCS; balanced salt solution (BSS) applied to the contralateral eye served as a control. Differences between eyes and between weeks of the study period were calculated for each cat. A positive response to CCS was defined as a consistent >15% or >25% higher IOP in the treated relative to control eye in normal and FCG cats, respectively. RESULTS: A total of 8 of 11 FCG cats responded to topical CCS after 1-5 weeks of treatment with an increase in IOP relative to the untreated eye (maximum IOP discrepancy of 56 mmHg). Two of five normal cats responded to topical CCS with an appreciable, but clinically unimportant increase in IOP in the treated eye (maximum IOP discrepancy of 6.4 mmHg). CONCLUSIONS: Our data indicate that the incidence of steroid-induced IOP elevation in cats is lower than that of previously published feline studies. Cats with preexisting compromise in aqueous humor outflow may show a greater, clinically relevant response to topical CCS than normal cats.

**Effect of cognitive enrichment on behavior, mucosal immunity and upper respiratory disease of shelter cats rated as frustrated on arrival.**

Gourkow N, Phillips CJ

*Prev Vet Med* (2016) **131**:103-110

Acquisition of resources and opportunity to engage in natural behaviors has been shown to reduce
frustration-related behaviors and enhance health in nondomestic felids kept in zoos, but little is known about whether there are similar effects in domestic cats living in confinement in animal shelters. Fifteen cats rated as Frustrated during the first hour of confinement to a cage at an animal shelter were assigned to either a Treatment (n=7) or Control (n=8) group. Treatment cats were taken from their cages to a separate room four times daily for 10min each time over a 10 d period, where they took part in training sessions to learn a novel behavior (paw-hand contact with a researcher). Changes in emotional states and mucosal immune response were evaluated over 10 days. Infectious status was determined upon admission and incidence of upper respiratory was determined up to day 40 based on clinical signs. Treated cats were more likely to be rated as Content than Control cats and had greater concentrations of S-IgA (537µg/g) in feces than Control cats (101µg/g). Within the Treatment group, cats that responded positively had greater concentrations of S-IgA (925µg/g) than those that responded negatively (399µg/g). Control cats were more likely to develop respiratory disease over time compared to cats that received treatment (Hazard Ratio: 2.37, Confidence Interval: 1.35-4.15). It is concluded that there is prima facie evidence that cognitive enrichment of cats exhibiting frustration-related behaviors can elicit positive affect (contentment), stimulate secretion of IgA and reduce incidence of respiratory disease, which is worthy of further study.

Management of Otic and Nasopharyngeal, and Nasal Polyps in Cats and Dogs.
Greci 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.

A Feline-Specific Anti-Nerve Growth Factor Antibody Improves Mobility in Cats with Degenerative Joint Disease-Associated Pain: A Pilot Proof of Concept Study.
Gruen ME, Thomson AE, Griffith EH, Paradise H, Gearing DP, Lascelles BD
BACKGROUND: Neutralizing antibodies against nerve growth factor (NGF) are analgesic in rodent models, naturally occurring degenerative joint disease (DJD) pain in dogs, and chronic pain in humans. OBJECTIVES: To evaluate the efficacy of a fully felinized anti-NGF antibody (NV-02) for the treatment of DJD pain and mobility impairment in cats. ANIMALS: Thirty-four client-owned cats with DJD-associated pain and mobility impairment. METHODS: In a placebo-controlled, pilot, masked clinical study, cats were randomized to a single treatment with NV-02 (0.4 mg/kg SC [n = 11] or 0.8 mg/kg SC [n = 12]) or placebo (saline, SC [n = 11]). Activity was measured objectively. Additionally, owners completed clinical metrology instruments (client-specific outcome measures [CSOM] and feline musculoskeletal pain index [FMPI]) on days 0 (screening), 14 (baseline), 35, 56, and 77. A repeated-measures model was used to evaluate the objective activity data. RESULTS: NV-02 significantly increased objectively measured activity overall (P =.017) and at 2 (P =.035), 3 (P =.007), 4 (P =.006), 5 (P =.007), and 6 (P =.017) weeks after treatment. CSOM scores (P =.035) and pain (P =.024) showed a significant effect of treatment 3 weeks after administration. In the treatment group, 83% of the owners correctly identified the treatment administered compared with 45% of owners in the placebo group (P =.013). No treatment-related adverse effects were identified. CONCLUSIONS: These
pilot data demonstrate a 6-week duration positive analgesic effect of this fully felinized anti-NGF antibody in cats suffering from DJD-associated pain.

**Digging for known genetic mutations underlying inherited bone and cartilage characteristics and disorders in the dog and cat.**
Haase B, Mazrier H, Wade CM
Gene mapping projects for many traits in both dogs and cats have yielded new knowledge. Both researchers and the public alike have been fascinated by the inheritance of breed characteristic phenotypes and sporadic disorders. It has been proposed that selective breeding practices have on occasion generated alterations in structure that might be harmful. In this review, simply inherited disorders and characteristics affecting bone and cartilage for which a putative mutation is known are collected. A better understanding of the known inherited basis of skeletal conditions and disorders will assist veterinarians to improve their diagnoses and increase their effectiveness on advising clients on the prevention, management, prognosis and possible treatment of the conditions.

**Chronic Vomiting in Cats: Etiology and Diagnostic Testing.**
Hauck SR, Gisselman K, Cordner A, Nicholson AG
Chronic vomiting in cats is a common presenting problem seen in veterinary practice today. The initial step when presented with a vomiting patient is to differentiate between vomiting and regurgitation or dysphagia. There are numerous causes for chronic vomiting in cats, and therefore a detailed and comprehensive patient history and a systematic diagnostic approach are key steps in determining the cause for vomiting and the most appropriate treatment plan. Common causes for chronic vomiting in cats may include inflammatory bowel disease, food allergy, gastrointestinal motility disorders, neoplasia, and extra-gastrointestinal diseases, such as renal disease, hepatobiliary disease, and hyperthyroidism.


**Usefulness of acute phase proteins in differentiating between feline infectious peritonitis and other diseases in cats with body cavity effusions.**
Hazuchova K, Held S, Neiger R
*J Feline Med Surg* (2016)
OBJECTIVES: The aim of this study was to evaluate the measurement of acute phase proteins (APPs) as a diagnostic tool to differentiate between feline infectious peritonitis (FIP) and other diseases in cats with body cavity effusions. METHODS: Cats with pleural, abdominal or pericardial effusion were prospectively enrolled. Cats were classified as having or not having FIP based on immunohistochemistry (if available) or a sophisticated statistical method using machine learning methodology with concepts from game theory. Cats without FIP were further subdivided into three subgroups: cardiac disease, neoplasia and other diseases. Serum amyloid A (SAA), haptoglobin (Hp) and α1-acid glycoprotein (AGP) were measured in serum and effusion, using assays previously validated in cats. RESULTS: Serum and effusion samples were available for the measurement of APPs from 88 and 67 cats, respectively. Concentrations of the APPs in serum and effusion were significantly different in cats with and without FIP (P <0.001 for all three APPs). The best APP to distinguish between cats with and without FIP was AGP in the effusion; a cut-off value of 1550 µg/ml had a
sensitivity and specificity of 93% each for diagnosing FIP. CONCLUSIONS AND RELEVANCE: AGP, particularly if measured in effusion, was found to be useful in differentiating between FIP and other diseases, while SAA and Hp were not. The concentration of all three APPs in some diseases (e.g., septic processes, disseminated neoplasia) was as high as in cats with FIP; therefore, none of these can be recommended as a single diagnostic test for FIP.

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) **26**:593-597
BACKGROUND: Early enteral nutrition in dogs and cats can have significant benefit in the therapeutic management of critical illness. Blind placement of nasogastric or nasoesophageal feeding tubes to accomplish this goal has become standard practice. However, complications from tube misdirection into the tracheobronchial tree can lead to significant patient morbidity and mortality. Safe and consistent alternatives are desirable to minimize these risks. KEY CONCEPTS: A modified method for placement of nasoenteric tubes is described. The main variation from standard procedure involves a second tube measurement, with the distal tip of the tube positioned at the thoracic inlet and measured to the nostril. The tube is advanced to this level and tested for negative pressure using a 12 mL syringe attached to the end of the feeding tube. This improves confidence in esophageal positioning before complete advancement of the tube to its distal endpoint. SIGNIFICANCE: This procedural adaptation to feeding tube placement has the potential to reduce bronchopulmonary trauma from intratracheal misdirection by providing an early safety check to identify malpositioning. Prospective validation studies are needed to support its advantages over standard tube placement techniques.

Amyloid-Producing Odontogenic Tumors of the Facial Skin in Three Cats.
Hirayama K, Endoh C, Kagawa Y et al.
*Vet Pathol* (2016)
Amyloid-producing odontogenic tumors (APOTs) of the facial skin were diagnosed in 3 domestic cats. The neoplasms had the histopathological characteristics of the odontogenic tumor. The neoplastic cells were present in irregular islands, strands, and sheets. The peripheral neoplastic cells of the islands and strands were arranged in a palisading fashion, while the central cells were polyhedral to stellate and randomly arranged. Multiple spherules of homogeneous eosinophilic material were closely apposed to the neoplastic epithelial cells. The spherules stained with Congo red and produced an apple green
birefringence under polarization microscopy, indicative of amyloid. Immunohistochemically, amyloid materials of the neoplasms reacted with polyclonal antibodies for ameloblastin, amelogenin, and sheathlin antibodies. Neoplastic epithelial cells also reacted with antiameloblastin, amelogenin, and sheathlin antibodies, with varied intensity. The histopathological and immunohistochemical characteristics of dermal neoplasms of the 3 cats were analogous to those of APOTs reported in the dog and the cat.

**Levels of Ancylostoma infections and phylogenetic analysis of cox 1 gene of A. ceylanicum in stray cat faecal samples from Guangzhou, China.**
Hu W, Yu XG, Wu S et al.
*J Helminthol* (2016) **90**:392-397
Ancylostoma ceylanicum is a common zoonotic nematode. Cats act as natural reservoirs of the hookworm and are involved in transmitting infection to humans, thus posing a potential risk to public health. The prevalence of feline A. ceylanicum in Guangzhou (South China) was surveyed by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). In total, 112 faecal samples were examined; 34.8% (39/112) and 43.8% (49/112) samples were positive with hookworms by microscopy and PCR method, respectively. Among them, 40.8% of samples harboured A. ceylanicum. Twelve positive A. ceylanicum samples were selected randomly and used for cox 1 sequence analysis. Sequencing results revealed that they had 97-99% similarity with A. ceylanicum cox 1 gene sequences deposited in GenBank. A phylogenetic tree showed that A. ceylanicum isolates were divided into two groups: one comprising four isolates from Guangzhou (South China), and the other comprising those from Malaysia, Cambodia and Guangzhou. In the latter group, all A. ceylanicum isolates from Guangzhou were clustered into a minor group again. The results indicate that the high prevalence of A. ceylanicum in stray cats in South China poses a potential risk of hookworm transmission from pet cats to humans, and that A. ceylanicum may be a species complex worldwide.

**Molecular detection of severe fever with thrombocytopenia syndrome virus (SFTSV) in feral cats from Seoul, Korea.**
Hwang J, Kang JG, Oh SS et al.
*Ticks Tick Borne Dis* (2016)
This study tested serum samples of feral cats from a highly urbanized habitat, Seoul, Korea to determine the infection to severe fever with thrombocytopenia syndrome virus (SFTSV). From 126 samples tested, SFTSV was detected by RT-PCR in 22 (17.5%) cats from various sites of Seoul. Sequences identified from this study were grouped with clusters from China and Japan. Our result provides data that SFTSV may have been circulating in settings that were suspected to have relatively low risk, such as highly urbanized habitats. Thus it warrants further study to investigate the ecology of SFTSV in urban-dwelling animals including ticks, human and other potential host species.

**Effect of Body Weight on Echocardiographic Measurements in 19,866 Pure-Bred Cats with or without Heart Disease.**
Häggström J, Andersson ÅO, Falk T et al.
BACKGROUND: Echocardiography is a cost-efficient method to screen cats for presence of heart disease. Current reference intervals for feline cardiac dimensions do not account for body weight (BW).
OBJECTIVE: To study the effect of BW on heart rate (HR), aortic (Ao), left atrial (LA) and ventricular (LV) linear dimensions in cats, and to calculate 95% prediction intervals for these variables in normal
adult pure-bred cats. ANIMALS: 19 866 pure-bred cats. METHODS: Clinical data from heart screens conducted between 1999 and 2014 were included. Associations between BW, HR, and cardiac dimensions were assessed using univariate linear models and allometric scaling, including all cats, and only those considered normal, respectively. Prediction intervals were created using 95% confidence intervals obtained from regression curves. RESULTS: Associations between BW and echocardiographic dimensions were best described by allometric scaling, and all dimensions increased with increasing BW (all P<0.001). Strongest associations were found between BW and Ao, LV end diastolic, LA dimensions, and thickness of LV free wall. Weak linear associations were found between BW and HR and left atrial to aortic ratio (LA:Ao), for which HR decreased with increasing BW (P<0.001), and LA:Ao increased with increasing BW (P<0.001). Marginal differences were found for prediction formulas and prediction intervals when the dataset included all cats versus only those considered normal. CONCLUSIONS AND IMPORTANCE: BW had a clinically relevant effect on echocardiographic dimensions in cats, and BW based 95% prediction intervals may help in screening cats for heart disease.

Characterization and Comparison of Injuries Caused by Accidental and Non-accidental Blunt Force Trauma in Dogs and Cats.
Intarapanich NP, McCobb EC, Reisman RW, Rozanski EA, Intarapanich PP
Motor vehicle accidents (MVA) are often difficult to distinguish from non-accidental injury (NAI). This retrospective case-control study compared animals with known MVA trauma against those with known NAI. Medical records of 426 dogs and cats treated after MVA and 50 after NAI were evaluated. Injuries significantly associated with MVA were pelvic fractures, pneumothorax, pulmonary contusion, abrasions, and degloving wounds. Injuries associated with NAI were fractures of the skull, teeth, vertebrae, and ribs, scleral hemorrhage, damage to claws, and evidence of older fractures. Odds ratios are reported for these injuries. MVA rib fractures were found to occur in clusters on one side of the body, with cranial ribs more likely to fracture, while NAI rib fractures were found to occur bilaterally with no cranial-caudal pattern. Establishing evidence-based patterns of injury may help clinicians differentiate causes of trauma and may aid in the documentation and prosecution of animal abuse.

Middle ear polyps: results of traction avulsion after a lateral approach to the ear canal in 62 cats (2004-2014).
Janssens SD, Haagsman AN, Ter Haar G
OBJECTIVES: The objective of this study was to report the surgical outcome and complication rate of deep traction avulsion (TA) of feline aural inflammatory polyps after a lateral approach (LA) to the ear canal. METHODS: This was a retrospective analysis of data retrieved from an electronic database of 62 cats treated with TA after an LA (TALA) for removal of ear canal polyps. Long-term outcome was assessed via a telephone questionnaire survey with the owners. RESULTS: Domestic shorthair cats (48%) and Maine Coons (37%) were over-represented. The most common presenting clinical signs were otorrhea, ear scratching and head shaking. Video-otoscopic examination confirmed a polypous mass in the ear canal in all patients. All 62 cats underwent TALA with a mean surgical time of 33 mins for experienced surgeons (n = 4) and 48 mins (n = 12) for less experienced surgeons. The recurrence rate of polyp regrowth for experienced surgeons was 14.3% vs 35% for the less experienced surgeons. Postoperative complications included Horner’s syndrome (11.5%) and facial nerve paralysis (3%). Otitis interna was not observed. CONCLUSIONS AND RELEVANCE: A lateral approach to the ear canal in combination with deep TA of an aural inflammatory polyp is an effective first-line technique
that results in a low recurrence and complication rate.

**Current Understanding of the Pathogenesis of Progressive Chronic Kidney Disease in Cats.**
Jepson RE
In cats with chronic kidney disease (CKD), the most common histopathologic finding is tubulointerstitial inflammation and fibrosis. However, these changes reflect a nonspecific response of the kidney to any inciting injury. The risk of developing CKD is likely to reflect the composite effects of genetic predisposition, aging, and environmental and individual factors that affect renal function over the course of a cat’s life. However, there is still little information available to determine exactly which individual risk factors predispose a cat to develop CKD. Although many cats diagnosed with CKD have stable disease for years, some cats show overtly progressive disease.

**Maximizing the diagnostic utility of endoscopic biopsy in dogs and cats with gastrointestinal disease.**
Jergens AE, Willard MD, Allenspach K
*Vet J* (2016) *214*:50-60
Flexible endoscopy has become a valuable tool for the diagnosis of many small animal gastrointestinal (GI) diseases, but the techniques must be performed carefully so that the results are meaningful. This article reviews the current diagnostic utility of flexible endoscopy, including practical/technical considerations for endoscopic biopsy, optimal instrumentation for mucosal specimen collection, the correlation of endoscopic indices to clinical activity and to histopathologic findings, and new developments in the endoscopic diagnosis of GI disease. Recent studies have defined endoscopic biopsy guidelines for the optimal number and quality of diagnostic specimens from different regions of the gut. They also have shown the value of ileal biopsy in the diagnosis of canine and feline chronic enteropathies, and have demonstrated the utility of endoscopic biopsy specimens beyond routine hematoxylin and eosin histopathological analysis, including their use in immunohistochemical, microbiological, and molecular studies.

**Causes of endogenous uveitis in cats presented to referral clinics in North Carolina.**
Jinks MR, English RV, Gilger BC
OBJECTIVE: To investigate the causes of endogenous uveitis in cats presenting to referral ophthalmology clinics in North Carolina. PROCEDURE: Medical records of cats diagnosed with endogenous uveitis at North Carolina State University’s College of Veterinary Medicine (NCSU-CVM) or Animal Eye Care Associates of Cary, NC between 2003 and 2015 were reviewed. Inclusion criteria were cats that had complete diagnostic workups, including clinical, clinicopathological, serological, and histopathological data, as well as imaging modalities. Serology was consistently completed for feline leukemia virus (FeLV), feline immunodeficiency virus (FIV), feline coronavirus (FCoV), Toxoplasma gondii, and Bartonella spp. RESULTS: One hundred and twenty cats met the inclusion criteria. Seroprevalence of FeLV (2.7%), FIV (7.3%), FCoV (34.7%), T. gondii (23.7%), and Bartonella spp. (43.2%) was observed, with a combined seroprevalence of 59.2%. Nineteen cats (15.8%) were diagnosed with feline infectious peritonitis (FIP) based on clinical, hematological, serological, histopathological, and necropsy findings. The average age of all cases was 7.62 years, while the average age of cats diagnosed with FIP was 1.82 years. Neoplasia was diagnosed in six cats (5.0%). No underlying etiology was found in 49 cats (40.8%). CONCLUSIONS: Both idiopathic and
neoplastic causes of uveitis were less prevalent than previously reported in studies, while seropositivity was higher than previously reported for the study area. This may be due to improved diagnostic capabilities or that cats with infectious disease were more likely to be referred. Because of the high prevalence of FIP, young cats with uveitis should be evaluated for hyperglobulinemia and FCoV serology should be performed as minimal diagnostics.

**Hypothermia in Uremic Dogs and Cats.**
Kabatchnick E, Langston C, Olson B, Lamb KE

**BACKGROUND:** The prevalence of uremic hypothermia (UH) and the effects of improving uremia on body temperature have not been determined in veterinary patients. **OBJECTIVES:** To determine the prevalence of UH and correlations between uremia and body temperature in patients undergoing intermittent hemodialysis (IHD). **ANIMALS:** Uremic dogs (n = 122) and cats (n = 79) treated by IHD at the Bobst Hospital of the Animal Medical Center from 1997 to 2013. **METHODS:** Retrospective review of medical records. **RESULTS:** The prevalence of hypothermia was 38% in azotemic cats and 20.5% in azotemic dogs. Statistically significant temperature differences were observed between uremic and nonuremic dogs (nonuremic: mean, 100.8°F; range, 91.2-109.5°F; uremic: mean, 99.9°F; range, 95.6-103.8°F; P <.0001) and cats (nonuremic: mean, 100.6°F; range, 94.0-103.8°F; uremic: mean, 99.3°F; range, 92.3-103.4°F; P <.0001). In dog dialysis patients, significant models included (1) timing (pre-dialysis versus post-dialysis) with weight class (small [P <.0001], medium [P =.016], and large breed [P =.033] dogs), (2) timing with serum creatinine concentration (P =.021), and (3) timing with BUN concentration (P <.0001). In cat dialysis patients, there was a significant interaction between timing and weight as a categorical variable (<5 kg and ≥5 kg). **CONCLUSIONS AND CLINICAL IMPORTANCE:** Uremic hypothermia appears to be a clinical phenomenon that occurs in cats and dogs. Uremic patients are hypothermic compared to ill nonuremic patients and body temperatures increase when uremia is corrected with IHD in dogs and in cats >5 kg. In cats, UH seems to be a more prevalent phenomenon driven by uremia. Uremic hypothermia does occur in dogs, but body weight is a more important predictor of body temperature.

**Comparison between point-of-care dermatophyte test medium and mycology laboratory culture for diagnosis of dermatophytosis in dogs and cats.**
Kaufmann R, Blum SE, Elad D, Zur G
*Vet Dermatol* (2016) 27:284-e68

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

**Lynxacarus radovskyi mites in feral cats: a study of diagnostic methods, preferential body locations, co-infestations and prevalence.**
Ketzis JK, Dundas J, Shell LG
*Vet Dermatol* (2016)

BACKGROUND: Lynxacarus radovskyi (fur mites) are ectoparasites found on the hair shafts of cats living in tropical environments. Diagnosis is via microscopic examination of hairs. Various anatomical areas have been reported to harbour these mites. OBJECTIVES: To assess adhesive tape impressions and trichograms for detecting L. radovskyi and co-infestations; to determine host body predilection sites and affected gender; to determine prevalence of L. radovskyi in a feral cat population. ANIMALS: 121 feral cats in a trap, neuter and release programme. METHODS: After cats were premedicated for surgical sterilization, hairs from seven to nine body sites were removed from each cat using adhesive tape impression and trichogram techniques. Samples were examined at 10-100× magnification using compound or stereo microscopes. RESULTS: The prevalence of L. radovskyi was 71% (86 of 121) within the feral cat population. Tape impressions identified 75 cats; trichograms identified 56 cats. There were fewer false negative results with tape impressions. Caudal body sites were more likely to be positive, with the perianal area being the most commonly affected. Males and females were infested equally. Tape impressions identified more Cheyletiella blakei infestations and both methods identified some Felicola felis infestations. CONCLUSIONS AND CLINICAL IMPORTANCE: Tape impressions were easier to perform and identified more L. radovskyi positive cats and more co-infestations. Hairs from the perianal area and other caudal body sites are most likely to harbour L. radovskyi. Within this feral cat population, L. radovskyi was a common infestation.

**Comparison of intramuscular alfaxalone and ketamine combined with dexmedetomidine and butorphanol for castration in cats.**
Khenissi L, Nikolayenkova-Topie O, Broussaud S, Touzot-Jourde G
*J Feline Med Surg* (2016)

OBJECTIVES: Cardiorespiratory parameters and anaesthesia quality in cats anaesthetised with either intramuscular (IM) alfaxalone or ketamine both combined with dexmedetomidine and butorphanol for castration were evaluated. METHODS: Thirty-two client-owned cats were randomly assigned to receive either alfaxalone (A; 3 mg/kg IM) or ketamine (K; 5 mg/kg IM), combined with dexmedetomidine (10 µg/kg) and butorphanol (0.2 mg/kg). Heart rate (HR), respiratory rate (RR) and rectal temperature (T°) were recorded prior to drug administration. Pulse rate (PR) and RR were recorded 10 (T10) and 15 (T15) mins after injection (T0). Cardiorespiratory values (PR, RR, SPO2, blood pressure, PE’CO2) were recorded every 5 mins for the duration of the procedure. Pain at injection, intubation and recovery were evaluated with simple descriptive scores. Feasibility of anaesthesia was evaluated by the number of top-ups of anaesthetic needed. Cat attitude, ability to walk and presence of ataxia were assessed several times after extubation (Texmin) and the time between injection and extubation recorded. Pain was assessed at Tex120 and Tex240 with the 4Avet-pain score. RESULTS: The RR was significantly lower in group K at T10 (RRK = 28 ±13.35 breaths per minute [brpm], RRA= 43.24 ±7.04 brpm) and T15 (RRK = 28 ±11.53 brpm vs RRA = 43 ±12.18 brpm). Time to extubation was significantly longer in group A (TA = 62 ±14.6 mins, TK = 45.13 ± 7.38 mins). Cats in group K needed more top-ups, were more ataxic at Tex120, had a worse recovery score at Tex60 and
were less willing to walk at Tex30. CONCLUSIONS AND RELEVANCE: Cats receiving alfalfaloxaline had a longer but better quality recovery. Cardiorespiratory parameters were stable and within clinical acceptable values following IM injection of either alfalfaloxaline or ketamine in healthy cats. Intramuscular alfalfaloxaline is a suitable alternative to ketamine for short procedures requiring anaesthesia when used in combination with dexmedetomidine and butorphanol.

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
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.

Pathological Features and Pathogenesis of the Endomyocardial Form of Restrictive Cardiomyopathy in Cats.
J Comp Pathol (2016) 155:190-198
This study reports pathological and molecular features in 41 cases of feline restrictive cardiomyopathy (RCM). Grossly, there were patchy or diffuse areas of endocardial thickening affecting the left ventricle. The more common patchy endocardial lesions occurred as large trabecular or irregular broad bands of fibrous tissue bridging the left ventricular free wall and ventricular septum. Microscopically, regardless of the gross pattern, the thickened endocardium contained various numbers of stellate, spindle-shaped or elongated mesenchymal cells surrounded by fibrous connective tissue. Immunohistochemical findings were indicative of smooth muscle differentiation in mesenchymal cells. These cells proliferated vigorously and produced alcian blue-positive ground substance and collagen fibres; it was considered that the mesenchymal cells contributed to the formation of the endocardial lesions. In addition, multiple left ventricular ‘false tendons’ were invariably included within the trabecular or broad fibrous bands, providing a framework for formation of those bands. Evidence of endocarditis or endomyocarditis was lacking in all 41 cases, and no viral genomes were detected in any of the DNA or RNA samples obtained from 14 of the hearts. These observations suggest that any relationship between feline RCM and a virus-induced inflammatory response seems unlikely.
Clinical safety of robenacoxib in feline osteoarthritis: results of a randomized, blinded, placebo-controlled clinical trial.
King JN, King S, Budsberg SC et al.
*J Feline Med Surg* (2016) **18**:632-642

**OBJECTIVES:** The objective of this study was to evaluate the clinical safety of the non-steroidal anti-inflammatory drug (NSAID) robenacoxib in cats with osteoarthritis. Degenerative joint disease, including osteoarthritis, is highly prevalent in cats and many cases have associated pain and impaired mobility. Although NSAIDs are used routinely to control pain and inflammation in cats with osteoarthritis, there are safety concerns because of the high concurrent prevalence of chronic kidney disease (CKD) and the paucity of data on the safety of these drugs in target clinical populations.

**METHODS:** A total of 194 cats with osteoarthritis were recruited and randomly allocated to receive either robenacoxib at a dosage of 1.0-2.4 mg/kg (n = 95) or placebo (n = 99) tablets PO q24h for 28 days. Safety was assessed in 193 cats, including a subgroup of 40 animals with concurrent CKD, defined as serum creatinine concentration ≥1.6 mg/dl and urine specific gravity <1.030. Safety endpoints included reports of adverse events, results of clinical examinations, including body weight, and clinical chemistry and hematology variables. **RESULTS:** In all 193 cats and the subgroup of 40 animals with concurrent CKD, there were no differences between groups in frequencies of reported adverse events, body weight change or results of serum or urine chemistry or hematology variables. **CONCLUSIONS AND RELEVANCE:** Robenacoxib was well tolerated when administered daily for 1 month in cats with osteoarthritis, including cats with evidence of concurrent CKD. There was no clinical indication of damage to the gastrointestinal tract, kidney or liver.

Female cats, but not males, adjust responsiveness to arousal in the voice of kittens.
Konerding WS, Zimmermann E, Bleich E, Hedrich HJ, Scheumann M
*BMC Evol Biol* (2016) **16**:157

**BACKGROUND:** The infant cry is the most important communicative tool to elicit adaptive parental behaviour. Sex-specific adaptation, linked to parental investment, may have evolutionary shaped the responsiveness to changes in the voice of the infant cries. The emotional content of infant cries may trigger distinctive responsiveness either based on their general arousing properties, being part of a general affect encoding rule, or based on affective perception, linked to parental investment, differing between species. To address this question, we performed playback experiments using infant isolation calls in a species without paternal care, the domestic cat. We used kitten calls recorded in isolation contexts inducing either Low arousal (i.e., isolation only) or High arousal (i.e., additional handling), leading to respective differences in escape response of the kittens. We predicted that only females respond differently to playbacks of Low versus High arousal kitten isolation calls, based on sex-differences in parental investment. **RESULTS:** Findings showed sex-specific responsiveness of adult cats listening to kitten isolation calls of different arousal conditions, with only females responding faster towards calls of the High versus the Low arousal condition. Breeding experience of females did not affect the result. Furthermore, female responsiveness correlated with acoustic parameters related to spectral characteristics of the fundamental frequency (F0): Females responded faster to kitten calls with lower F0 at call onset, lower minimum F0 and a steeper slope of the F0. **CONCLUSIONS:** Our study revealed sex-specific differences in the responsiveness to kitten isolation calls of different arousal conditions independent of female breeding experience. The findings indicated that features of F0 are important to convey the arousal state of an infant. Taken together, the results suggest that differences in parental investment evolutionary shaped responsiveness (auditory sensitivity/ motivation) to infant calls in a sex-specific manner in the domestic cat.
Detection of heart rate and rhythm with a smartphone-based electrocardiograph versus a reference standard electrocardiograph in dogs and cats.
Kraus MS, Gelzer AR, Rishniw M

**OBJECTIVE** To evaluate the diagnostic utility of ECGs acquired with a smartphone-based device, compared with reference 6-lead ECGs, for identification of heart rate and rhythm in dogs and cats.

**DESIGN** Prospective study.

**ANIMALS** 51 client-owned dogs and 27 client-owned cats.

**PROCEDURES** Patients examined by a small animal referral cardiology service between April 2012 and January 2013 were enrolled consecutively. In each patient, a 30-second ECG was simultaneously acquired with a smartphone-based device (a bipolar, single-lead recorder coupled to a smartphone with an ECG application) and a standard 6-lead ECG machine. Recordings were evaluated by 3 board-certified cardiologists, and intra- and interobserver agreement were evaluated for both rhythm diagnosis and QRS polarity identification.

**RESULTS** Values for instantaneous and mean heart rates for the smartphone-acquired and reference ECGs were within 1 beat of each other when mean heart rates were calculated. Intraobserver agreement for rhythm assessment was very high, with maximum disagreement for any observer for only 2 of 51 dogs and only 4 of 27 cats. There was minimal disagreement in the polarity of depolarization between the smartphone-acquired and reference ECGs in dogs but frequent disagreement in cats. Interobserver agreement for smartphone-acquired ECGs was similar to that for reference ECGs, with all 3 observers agreeing on the rhythm analysis and minimal disagreement on polarity.

**CONCLUSIONS AND CLINICAL RELEVANCE** Results suggested that ECGs acquired with the smartphone-based device accurately identified heart rate and rhythm in dogs and cats. Thus, the device may allow veterinarians to evaluate and manage cardiac arrhythmias relatively inexpensively at the cage side and could also allow clinicians to rapidly share information via email for further consultation, potentially enhancing patient care.

Cytologic-histologic concordance in the diagnosis of neoplasia in canine and feline lymph nodes: a retrospective study of 367 cases.
Ku CK, Kass PH, Christopher MM
*Vet Comp Oncol* (2016)

Lymph nodes are frequently sampled in dogs and cats for the diagnosis of primary and metastatic neoplasia. We determined the accuracy of cytologic diagnosis in lymph nodes using histology as the gold standard. Lymph node reports (2001-2011) were retrospectively evaluated and diagnoses were categorized as neoplastic or non-neoplastic. Lymph nodes from 296 dogs and 71 cats included 157 (42.7%) non-neoplastic lesions, 62 (16.9%) lymphomas and 148 (40.3%) metastatic neoplasms. Cytology had a sensitivity of 66.6% [95% confidence interval (CI) 60.0-72.8%], specificity of 91.5% (CI 86.3-95.2%), and accuracy of 77.2% (CI 72.6-81.3%) for neoplasia. Likelihood of malignancy with a positive cytologic diagnosis of neoplasia was 93.0%. High proportions of false-negative results were found in mesenteric T-cell lymphoma (22/35, 63%, mainly cats), metastatic sarcoma (8/14, 57%) and metastatic mast cell tumour (15/48, 31%, mainly dogs). Factors contributing to discrepancies included well-differentiated lymphocyte morphology, focal distribution of metastases and poorly defined criteria for metastatic mast cell tumours.

**Correction:** A Mutation in LTBP2 Causes Congenital Glaucoma in Domestic Cats (Felis catus).
Kuehn MH, Lipsett KA, Menotti-Raymond M et al.
[This corrects the article DOI: 10.1371/journal.pone.0154412.]
Associations between respiratory signs and abnormalities reported in thoracic CT scans of cats.
Lamb CR, Jones ID
*J Small Anim Pract* (2016)

**OBJECTIVES:** To estimate the prevalence of subclinical abnormalities reported in thoracic (CT) scans of cats and to investigate associations between respiratory signs and CT signs. **METHODS:** Retrospective review of signalment, indications, respiratory signs and reported CT findings in a series of cats. Associations between patient variables, respiratory signs and CT signs were analysed using multi-variable regression methods. **RESULTS:** Records of 352 consecutive cats were reviewed. Abnormalities affecting thoracic structures were reported in CT scans of 138/179 (77%) cats that did not have respiratory signs; the most prevalent CT findings were pulmonary collapse (41%), evidence of bronchial disease (24%) and space-occupying lesions (21%). Dyspnoea, cough and tachypnoea were associated with space-occupying lesions. Dyspnoea was also associated with pulmonary consolidation and atelectasis. Increasing body weight was associated with pulmonary atelectasis and increasing age was associated with evidence of bronchial disease. **CLINICAL SIGNIFICANCE:** Abnormalities were commonly detected in thoracic CT scans of cats that did not show respiratory signs. The most prevalent abnormality - pulmonary atelectasis - is probably a temporary effect of sedation or anaesthesia. A high prevalence of subclinical abnormalities and limited correlations between clinical signs and CT findings will complicate diagnosis.

**COMPUTED TOMOGRAPHY OF TOOTH RESORPTION IN CATS.**
Lang LG, Wilkinson TE, White TL, Farnsworth RK, Potter KA
*Vet Radiol Ultrasound* (2016) 57:467-474

Tooth resorption is the most common dental disease in cats and can be a source of oral pain. The current clinical gold standard for diagnosis includes a combination of oral exam and dental radiography, however early lesions are not always detected. Computed tomography (CT) of the skull, including the dental arches, is a commonly performed diagnostic procedure, however the appearance of tooth resorption on CT and the diagnostic ability of CT to detect tooth resorption have not been evaluated. The purpose of this prospective, descriptive, diagnostic accuracy study was to characterize the CT appearance of tooth resorption in a sample of affected cats and to evaluate the sensitivity and specificity of CT for tooth resorption compared to the clinical gold standard of oral exam and intraoral dental radiography. Twenty-eight cat cadaver specimens were recruited for inclusion. Each specimen was evaluated using oral exam, intraoral dental radiography, and computed tomography (four different slice thicknesses). Each tooth was evaluated for the presence or absence of tooth resorption. Teeth with lesions and a subset of normal teeth were evaluated with histopathology. On CT, tooth resorption appeared as irregularly marginated hypoattenuating defects in the mineral attenuating tooth components, most commonly involving the root or cementoenamel junction. Sensitivity for CT detection of tooth resorption was fair to poor (42.2-57.7%) and specificity was good to excellent (92.8-96.3%). Findings from this study indicated that CT has high specificity but low sensitivity for detection of tooth resorption in cats.

**Evaluation of systemic absorption and renal effects of topical ophthalmic flurbiprofen and diclofenac in healthy cats.**
Lanuza R, Rankin AJ, KuKanich B, Meekins JM

**OBJECTIVE:** To investigate systemic absorption and renal effects of topically applied ophthalmic...
flurbiprofen and diclofenac in healthy cats. ANIMALS STUDIED: Twelve domestic shorthair cats. PROCEDURES: Cats were randomly assigned to two treatment groups (n = 6) and administered one drop (approximately 40 µL) of either flurbiprofen 0.03% or diclofenac 0.1% in both eyes four times daily (6 am, 12 pm, 6 pm, and 12 am) for 14 days. Blood samples were collected on days 0, 4, 8, 14, 16, and 17 and analyzed by liquid chromatography and mass spectrometry for flurbiprofen and diclofenac plasma concentrations. A complete blood count (CBC), serum chemistry, and urinalysis were analyzed at the beginning of the study (Day 0) and at the end of topical drug administration (Day 15). RESULTS: Both drugs demonstrated systemic absorption. Flurbiprofen was detected (mean ± SD) at day 4 (237 ± 65 ng/mL), day 8 (396 ± 91 ng/mL), day 14 (423 ± 56 ng/mL), day 16 (350 ± 66 ng/mL), and day 17 (270 ± 62 ng/mL), and diclofenac was detected (mean ± SD) at day 4 (130 ± 44 ng/mL), day 8 (131 ± 25 ng/mL), day 14 (150 ± 36 mg/mL), and sporadically on day 16. Flurbiprofen plasma concentration decreased slowly over 48 h after the last dose. No clinically significant abnormalities were noted in the serum blood urea nitrogen, creatinine, or urine specific gravity at the end of topical drug administration compared to the beginning of the study. CONCLUSIONS: Flurbiprofen and diclofenac were systemically absorbed after topical administration four times daily to both eyes of healthy cats. Flurbiprofen reached higher plasma concentrations compared to diclofenac.

Controversies in Veterinary Nephrology: Differing Viewpoints: Role of Dietary Protein in the Management of Feline Chronic Kidney Disease.
Larsen JA
The role of diet in management of chronic kidney disease (CKD) is important. There are different interpretations of the current knowledge on this topic. Neither clinical trials involving product testing, nor prospective research investigating dietary influences on cats with induced kidney disease provide guidance on the utility of specific nutritional strategies. Likewise, data derived from other species also has limitations. More research is needed to further our understanding of this topic. However, practical guidance from current knowledge for the management of individual patients can be utilized with success.

Animal models of GM2 gangliosidosis: utility and limitations.
Lawson CA, Martin DR
GM2 gangliosidosis, a subset of lysosomal storage disorders, is caused by a deficiency of the glycohydrolase, β-N-acetylgalactosaminidase, and includes the closely related Tay-Sachs and Sandhoff diseases. The enzyme deficiency prevents the normal, stepwise degradation of ganglioside, which accumulates unchecked within the cellular lysosome, particularly in neurons. As a result, individuals with GM2 gangliosidosis experience progressive neurological diseases including motor deficits, progressive weakness and hypotonia, decreased responsiveness, vision deterioration, and seizures. Mice and cats are well-established animal models for Sandhoff disease, whereas Jacob sheep are the only known laboratory animal model of Tay-Sachs disease to exhibit clinical symptoms. Since the human diseases are relatively rare, animal models are indispensable tools for further study of pathogenesis and for development of potential treatments. Though no effective treatments for gangliosidoses currently exist, animal models have been used to test promising experimental therapies. Herein, the utility and limitations of gangliosidosis animal models and how they have contributed to the development of potential new treatments are described.
Urinary active transforming growth factor β in feline chronic kidney disease.
Lawson JS, Syme HM, Wheeler-Jones CP, Elliott J
Vet J (2016) 214:1-6
The cytokine transforming growth factor beta 1 (TGF-β1) has been widely implicated in the development and progression of renal fibrosis in chronic kidney disease (CKD) in humans and in experimental models. The aims of this study were to assess the association between urinary active TGF-β1 and (a) development of CKD in a cross-sectional study, (b) deterioration of renal function over 1 year in a longitudinal study, and (c) renal histopathological parameters in cats. A human active TGF-β1 ELISA was validated for use in feline urine. Cross-sectional analysis revealed no significant difference in urinary active TGF-β1:creatinine ratio (aTGF-β1:UCr) between groups with differing renal function. Longitudinally, non-azotaemic cats that developed CKD demonstrated a significant (P = 0.028) increase in aTGF-β1:UCr approximately 6 months before the development of azotaemia, which remained elevated (P = 0.046) at diagnosis (approximately 12 months prior, 8.4 pg/mg; approximately 6 months prior, 22.2 pg/mg; at CKD diagnosis, 24.6 pg/mg). In the histopathology study, aTGF-β1:UCr was significantly higher in cats with moderate (P = 0.02) and diffuse (P = 0.005) renal fibrosis than in cats without fibrosis. Cats with moderate renal inflammation had significantly higher urinary active aTGF-β1 concentrations than cats with mild (P = 0.035) or no inflammatory change (P = 0.004). The parameter aTGF-β1:UCr was independently associated with Log urine protein:creatinine ratio in a multivariable analysis of clinicopathological parameters and interstitial fibrosis score in a multivariable analysis of histopathological features. These results suggest that urinary aTGF-β1 reflects the severity of renal pathology. Increases in urinary aTGF-β1 followed longitudinally in individual cats may indicate the development of CKD.

Genetic testing in veterinary dermatology.
Leeb T, Müller EJ, Roosje P, Welle M
Vet Dermatol (2016)
BACKGROUND: Molecular genetics has made significant advances in the analysis of hereditary dermatoses during the last several years. OBJECTIVES: To provide an update on currently available genetic tests for skin diseases of dogs, cats and horses, and to aid the veterinary clinician in the appropriate selection and applications of genetic tests. METHODS: The scientific literature on the topic was critically reviewed. The list of known causative variants for genodermatoses and hair morphology traits was compiled by searching the Online Mendelian Inheritance in Animals (OMIA) database. RESULTS: Genetic testing has become an important diagnostic method in veterinary medicine. Genetic tests can help to establish the correct diagnosis in some diseases with relatively nonspecific signs. Genetic tests are also essential for sustainable breeding programmes and to help minimize the frequency of animals with hereditary diseases. Advances in genetic methodology and bioinformatics already allow genome-wide screening for potential disease causing mutations for research purposes. It is anticipated that this will become a routine process in clinical practice in the future. CONCLUSION AND CLINICAL IMPORTANCE: As specific DNA tests and broad genome-wide analyses come into more common use, it is critical that clinicians understand the proper application and interpretation of these test results.

Chronic Invasive Pulmonary Aspergillosis in Two Cats with Diabetes Mellitus.
Leite-Filho RV, Fredo G, Lupion CG et al.
J Comp Pathol (2016) 155:141-144
Human patients with diabetes mellitus are at increased risk of fungal infections. Diabetes mellitus has also been implicated as a predisposing factor in the establishment of fungal lung infections in cats. Two diabetic cats of different origins presented with severe acute respiratory conditions that resulted in their death. At necropsy examination there was friable, black material in the main bronchi that obstructed the bronchial lumina. Microscopical examination of the lungs revealed the presence of pneumonia, calcium oxalate crystals and a large quantity of fungal hyphae and conidial heads. Fungal infection was confirmed with Grocott’s methenamine silver stain. The results of the mycology analysis were compatible with Aspergillus section Nigri.

Hepatic encephalopathy in dogs and cats.
 Lidbury JA, Cook AK, Steiner JM
 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.

Treatment of feline lymphoma using a 12-week, maintenance-free combination chemotherapy protocol in 26 cats.
 Limmer S, Eberle N, Nerschbach V, Nolte I, Betz D
 Vet Comp Oncol (2016) 14 Suppl 1:21-31
 The aim of this prospective clinical trial was to investigate the efficacy and toxicity of a short-term, maintenance-free chemotherapy protocol in feline lymphoma. Twenty-six cats with confirmed diagnosis of high-/intermediate-grade lymphoma were treated with a 12-week protocol consisting of cyclic administration of l-asparaginase, vincristine, cyclophosphamide, doxorubicin and prednisolone. Complete (CR) and partial remission (PR) rates were 46 and 27%, respectively. Median duration of first CR was 394 days compared with a median PR duration of 41 days. No factor was identified to significantly influence the likelihood to reach CR. Overall survival amounted to 78 days (range: 9-2230 days). Median survival in CR cats was 454 days and in PR cats was 82 days. Toxicosis was mainly low grade with anorexia seen most frequently. In cats achieving CR, maintenance-free
chemotherapy may be sufficient to attain long-term remission and survival. Factors aiding in prognosticating the likelihood for CR, strategies enhancing response and targeting chemotherapy-induced anorexia need to be identified in future.

**Mucopolysaccharidosis VI in cats - clarification regarding genetic testing.**
Lyons LA, Grahn RA, Genova F, Beccaglia M, Hopwood JJ, Longeri M
The release of new DNA-based diagnostic tools has increased tremendously in companion animals. Over 70 different DNA variants are now known for the cat, including DNA variants in disease-associated genes and genes causing aesthetically interesting traits. The impact genetic tests have on animal breeding and health management is significant because of the ability to control the breeding of domestic cats, especially breed cats. If used properly, genetic testing can prevent the production of diseased animals, causing the reduction of the frequency of the causal variant in the population, and, potentially, the eventual eradication of the disease. However, testing of some identified DNA variants may be unwarranted and cause undo strife within the cat breeding community and unnecessary reduction of gene pools and availability of breeding animals. Testing for mucopolysaccharidosis Type VI (MPS VI) in cats, specifically the genetic testing of the L476P (c.1427T>C) and the D520N (c.1558G>A) variants in arylsulfatase B (ARSB), has come under scrutiny. No health problems are associated with the D520N (c.1558G>A) variant, however, breeders that obtain positive results for this variant are speculating as to possible correlation with health concerns. Birman cats already have a markedly reduced gene pool and have a high frequency of the MPS VI D520N variant. Further reduction of the gene pool by eliminating cats that are heterozygous or homozygous for only the MPS VI D520N variant could lead to more inbreeding depression effects on the breed population. Herein is debated the genetic testing of the MPS VI D520N variant in cats. Surveys from different laboratories suggest the L476P (c.1427T>C) disease-associated variant should be monitored in the cat breed populations, particularly breeds with Siamese derivations and outcrosses. However, the D520N has no evidence of association with disease in cats and testing is not recommended in the absence of L476P genotyping. Selection against the D520N is not warranted in cat populations. More rigorous guidelines may be required to support the genetic testing of DNA variants in all animal species.

**Patent ductus arteriosus in cats.**
López-Alvarez J
Vet Rec (2016) 179:15-16

**Current Treatment Options for Auricular Hematomas.**
MacPhail C
Ear disease, such as otitis externa, resulting in aggressive head shaking or ear scratching, is the most common cause of the development of aural hematomas in dogs and cats. An underlying immunologic cause has also been proposed to explain cartilage and blood vessel fragility. Numerous options exist for management of aural hematomas, from medical management alone with corticosteroids, to simple hematoma centesis, to surgical intervention. Because this condition is usually secondary to another disease process, regardless of mode of treatment, likelihood of recurrence is low if the underlying condition is managed properly.
Rickettsial Infections among Ctenocephalides felis and Host Animals during a Flea-Borne Rickettsioses Outbreak in Orange County, California.
Maina AN, Fogarty C, Krueger L et al.

Due to a resurgence of flea-borne rickettsioses in Orange County, California, we investigated the etiologies of rickettsial infections of *Ctenocephalides felis*, the predominant fleas species obtained from opossums (*Didelphis virginiana*) and domestic cats (*Felis catus*), collected from case exposure sites and other areas in Orange County. In addition, we assessed the prevalence of IgG antibodies against spotted fever group (SFGR) and typhus group (TGR) rickettsiae in opossum sera. Of the 597 flea specimens collected from opossums and cats, 37.2% tested positive for Rickettsia. PCR and sequencing of rickettsial genes obtained from *C. felis* flea DNA preparations revealed the presence of *R. typhi* (1.3%), *R. felis* (28.0%) and *R. felis*-like organisms (7.5%). Sera from opossums contained TGR-specific (40.84%), but not SFGR-specific antibodies. The detection of *R. felis* and *R. typhi* in the *C. felis* fleas in Orange County highlights the potential risk for human infection with either of these pathogens, and underscores the need for further investigations incorporating specimens from humans, animal hosts, and invertebrate vectors in endemic areas. Such studies will be essential for establishing a link in the ongoing flea-borne rickettsioses outbreaks.

**Postoperative Respiratory Function and Survival After Pneumonectomy in Dogs and Cats.**
Majeski SA, Steffey MA, Mayhew PD et al.
*Vet Surg* (2016) 45:775-781

**OBJECTIVE:** To describe indications for, and outcomes after, pneumonectomy in dogs and cats, including assessment of immediate postoperative respiratory function in comparison to dogs undergoing single lung lobectomy. **STUDY DESIGN:** Retrospective case series. **ANIMALS:** Dogs (n=16) and cats (n=7) with naturally occurring pulmonary disease. **METHODS:** Medical records (1990-2014) of dogs and cats undergoing right or left pneumonectomy were reviewed. Data retrieved included signalment, history, preoperative diagnostics, operative descriptions, postoperative data including respiratory function, and postdischarge outcomes. For respiratory function comparisons, medical records of dogs having undergone a single lung lobectomy via median sternotomy (n=15) or intercostal thoracotomy (n=15) were reviewed. **RESULTS:** Twenty-three cases (16 dogs, 7 cats) were included. Pneumonectomy was performed for congenital (1 dog, 1 cat), neoplastic (8 dogs, 1 cat), and infectious (7 dogs, 5 cats) disease. Postoperative aspiration pneumonia occurred in 2 dogs; 15 of 16 dogs (94%) and 6/7 cats (86%) survived to hospital discharge. After pneumonectomy, dogs had a significantly higher postoperative PaO2 on 21% oxygen (P=.033) and lower postoperative A-a gradient (P=.004) compared to dogs undergoing single lung lobectomy. Survival times (right-censored at last follow-up) for dogs ranged from 2 days to 7 years (estimated median=1,868 days) and for cats from 1-585 days. **CONCLUSION:** Dogs and cats have acceptable respiratory function immediately postoperatively and most have protracted long-term survival after pneumonectomy for a variety of pulmonary diseases.

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

Dogs and cats are often infected with vector-borne pathogens and play a crucial role as reservoirs and hosts in their life cycles. The aim of the present study was to investigate the occurrence of vector-borne pathogens among dogs and cats in the northwestern region of Rio Grande do Sul (RS) State, Brazil. One hundred and ten blood samples were collected from dogs (n=80) and cats (n=30). Laboratory
analysis were carried out through stained blood smears, indirect enzyme-linked immunosorbent assay (ELISA) for Babesia vogeli and Ehrlichia canis (only for dogs) and polymerase chain reaction (PCR) aiming the detection of pathogens. The following pathogens were screened by PCR among dogs and cats: Babesia spp. and Hepatozoon spp. (18S rRNA gene), Anaplasma spp. (16S rRNA gene), and Ehrlichia spp. (dsb gene for dogs and 16S rRNA gene for cats) and Bartonella spp. (nuoG gene only for cats). Using blood smears structures morphologically compatible with piroplasms were found in 5.45% (6/110) of the samples. Anti-B. vogeli and anti-E. canis antibodies were detected in 91% (73/80) and 9% (7/80) of the dogs, respectively. All the seropositive dogs to E. canis were also to B. vogeli.

Nineteen (17.3%) animals were positive to hemoparasites by PCR. After sequencing Rangelia vitalii 6/80 (7.5%), B. vogeli 3/80 (4%), Hepatozoon spp. 1/80 (1%), and Anaplasma spp. 1/80 (1%) were found in the dogs, and B. vogeli 2/30 (7%) and Bartonella spp. 6/30 (20%) were detected in the screened cats. No sample was positive for genes dsb and 16S rRNA of Ehrlichia spp. Only those animals which were positive for R. vitalii showed findings compatible with rangeliosis, such as anemia (100%), thrombocytopenia (67%), jaundice (50%), external bleeding (50%), and anorexia (50%). This is the first time that B. vogeli detected among cats in Southern Brazil.

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

**Maropitant administered orally 2-2.5 h prior to morphine and dexmedetomidine reduces the incidence of emesis in cats.**
Martin-Flores M, Mastrocco A, Lorenzutti AM et al.  
*J Feline Med Surg* (2016)
OBJECTIVES: The main goal of this study was to test the antiemetic effects of maropitant administered orally 2-2.5 h prior to morphine and dexmedetomidine in cats. METHODS: Eighty-three healthy female cats were randomized to receive maropitant (8 mg orally; n = 39) or no treatment (control; n = 44), 2-2.5 h prior to morphine 0.1 mg/kg and dexmedetomidine 20 µg/kg intramuscularly. The incidence of sialorrhea, lip licking, retching and vomiting were recorded after morphine/dexmedetomidine injection. RESULTS: There were no differences between groups in terms of age or weight. The treated group received a mean ± SD dose of maropitant of 2.9 ± 0.6 mg/kg. The incidence of sialorrhea and lip licking was no different between groups. The incidence of retching (control 36% vs maropitant 13%; P = 0.012) and emesis (control 32% vs maropitant 13%; P = 0.03) were significantly reduced in cats treated with maropitant. CONCLUSIONS AND RELEVANCE: Maropitant 8 mg (total dose) administered orally 2-2.5 h prior to morphine and dexmedetomidine significantly reduced, but did not eliminate, the incidences of retching and vomiting. Maropitant did not decrease the occurrence of sialorrhea and lip licking, signs that may be indicative of nausea. Maropitant might be useful for morning administration to prevent emesis in outpatient cats requiring sedation or anesthesia; however, dose regimes or interval of administration might require improvement.
Campylobacter Species and Neutrophilic Inflammatory Bowel Disease in Cats.  
Maunder CL, Reynolds ZF, Peacock L, Hall EJ, Day MJ, Cogan TA  
**BACKGROUND:** Inflammatory bowel disease (IBD) is a common cause of signs of gastrointestinal disease in cats. A subset of cats with IBD has neutrophilic inflammation of the intestinal mucosa.  
**HYPOTHESIS:** Neutrophilic enteritis in cats is associated with mucosal invasion by microorganisms, and specifically *Campylobacter* spp.  
**ANIMALS:** Seven cats with neutrophilic IBD and 8 cats with lymphoplasmacytic IBD.  
**METHODS:** Retrospective review of duodenal biopsy specimens that were collected endoscopically for histologic examination. Cases were identified and selected by searching the histopathology archive for cats with a diagnosis of neutrophilic and lymphoplasmacytic IBD. Fluorescence in situ hybridization (FISH) targeting either all eubacteria or individual *Campylobacter* spp. was performed on archived samples. Neutrophils were detected on the same samples using a FISH probe for neutrophil elastase.  
**RESULTS:** *Campylobacter coli* was present in (6/7) cats with neutrophilic IBD and in (1/8) cats with lymphoplasmacytic IBD (P =.009). Cats with neutrophilic IBD had significantly higher number of *C. coli* (median bacteria 0.7/hpf) in the mucosa than cats with lymphoplasmacytic IBD (median bacteria 0/hpf) (P = 0.002). Colocalization of neutrophils and *C. coli* was demonstrated, with *C. coli* closer to the neutrophils than any other bacteria (P <.001).  
**CONCLUSIONS AND CLINICAL IMPORTANCE:** Identification of *C. coli* associated with neutrophilic inflammation suggests that *C. coli* is able either to produce compounds which stimulate neutrophils or to induce feline intestinal cells to produce neutrophil chemoattractants. This association should allow a directed therapeutic approach in cats with neutrophilic IBD, potentially improving outcome and reducing any zoonotic risk.

**Posaconazole Pharmacokinetics in Healthy Cats after Oral and Intravenous Administration.**  
Mawby DI, Whittemore JC, Fowler LE, Papich MG  
**BACKGROUND:** Posaconazole is the most active available azole antifungal drug, but absorption and pharmacokinetics are not available to guide dosing regimens in cats.  
**OBJECTIVE:** To determine the pharmacokinetics of posaconazole in cats given an IV solution and PO suspension.  
**ANIMALS:** Six healthy, adult research cats.  
**METHODS:** After a 12-hour fast, each cat received 15 mg/kg of posaconazole PO suspension with food. Four cats also received 3 mg/kg IV posaconazole after a 7-day washout period. Plasma was collected at predetermined intervals for analysis using high-pressure liquid chromatography (HPLC). Concentration data were analyzed using a 2-compartment pharmacokinetic analysis for IV administration data and a 1-compartment analysis with first-order input for PO administration data using Phoenix® software.  
**RESULTS:** After IV dosing, volume of distribution (VSS) was 1.9 (0.3) L/kg (mean, standard deviation), terminal half-life (T½) was 57.7 (28.4) hours, and clearance was 28.1 (17.3) mL/kg/h. After PO dosing, peak concentration (CMAX) was 1.2 (0.5) µg/mL and T½ was 38.1 (15.0) hours. Bioavailability of PO suspension was 15.9% (8.6). No adverse effects were observed with either route of administration.  
**CONCLUSION AND CLINICAL IMPORTANCE:** Despite low PO absorption, these data allow for simulation of PO dosage regimens that could be explored in clinical studies. Two regimens can be considered to maintain targeted trough concentrations of 0.5-0.7 µg/mL as extrapolated from studies in humans: (1) 30 mg/kg PO loading dose followed by 15 mg/kg q48h, or (2) 15 mg/kg PO loading dose followed by 7.5 mg/kg q24h.

**Effect of topical latanoprost 0.005% on intraocular pressure and pupil diameter in normal and glaucomatous cats.**  
McDonald JE, Kiland JA, Kaufman PL, Bentley E, Ellinwood NM, McLellan GJ
OBJECTIVE: To determine the effects of latanoprost on intraocular pressure (IOP) and pupil diameter (PD) in cats with inherited primary congenital glaucoma (PCG) and normal cats. ANIMALS STUDIED AND PROCEDURES: IOP and PD were measured in both eyes (OU) of 12 adult cats (six normal, six PCG), three times per week for 3 weeks prior to, for 3 weeks during, and for 2 weeks following twice-daily treatment with 0.005% latanoprost to the right eye (OD) and vehicle to the left (control) eye (OS). IOP and PD were measured hourly, for 8 h, 1 day prior to, and on the first and last days of treatment. Aqueous humor flow rate (AHF) was determined at baseline and at the end of the treatment phase in six normal cats. RESULTS: Mean IOP was significantly lower in treated vs. control eyes of PCG cats, for up to 8 h following a single latanoprost treatment, and a maximal IOP reduction of 63% occurred in treated eyes at 3 h. Latanoprost acutely lowered IOP in cats with PCG, but this effect appeared to diminish over 3 weeks of treatment. AHF was modestly increased in the treated eyes of normal cats after 3 weeks of latanoprost treatment, although IOP was not significantly affected. Latanoprost caused miosis, with rebound mydriasis at 24 h posttreatment, in the treated eyes of all cats. CONCLUSIONS: Further research is needed to determine the suitability and efficacy of latanoprost treatment for long-term IOP-lowering in cats with PCG or other forms of glaucoma.

High prevalence of Felis catus gammaherpesvirus 1 infection in haemoplasma-infected cats supports co-transmission.
McLuckie A, Tasker S, Dhand NK, Spencer S, Beatty JA
Vet J (2016) 214:117-121
Felis catus gammaherpesvirus 1 (FcaGHV1), a potential feline pathogen, has been identified in domestic cats from USA, Asia-Pacific and Central Europe. Transmission of FcaGHV1 during territorial encounters, a route not typical for gammaherpesviruses, is suggested by risk factor analyses from some regions. The aim of this study was to investigate the relationship between FcaGHV1 detection and risk factors, including haemoplasma co-infections, among UK cats to better understand transmission and global distribution of FcaGHV1. FcaGHV1 DNA was detected in blood samples from UK cats (11.56%; 95% confidence interval [CI], 7.47-16.84; n = 199). Logistic regression analyses showed that entire male cats were more likely to be FcaGHV1 positive than neutered male cats (odds ratio, 3.60; 95% CI, 1.22-10.46). Samples positive for DNA from any of three haemoplasma species had 19 times greater odds for testing positive for FcaGHV1 than haemoplasma negative cats in multivariable analyses after adjusting for age, sex and neuter status. Domestic cats in the UK can be infected with FcaGHV1, confirming that this virus is globally endemic. The identification of neuter status as a risk factor for FcaGHV1 detection provides further evidence to support transmission of this virus during territorial encounters and co-transmission with haemoplasmas is suggested.

Detection of Felis catus gammaherpesvirus 1 (FcaGHV1) in peripheral blood B- and T-lymphocytes in asymptomatic, naturally-infected domestic cats.
McLuckie AJ, Barrs VR, Smith AL, Beatty JA
Virology (2016) 497:211-216
The domestic cat is natural host to both feline immunodeficiency virus and Felis catus gammaherpesvirus 1 (FcaGHV1). Comparative data suggest that these agents might act as synergistic copathogens in feline AIDS-related lymphoma. To identify leucocyte subsets harbouring gammaherpesvirus DNA, whole blood from 5 healthy, FcaGHV1-infected cats was labelled with monoclonal antibodies to feline CD21, CD4, CD8 and CD14 for 4-way fluorescence-activated cell sorting. FcaGHV1gB qPCR was performed on DNA extracted from purified fractions and whole blood longitudinally. FcaGHV1 DNA was detected in CD21+, CD4+, CD8+, but not CD14+ cells. Variation
in whole blood load, up to 19,788 copies/10(6)cells, was detected in individual cats over time. 
FcaGHV1 DNA was undetectable in one cat on one occasion highlighting that qPCR of whole blood
from a single time point will not detect all cases of FcaGHV1 infection. Further investigation of the
role of FcaGHV1 in feline lymphoid malignancies is warranted.

Patient characteristics, histopathological findings and outcome in 97 cats with extranodal
Meichner K, von Bomhard W
Vet Comp Oncol (2016) 14 Suppl 1:8-20
This study describes epidemiologic, clinical, macro- and microscopic tumour characteristics and
outcome in 97 cats with subcutaneous lymphoma, an uncommon variant of feline extranodal
lymphoma. Middle-aged (median 11 years), male (60.8%), Domestic Shorthair cats (89.7%) were
commonly affected. Most tumours presented as a painless, firm, subcutaneous nodule or mass, with
predilection to the lateral thoracic or abdominal wall, and the interscapular region. Deep subcutaneous
invasion with extension into superficial or underlying tissues, extensive central areas of necrosis and
peripheral inflammation were characteristic histopathological findings. Prevalence of retroviral
infection was low. Local relapses after therapy were common (43.5%), and 32.2% had distant
involvement later in course. Median overall survival was 148 days. Subcutaneous lymphoma should be
considered a rare but important differential diagnosis for a subcutaneous mass in cats. Tumours show
an aggressive biological behaviour. Treatment options including prognosis should be investigated in
further studies.

A pilot study exploring the effects of musical genres on the depth of general anaesthesia assessed
by haemodynamic responses.
Mira F, Costa A, Mendes E, Azevedo P, Carreira LM
OBJECTIVES: This pilot study aimed to investigate whether and how music and musical genres may
influence the depth of anaesthesia, as measured using changes in arterial blood pressure (ABP),
including systolic blood pressure (SBP), and heart rate (HR) across three different surgical time points.
METHODS: This work focused on a sample of 12 female cats (Felis catus) that were subjected to an
elective ovariohysterectomy (OVH), and three different surgical time points were considered (T1,
coeliotomy; T2, ligature placement and transection of the ovarian pedicle; and T3, ligature placement
and transection of the uterine body). All of the cats were subjected to stimulation with 2 min segments
of three music tracks from different genres (pop [PM], classical [CM] and heavy metal [HM]). At the
same time, ABP and HR measurements were obtained using a multi-parametric monitor. For statistical
analysis, P values <0.05 were considered significant. RESULTS: For all cats, music exposure induced
statistically significant changes in the parameters under study; the same finding was observed for the
genre of music. The majority of cats experienced the same variation pattern, with lower values when
exposed to CM, intermediate values when exposed to PM and higher values when exposed to HM.
CONCLUSIONS AND RELEVANCE: Our results indicate that the development of sensory processing
of acoustic stimuli is maintained by cats under general anaesthesia and reveal the influence of music on
the autonomous nervous system, as measured using HR and SBP.

Canine parvovirus: the worldwide occurrence of antigenic variants.
Miranda C, Thompson G
J Gen Virol (2016)
The most important enteric virus infecting canids is canine parvovirus type 2 (CPV-2). Canine parvovirus is the etiologic agent of a contagious disease, mainly characterized by clinical gastroenteritis signs in younger dogs. CPV-2 emerged as a new virus in the late 1970s, which could infect domestic dogs, and becoming distributed in the global dog population within 2 years. A few years later the virus original type was replaced by a new genetic and antigenic variant, called CPV-2a. Around 1984 and 2000 virus variants with the single change to Asp or Glu in the VP2 residue 426 were detected (sometimes termed CPV-2b and CPV-2c). The genetic and antigenic changes in the variants have also been correlated with changes in their host range; in particular in the ability to replicate in cats and also host range differences in canine and other tissue culture cells. CPV-2 variants have been circulating among wild carnivores and have been well-documented in several countries around the world. Here we review and summarize the current information about the worldwide distribution and evolution of CPV-2 variants since they emerged, as well as the host ranges they are associated with.

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.

Cystinuria Associated with Different SLC7A9 Gene Variants in the Cat.
Mizukami K, Raj K, Osborne C, Giger U
*PLoS One* (2016) **11**:e0159247

Cystinuria is a classical inborn error of metabolism characterized by a selective proximal renal tubular defect affecting cystine, ornithine, lysine, and arginine (COLA) reabsorption, which can lead to uroliths and urinary obstruction. In humans, dogs and mice, cystinuria is caused by variants in one of two genes, SLC3A1 and SLC7A9, which encode the rBAT and bo,+AT subunits of the bo,+ basic amino acid transporter system, respectively. In this study, exons and flanking regions of the SLC3A1 and SLC7A9 genes were sequenced from genomic DNA of cats (*Felis catus*) with COLAuria and cystine calculi. Relative to the *Felis catus*-6.2 reference genome sequence, DNA sequences from these affected cats revealed 3 unique homozygous SLC7A9 missense variants: one in exon 5 (p.Asp236Asn) from a non-purpose-bred medium-haired cat, one in exon 7 (p.Val294Glu) in a Maine Coon and a Sphinx cat, and one in exon 10 (p.Thr392Met) from a non-purpose-bred long-haired cat. A genotyping assay subsequently identified another cystinuric domestic medium-haired cat that was homozygous for the variant originally identified in the purebred cats. These missense variants result in deleterious amino acid substitutions of highly conserved residues in the bo,+AT protein. A limited population survey supported that the variants found were likely causative. The remaining 2 sequenced domestic short-
haired cats had a heterozygous variant at a splice donor site in intron 10 and a homozygous single nucleotide variant at a branchpoint in intron 11 of SLC7A9, respectively. This study identifies the first SLC7A9 variants causing feline cystinuria and reveals that, as in humans and dogs, this disease is genetically heterogeneous in cats.

**Plate failure by bending following tibial fracture stabilisation in 10 cats.**
Morris AP, Anderson AA, Barnes DM et al.
OBJECTIVE: To describe the clinical findings and management of tibial fractures in cats in which osteosynthesis failed due to plate bending. METHODS: Case records and radiographs of cat tibial fracture repairs from five referral centres were reviewed for signalment and to assess incidence of plate failure by bending. Cats that sustained plate bending following plate or plate-rod fixation were reviewed for fracture configuration, repair method, initial postoperative and postfailure tibial alignment, revision treatment and outcome. RESULTS: The incidence of plate bending in cat fractures managed with plate and plate-rod fixation in the four referral centres where the overall number could be established was 13% (8/60). In the 10 cats in which plates bent, initial fractures were generally oblique or spiral with mild comminution and located in the middle or distal third of the tibia. Mean time to implant failure was 24 days (range 2 to 56 days). Mean tibial valgus angle increased from 12.9° to 30.9° following bending of the plate. Short-term outcome following revision surgery using orthogonal plating or stacked medial plates was favourable with improvement in tibial valgus in all five fractures with follow-up data. CLINICAL SIGNIFICANCE: Plate bending following tibial fracture stabilisation in these 10 cats resulted in tibial valgus deformation. Consideration of plate and/or intramedullary rod selection and application should be given to avoid a plate strain environment that exceeds the yield point of the plate.

**Antimicrobial susceptibility monitoring of bacterial pathogens isolated from respiratory tract infections in dogs and cats across Europe: ComPath results.**
Morrissey I, Moyaert H, de Jong A et al.
ComPath is a pan-European resistance monitoring programme collecting bacterial pathogens from dogs and cats. We present data for respiratory tract infection (RTI) isolates collected between 2008 and 2010. Antimicrobial minimal inhibitory concentrations (MICs) were determined and susceptibility calculated following Clinical Laboratory Standards Institute (CLSI) standards for veterinary medicine. The main pathogen from dogs was Staphylococcus intermedius Group (49/215, 22.8%) which was >90% susceptible to most antimicrobials (including oxacillin - 93.9%; 3 isolates confirmed mecA-positive) but only 59.2%, 73.5% and 87.8% susceptible to tetracycline, chloramphenicol and penicillin. Bordetella bronchiseptica (48/215, 22.3%), streptococci (36/215, 16.7%), Escherichia coli (24/215, 11.2%) and Pasteurella multocida (23/215, 10.7%) were also found in dog RTI. There are no breakpoints for Bordetella bronchiseptica. Most streptococci were penicillin- chloramphenicol-, ampicillin- and pradofloxacin-susceptible. None were enrofloxacin-resistant but 6 isolates (16.7%) were of intermediate susceptibility. The least active agent against streptococci was tetracycline (47.2% susceptible). For E. coli, 37.5% were ampicillin-susceptible but 83.3% were amoxicillin/clavulanic acid-susceptible. Only chloramphenicol showed susceptibility>90% against E. coli, with 66.7% tetracycline-susceptible and 79.2% to 87.5% susceptibility to enrofloxacin, trimethoprim- sulfamethoxazole or pradofloxacin. P. multocida were susceptible to pradofloxacin (no other breakpoints are available). The main pathogen from cats was P. multocida (82/186, 44.1%), where only pradofloxacin has breakpoints (100% susceptible). Streptococci were also collected from cats (25/186,
13.4%) and were >90% susceptible to all antimicrobials except tetracycline (36% susceptible). Most susceptibility was calculated with human-derived breakpoints and some antimicrobials had no breakpoints. Therefore predictions of clinical utility for dog and cat RTI will remain problematical unless specific breakpoints are set.

**Molecular characterisation of parvoviruses from domestic cats reveals emergence of newer variants in India.**
Mukhopadhyay HK, Nookala M, Thangamani NR et al.
*J Feline Med Surg* (2016)

OBJECTIVES: The present study was undertaken to characterise the viral polypeptide 2 (VP2) gene of parvovirus from domestic cats in India. METHODS: The faecal samples from diarrhoeic/healthy domestic cats were collected from different geographical regions of India for screening by PCR assay followed by sequence analysis of the VP2 gene. RESULTS: Canine parvovirus (CPV)/feline panleukopenia virus (FPV) infections were found in 12 samples (11.3%) of 106 faecal samples tested. Two new CPV-2a (297Ala and Asn426) and three FPV strains were identified by VP2 gene analysis. Several unique and existing amino acid mutations were found suggesting continuous evolution and emergence of newer variants. The phylogenetic analysis of the CPV sequences revealed that the two new CPV-2a strains from Mumbai (MC8) and Puducherry (P15) were clustered together in a single clade but had evolved independently and were ancestrally related to Chinese CPV-2a isolates. The FPV sequences (T-C-6 and T-C-1) from Thrissur, Kerala, formed a different clade (FPV clade) and were closely related to each other and had an ancestral relationship with an FPV isolate from the USA. Another FPV isolate from Goa (GC1) was positioned in the same clade but had evolved independently. CONCLUSIONS AND RELEVANCE: Detection of CPV in both diarrhoeic/healthy cats and the occurrence of FPV infection in a vaccinated cat provide new insights into parvovirus infections in cats in India.

**The detection of Felis catus papillomavirus 3 DNA in a feline Bowenoid in situ carcinoma with novel histologic features and benign clinical behavior.**
Munday JS, Fairley R, Atkinson K

Bowenoid in situ carcinoma (BISC; papillomavirus-associated squamous cell carcinoma in situ) is an uncommon skin neoplasm of cats that can result in euthanasia because of the development of multiple lesions or because of progression to invasive squamous cell carcinoma. BISCs are currently thought to be caused by Felis catus papillomavirus 2 (FcaPV-2). The presently described cat developed a single 0.5 cm in diameter interscapular mass. Over the following 18 months, the mass doubled in size; no additional lesions developed. The mass was surgically excised and histologically diagnosed as a BISC. However, in contrast to previously reported BISCs, neither prominent thickening of the deep aspects of the follicular infundibula nor marked cell dysplasia were present. Furthermore, ~50% of the keratinocytes in the affected epidermis had prominent PV cytopathic changes that included shrunken angular nuclei and elongated basophilic cytoplasmic inclusions. As the histopathology was not typical for FcaPV-2 infection, polymerase chain reaction was performed and revealed only DNA sequences from Felis catus papillomavirus 3 (FcaPV-3). No further BISCs developed in this cat 6 months postremoval, hence surgical excision appeared to be curative. Results from this case suggest that, although FcaPV-2 appears to be the predominant cause of BISCs in cats, infection by FcaPV-3 can also cause these neoplasms. BISCs caused by FcaPV-3 appear to have unique histologic features that allow the causative PV type to be predicted. Results from this single case suggest that BISCs caused by FcaPV-3 may have a more benign clinical course than those caused by FcaPV-2.
Sodium in feline nutrition.
Nguyen P, Reynolds B, Zentek J, Paßlack N, Leray V
*J Anim Physiol Anim Nutr (Berl)* (2016)

High sodium levels in cat food have been controversial for a long time. Nonetheless, high sodium levels are used to enhance water intake and urine volume, with the main objective of reducing the risk of urolithiasis. This article is a review of current evidence of the putative risks and benefits of high dietary sodium levels. Its secondary aim is to report a possible safe upper limit (SUL) for sodium intake. The first part of the manuscript is dedicated to sodium physiology, with a focus on the mechanisms of sodium homeostasis. In this respect, there is only few information regarding possible interactions with other minerals. Next, the authors address how sodium intake affects sodium balance; knowledge of these effects is critical to establish recommendations for sodium feed content. The authors then review the consequences of changes in sodium intake on feline health, including urolithiasis, blood pressure changes, cardiovascular alterations and kidney disease. According to recent, long-term studies, there is no evidence of any deleterious effect of dietary sodium levels as high as 740 mg/MJ metabolizable energy, which can therefore be considered the SUL based on current knowledge.

Development and validation of a questionnaire to evaluate the Quality of Life of cats with skin disease and their owners, and its use in 185 cats with skin disease.
Noli C, Borio S, Varina A, Schievano C

BACKGROUND: Skin disease can negatively affect the Quality of Life (QoL) of cats and of their owners. OBJECTIVES: To develop and evaluate a questionnaire on QoL of cats with skin disease and their owners. METHODS: Following interviews with owners of cats with severe skin disease and elaboration of a preliminary 19 item questionnaire, a final 15 item (score 0-3) questionnaire was developed. This was administered to owners of 45 cats with allergic dermatitis and 39 healthy cats, to assess its ability to differentiate between diseased and healthy subjects. In allergic cats, owners evaluated overall disease severity (S) and pruritus with a Visual Analog Scale (VAS); veterinarians evaluated skin lesions [SCORing Feline Allergic Dermatitis (SCORFAD) and Feline Dermatitis Extent and Severity Index (FeDESI)]. The correlation with QoL was analysed by Spearman’s rank test. In 31 allergic cats, SCORFAD, FeDESI, pruritus VAS, S and QoL scores were obtained before and after therapy, and their improvement evaluated statistically. RESULTS: QoL scores in allergic cats were significantly higher than in healthy cats (P=<0.0001). Severity correlated well and significantly with both cat’s and owner’s QoL (r = 0.51 and 0.64, P = 0.0003 and <0.0001, respectively). Correlation of QoL with pruritus VAS was moderate and significant (r = 0.3, P = 0.03), whereas with SCORFAD and FeDESI it was low and not significant. With therapy all scores decreased significantly (P < 0.0001); however, QoL was not influenced by improvement of clinical scores. Questions related to the burden of therapy showed the smallest improvements. CONCLUSIONS: This QoL questionnaire could be a useful tool in evaluating cats with skin disease.


BACKGROUND: Diabetes mellitus (DM) is a common endocrine disease of cats. The prevalence of
DM in cats in England is not well-defined. HYPOTHESIS/OBJECTIVES: To estimate the prevalence and identify risk factors for DM in a large population of cats attending primary-care practices.

ANIMALS: A cohort of 193,563 cats in the VetCompass Programme attending 118 primary-care practices in England. METHODS: Cross-sectional analysis of cohort clinical data. Data were extracted covering September 1st 2009 and August 31st 2014. Period prevalence of DM was calculated. Associations between risk factors and DM were assessed using logistic regression modelling.

RESULTS: Of 1,128 DM cases were identified among 194,563 cats (period prevalence 0.58%; 95% confidence interval [CI] 0.54-0.61). Multivariable modelling indicated that Tonkinese (OR 4.1; 95% CI 1.8-9.6; P =.001), Norwegian Forest (odds ratio [OR] 3.5; 95% CI 1.3-9.6; P =.001) and Burmese (OR 3.0; 95% CI 2.0-4.4; P <.001) cats had increased odds of DM compared with crossbred cats. DM odds increased as bodyweight categories increased above 4 kg (P <.001), as cats aged beyond 6 years old (P <.001) and in insured cats (OR 2.0; 95% CI 1.6-2.4; P <.001) but sex was not significantly associated with DM. CONCLUSIONS AND CLINICAL IMPORTANCE: Diabetes mellitus is an important component of the primary-care practice caseload with 1-in-200 cats affected. An increased risk of DM in certain cat breeds supports a genetic predisposition. These results can guide future research and preventative healthcare.

Urine protein, urine protein to creatinine ratio and N-acetyl-β-D-glucosaminidase index in cats with idiopathic cystitis vs healthy control cats.

Panboon I, Asawakarn S, Pusoonthornthum R

*J Feline Med Surg* (2016)

OBJECTIVES: The objective was to compare urine protein, urine protein to creatinine ratio (UPC) and N-acetyl-β-D-glucosaminidase (NAG) index between cats with idiopathic cystitis and clinically normal cats. METHODS: Urine and blood samples were collected from 19 clinically normal cats and 19 cats with idiopathic cystitis without azotaemia at the time of first presentation. Urine protein, urine creatinine and UPC were measured. Additionally, the urinary NAG concentration was measured using the colorimetric method, and the NAG index was calculated by dividing the urinary NAG concentration by the urine creatinine ratio. RESULTS: Urine protein concentration (mean ± SEM) was four times higher in cats with idiopathic cystitis (218.29 ± 58.95) than in clinically normal cats (56.13 ± 9.95) (P <0.05). The UPC (mean ± SEM) of cats with idiopathic cystitis (0.70 ± 0.19) was also five times higher than that of clinically normal cats (0.14 ± 0.02) (P<0.05). The mean ± SEM NAG index in cats with idiopathic cystitis (4.79 ± 1.53 U/g) was two times higher than that in clinically normal cats (2.14 ± 0.48 U/g). The log UPC was positively correlated with the log NAG index in cats with idiopathic cystitis at moderate levels (r(2) = 0.512; P <0.05). CONCLUSIONS AND RELEVANCE: Cats with idiopathic cystitis had increased amounts of urine protein and an increased UPC. Further study is needed to address the role of urinary NAG and its relationship with glycosaminoglycan levels in cats with idiopathic cystitis.

Seropositivity of *Borrelia burgdorferi* in a cohort of symptomatic cats from Europe based on a C6-peptide assay with discussion of implications in disease aetiology.

Pantchev N, Vrhovec MG, Pluta S, Straubinger RK

*Berl Munch Tierarztl Wochenschr* (2016) 129:333-339

There are only few reports on Lyme borreliosis (LB) in cats. The reasons might be a different tick infestation in cats compared to dogs, a low susceptibility for tick-borne infections or a low awareness of veterinarians for tick-borne diseases in feline patients. The aim of this study was to determine the proportion of antibodies against *Borrelia burgdorferi* sensu lato (Bbssl) in feline sera, to compare the significance of feline versus canine LB, as well as to evaluate possible implications on disease
occurrence. Specific antibodies against the C6-peptide of Bbsl in cats were detected by a rapid test based on enzyme immunoassay technique. The serum samples were sent to a diagnostic laboratory by veterinarians from Germany and other European countries with request for Borrelia serology in the years 2009-2011. Veterinarians were asked for information regarding the cats’ location, age, gender, clinical signs, treatment and follow-up. In six of 271 (2.2%; 95% CI: 0.8-4.8%) cat sera, antibodies against the C6-peptide of Bbsl were detected. Proportion of Borrelia antibody-positive cat sera was significantly lower than the one determined for dogs during the same time period. All positive cats lived in countries endemic for LB (Germany, Sweden and Belgium), and all C6-antibody positive cats with the exception of one cat showed clinical signs. Possible implications on disease occurrence are discussed. Data presented here demonstrate a lower prevalence of Borrelia specific C6-antibodies in European cats when compared to dogs residing in the same regions. The absence of antibodies against Bbsl in 97.8% (95% CI: 95.2-99.2%) of the submitted samples indicate that diagnosis “feline LB” is rare in cats. Nevertheless, LB should be considered in cats with compatible clinical signs (e.g. shifting leg lameness, to less extent neurological signs) when other differential diagnoses are ruled out.


Peck CM, Nielsen LK, Quinn RL, Laste NJ, Price LL

*J Vet Emerg Crit Care (San Antonio)* (2016)

**OBJECTIVE:** To determine whether the presence of spontaneous echocardiographic contrast (SEC) in cats with cardiomyopathy is associated with increased mortality. To establish whether specific types of cardiomyopathy are more often associated with SEC in an attempt to provide a risk-stratification scheme for cats with increased risk of thromboembolic events. **DESIGN:** Retrospective study 2006-2011. **SETTING:** Tertiary referral and teaching hospital. **ANIMALS:** Seven hundred twenty-five client-owned cats undergoing echocardiographic evaluation. **MEASUREMENTS AND MAIN RESULTS:** Patient characteristics, including age, breed, clinical signs, type of cardiovascular disease, presence of SEC, and survival time were recorded. Thyroxine, HCT, and blood pressure were recorded when available. Among cats diagnosed with cardiac abnormalities based on echocardiographic findings, those with SEC were at significantly increased risk of death as compared to those without SEC. Cats with dilated cardiomyopathy, unclassified cardiomyopathy, and hypertrophic cardiomyopathy were significantly more likely to have SEC compared to cats with other types of cardiac disease. **CONCLUSIONS:** Cats with cardiomyopathy and SEC have an increased risk of death compared to cats without SEC, although other previously identified factors such as the presence of congestive heart failure and increased left atrium to aorta ratio remain important determinants of mortality. Cats with hypertrophic cardiomyopathy, unclassified cardiomyopathy, and dilated cardiomyopathy may benefit from anticoagulant therapy due to the increased risk of SEC in these subpopulations.

**Use of a nictitating membrane flap for treatment of feline acute corneal hydrops-21 eyes.**

Pederson SL, Pizzirani S, Andrew SE, Pate DO, Stine JM, Michau TM


**OBJECTIVE:** To evaluate the effectiveness of the use of a nictitating membrane flap (NMF) as therapy in 19 cats (21 eyes) affected with feline acute corneal hydrops (FACH). **METHODS:** Medical records from 19 cats diagnosed with FACH and treated with a NMF were retrospectively evaluated. Information was collected from multiple veterinary hospitals and included signalment, medical history, therapy, and ocular outcome. **RESULTS:** Breeds included 13 Domestic Shorthairs, 2 Exotic Shorthairs,
2 Maine Coons, 1 Persian, and 1 Domestic Medium Hair. Two cats were bilaterally affected. Median age of cats was 3.2 years (range 0.26-15 years). Eleven patients were spayed females, 6 were neutered males, and 2 were intact males. Topical steroids were previously administered in 5 (23.8%) eyes; oral steroids were previously administered in 7 cats (36.8% of patients); three patients received both oral and topical steroids. Thirteen of 21 (61.9%) eyes had a history of ocular disease including ulcerative and nonulcerative keratitis, anterior uveitis, corneal sequestrum, conjunctivitis, and glaucoma. Median duration of NMF was 15 days (range 6-30 days). Follow-up ranged from 12 to 1601 days (median 169 days). Corneal perforation occurred in 1 (4.7%) eye and was successfully repaired. One lesion (4.7%) in a diabetic patient did not resolve. Nineteen of the treated eyes (90.5%) resolved without complications. CONCLUSIONS: A nictitating membrane flap successfully treated 90.5% of FACH eyes (89.5% of patients).

EVALUATION OF QUANTITATIVE THYROID SCINTIGRAPHY FOR DIAGNOSIS AND STAGING OF DISEASE SEVERITY IN CATS WITH HYPERTHYROIDISM: COMPARISON OF THE PERCENT THYROIDAL UPTAKE OF PERTECHNETATE TO THYROID-TO-SALIVARY RATIO AND THYROID-TO-BACKGROUND RATIOS.

Peterson ME, Guterl JN, Rishniw M, Broome MR


Thyroid scintigraphy is commonly used for evaluation of cats with hyperthyroidism, with the thyroid-to-salivary ratio (T/S) being the most common method to quantify the degree of thyroid activity and disease. Calculation of thyroid-to-background ratios (T/B) or percent thyroidal uptake of (99m) TcO4 (TcTU) has only been reported in a few studies. The purpose of this prospective, cross-sectional study was to evaluate a number of quantitative scintigraphic indices as diagnostic tests for hyperthyroidism, including the T/S, three different T/B, TcTU, and estimated thyroid volume. Of 524 cats referred to our clinic for evaluation of suspected hyperthyroidism, the diagnosis was confirmed (n = 504) or excluded (n = 20) based on results of a serum thyroid panel consisting of thyroxine (T4), triiodothyronine (T3), free T4 (fT4), and thyroid-stimulating hormone (TSH) concentrations. In the hyperthyroid cats, median values for TcTU, T/S, and three T/B ratios were all significantly higher (P < 0.001) than values in euthyroid suspect cats or clinically normal cats. All scintigraphic parameters were relatively sensitive and specific as diagnostic tests for hyperthyroidism, but the T/S ratio had the highest test accuracy. The T/S ratio correlated strongly with the TcTU (r = 0.85). However, the TcTU had a higher and more significant correlation (P < 0.01) with serum T4 (r = 0.76 vs. 0.64), T3 (r = 0.77 vs. 0.64), and estimated thyroid volume (r = 0.63 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.

*One Health in Practice: A Pilot Project for Integrated Care of Zoonotic Infections in Immune-Medicated Children and Their Pets in Chile.*

Peña A, Abarca K, Weitzel T et al.

*Zoonoses Public Health* (2016) 63:403-409

Although pets provide physiological and psychological benefits to their owners, they are a potential source of zoonotic infections, especially for vulnerable individuals such as immunocompromised patients. During 1 year, we therefore performed a pilot project, which included 32 immunocompromised Chilean children and their family pets (35 dogs and 9 cats) with the aim of detecting, treating and preventing zoonotic infections. Children were examined by Infectious Diseases paediatricians and demographical and clinical information related to zoonotic infections were recorded. Pets were examined and sampled by veterinarians, who also administered missing routine vaccines and
anti-parasitics. During family visits, all members were informed and educated about zoonoses and a satisfaction survey was performed. Visits also included vector control and indoor residual spraying with pyrethroids. Children were re-examined and re-tested according to the findings of their pets, and all detected zoonotic infections were treated both in children and pets. Physical examination revealed abnormalities in 18 dogs (51.4%) and three cats (33.3%). Twenty-eight (63.6%) of the pets were diagnosed with a zoonotic pathogen, and seven (15.9%) with a facultative pathogen. Most zoonotic agents were isolated from the pet’s external ear and intestine. Bacteria with the highest pathogenic potential were Campylobacter jejuni and Brucella canis. In two children and their respective pets, the same zoonotic diseases were diagnosed (toxocariasis and giardiasis). Arthropods serving as potential vectors of zoonotic infections were found in 49% of dogs and 44% of cats. The pilot project was positively evaluated by the participating families. Our pilot project confirmed that pets are reservoir for various zoonotic agents in Chile and that the implementation of an integrated multidisciplinary programme was a valuable tool to prevent, diagnose and treat such zoonotic infections in vulnerable patients such as immunocompromised children.

**Analgesic efficacy of oral firocoxib in ovariohysterectomized cats.**
Phuwapattanachart P, Thengchaisri N
The post-operative analgesic effects of firocoxib in ovariohysterectomized cats were observed. Twenty-four cats were divided into 3 groups: control (no medicine), firocoxib-1 (1 mg/kg/day) and firocoxib-3 (3 mg/kg/day). Colorado pain scale scores (CPSS), composite pain scores (CPS), and buccal mucosal bleeding times (BMBT) were recorded in blinded fashion before induction and 2, 5, 8, 24, 30, and 48 hours post-operation. The average post-operative CPSS (mean±SEM) from 2 to 48 hours post-operation in firocoxib-3 (0.4±0.1) was significantly lower than those of the control (0.7±0.2; P-value = 0.004), but that of firocoxib-1 (0.5±0.2) was not different from control (P-value=0.40). The average CPS of the firocoxib-3 were significantly lower than those of the control at 24 hours post-operation (P-value = 0.04), nonetheless, there was no significant difference in average composite pain scores between firocoxib-1 and control at all intervals. The average BMBT and body temperature were in normal limit in all groups. However, a reversible azotemia was identified in 2 cats from the firocoxib-3 at 72 hours post-operation. One cat from the firocoxib-3 vomited once at 48 hours post-operation. In conclusions, firocoxib-3 is helpful for post-operative pain control in cats; however, gastrointestinal irritation and renal function side effects may occur.

**An association between systemic cyclosporine administration and development of acute bullous keratopathy in cats.**
Pierce KE, Wilkie DA, Gemensky-Metzler AJ et al.
*Vet Ophthalmol* (2016) **19 Suppl 1**:77-85
OBJECTIVE: To determine whether any association exists between the onset of feline acute bullous keratopathy (ABK) and administration of systemic corticosteroid or immunosuppressive therapy.
ANIMALS STUDIED: Medical records of cats diagnosed with ABK between the years of 2000 and 2008 were retrospectively reviewed. Breed, age at diagnosis, weight, systemic disease status, eye affected, ophthalmic examination findings, systemic and topical therapy instituted, dosage and duration of therapy, visual outcome and histopathological analyses were recorded in cases meeting the inclusion criteria. RESULTS: A total of 12 cats of a surveyed population of 70 167 met the inclusion criteria with 17/24 eyes affected by ABK. Medical and/or surgical therapy was utilized for management of ABK with 13/17 eyes remaining sighted at the time of last follow-up. In a subset of cases corneal cytology, aerobic bacterial culture, FHV-1 PCR, virus isolation and/or histopathology were performed;
no infectious organisms were identified. A rupture in Descemet’s membrane of the cornea was identified histologically in two globes. A total of 10 of 12 cats had been previously diagnosed with ongoing systemic disease. A total of 10 of 12 cats were receiving systemic therapy, and a significant association (P < 0.001) was noted between systemic administration of corticosteroids and/or cyclosporine A and the development of ABK. A total of 8 of 10 cats were administered oral prednisolone at doses between 1-2 mg/kg every 12-24 h. A total of 5 of 8 cats receiving oral prednisolone were concurrently administered oral cyclosporine at doses of 1.5-7 mg/kg every 12-24 h. Systemic cyclosporine therapy was found to be a significant risk factor (P < 0.001) for ABK development, while systemic prednisolone was not significant (P = 0.10). CONCLUSIONS: Systemic cyclosporine administration appears to be a risk factor for development of ABK in the population of cats studied.

Controversies in Veterinary Nephrology: Renal Diets Are Indicated for Cats with International Renal Interest Society Chronic Kidney Disease Stages 2 to 4: The Pro View.
Polzin DJ, Churchill JA
Renal diets have been the mainstay of therapy for cats with chronic kidney disease (CKD) for many decades. Clinical trials in cats with CKD have shown them to be effective in improving survival, reducing uremic crises, and improving serum urea nitrogen and phosphorous concentrations. It has shown that, when food intake is adequate, renal diets can maintain body weight and body condition scores for up to 2 years. Although some have questioned whether renal diets provide adequate protein and have advocated feeding higher-protein diets to cats with CKD, there is currently no convincing evidence in support of this proposal.

Prevalence of gastrointestinal helminth parasites of zoonotic significance in dogs and cats in lower Northern Thailand.
Pumidonming W, Salman D, Gronsang D et al.
Gastrointestinal zoonotic helminths of dogs and cats have a public health concern worldwide. We investigated the prevalence of gastrointestinal helminths of zoonotic significance in dogs and cats in lower Northern Thailand and utilized molecular tools for species identification of hookworms and Opisthorchis viverrini. Fecal samples of 197 dogs and 180 cats were collected. Overall prevalence of infection using microscopy was 40.1% in dogs and 33.9% in cats. Helminth infection found in both dogs and cats included hookworms, *Spirometra* spp., *Taenia* spp., *Toxocara* spp., *O. viverrini*, *Strongyloides* spp. and *Trichuris* spp. Hookworms were the most common helminth in dogs, while *Spirometra* spp. was the most prevalent in cats. Among hookworm infection in dogs and cats, *Ancylostoma ceylanicum* was the most prevalent hookworm, being 82.1% in hookworm infected dogs and 95.8% in hookworm infected cats. Mixed-infection due to hookworms and *Spirometra* spp. was the most dominant in both dogs and cats. Our finding showed that zoonotic helminth infection is highly prevalent in dogs and cats in the lower Northern area of Thailand.

Cardiovascular effects of dexmedetomidine, with or without MK-467, following intravenous administration in cats.
Pypendop BH, Honkavaara J, Ilkiw JE
*Vet Anaesth Analg* (2016)
OBJECTIVE: To characterize the cardiovascular effects of dexmedetomidine, with or without MK-
467, following intravenous (IV) administration in cats. STUDY DESIGN: Prospective Latin square experimental study. ANIMALS: Six healthy adult purpose-bred cats. METHODS: Cats were anesthetized with desflurane in oxygen for instrumentation with a carotid artery catheter and a thermodilution catheter in the pulmonary artery. One hour after discontinuation of desflurane, cats were administered dexmedetomidine (25 µg kg(-1)), MK-467 (600 µg kg(-1)), or dexmedetomidine (25 µg kg(-1)) and MK-467 (600 µg kg(-1)). All treatments were administered IV as a bolus. Cardiovascular variables were measured prior to drug administration and for 8 hours thereafter. Only data from the dexmedetomidine and dexmedetomidine-MK-467 treatments were analyzed. RESULTS: Dexmedetomidine produced significant decreases in heart rate, cardiac index and right ventricular stroke work index, and significant increases in arterial blood pressure, central venous pressure, pulmonary artery pressure and systemic vascular resistance index. Dexmedetomidine combined with MK-467 resulted in significant but transient decrease in blood pressure and right ventricular stroke work index. CONCLUSION AND CLINICAL RELEVANCE: Following IV co-administration, MK-467 effectively attenuated dexmedetomidine-induced cardiovascular effects in cats. The drug combination resulted in transient reduction in arterial blood pressure, without causing hypotension.

Renal pelvic and ureteral ultrasonographic characteristics of cats with chronic kidney disease in comparison with normal cats, and cats with pyelonephritis or ureteral obstruction.
Quimby JM, Dowers K, Herndon AK, Randall EK
*J Feline Med Surg* (2016)
OBJECTIVES: The objective was to describe ultrasonographic characteristics of cats with stable chronic kidney disease (CKD) and determine if these were significantly different from cats with pyelonephritis (Pyelo) and ureteral obstruction (UO), to aid in clinical assessment during uremic crisis. METHODS: Sixty-six cats with stable CKD were prospectively enrolled, as well as normal control cats (n = 10), cats with a clinical diagnosis of pyelonephritis (n = 13) and cats with UO confirmed by surgical resolution (n = 11). Renal ultrasound was performed and routine still images and cine loops were obtained. Analysis included degree of pelvic dilation and presence, and degree of ureteral dilation. Measurements were compared between groups using non-parametric one-way ANOVA with Dunn’s post-hoc analysis. RESULTS: In total, 66.6% of CKD cats had measureable renal pelvic dilation compared with 30.0% of normal cats, 84.6% of Pyelo cats and 100% of UO cats. There was no statistically significant difference in renal pelvic widths between CKD cats and normal cats, or CKD cats and Pyelo cats. On almost all measurement categories, UO cats had significantly greater renal pelvic widths compared with CKD cats and normal cats (P <0.05) but not Pyelo cats. Six percent of stable CKD cats had measureable proximal ureteral dilation on one or both sides vs 46.2% of Pyelo cats and 81.8% of UO cats. There was no statistically significant difference in proximal ureteral width between normal and CKD cats, or between Pyelo and UO cats. There was a statistically significant difference in proximal ureteral width between CKD and Pyelo cats, CKD and UO cats, normal and UO cats, and normal and Pyelo cats. CONCLUSIONS AND RELEVANCE: No significant difference in renal pelvic widths between CKD cats and Pyelo cats was seen. These data suggest CKD cats should have a baseline ultrasonography performed so that abnormalities documented during a uremic crisis can be better interpreted.

Assessment of the ability of Aedes species mosquitoes to transmit feline Mycoplasma haemofelis and ‘Candidatus Mycoplasma haemominutum’.
Reagan KL, Clarke LL, Hawley JR, Lin P, Lappin MR
*J Feline Med Surg* (2016)
OBJECTIVES: The objective of this study was to evaluate wild-caught mosquitoes for evidence of
hemotropic Mycoplasma species DNA and to determine whether the feline hemoplasmas, Mycoplasma haemofelis (Mhf) and ‘Candidatus Mycoplasma haemominutum’ (Mhm), can be transmitted by Aedes aegypti mosquitoes in a laboratory setting. METHODS: Wild-caught mosquito pools (50 mosquitoes per pool, 84 pools) utilized in routine public health department disease surveillance programs were tested for hemotropic Mycoplasma species DNA using PCR with primers designed to amplify all known hemoplasmas. Additionally, mosquitoes were trapped in the vicinity of known feral cat colonies, pooled (50 mosquitoes per pool) and tested (84 pools). Purpose-bred cats housed in a research facility were infected with Mhf or Mhm and then colonized laboratory A aegypti were fed upon the bacteremic cats. After a 7 day incubation period, mosquitoes previously fed on infected cats were then allowed to feed again on naive cats, which were monitored for bacteremia for 10 weeks. RESULTS: Mycoplasma wenyonii DNA was confirmed in one wild-caught mosquito pool by DNA sequencing. While 7% of cats tested in feral colonies were hemoplasma positive, none of the mosquitoes trapped near colonies were positive. Hemoplasma DNA was amplified from A aegypti by PCR immediately after the infectious blood meal, but DNA was not detected at 7 and 14 days after feeding. Although evidence for uptake of organisms existed, hemoplasma DNA was not amplified from the experimentally infested cats in the 10 week observation period. CONCLUSIONS AND RELEVANCE: While wild-caught mosquitoes contained hemoplasma DNA and laboratory reared A aegypti mosquitoes take up hemoplasmas during the blood meal, there was no evidence of biologic transmission in this model.

Hyperlactatemia and serial lactate measurements in sick cats.
Redavid LA, Sharp CR, Mitchell MA, Beckel NF

OBJECTIVES: To document the incidence of hyperlactatemia in sick cats hospitalized for emergency care and to evaluate the prognostic utility of serial lactate measurements in cats with hyperlactatemia. DESIGN: Prospective observational study over a 10-month period (July 2010-May 2011). SETTING: Private veterinary referral center with 24-hour hospital care. ANIMALS: One hundred and twenty-three privately owned cats admitted to a private referral center. INTERVENTIONS: Blood was collected by direct venipuncture from the jugular or medial saphenous vein at the time of hospital admission and at 6 and 24 hours following admission. MEASUREMENTS AND MAIN RESULTS: The median plasma lactate concentration for all cats at admission (T0) was 1.89 mmol/L (17.0 mg/dL) (range: 0.3-12.48). Twenty-three percent (28/123) of cats admitted were hyperlactatemic (ie, >2.87 mmol/L; >25.86 mg/dL) upon admission. Lactate concentration at presentation and serial lactate measurements were not found to be related with survival to discharge or correlated with duration of hospitalization. The overall survival rate of all cats in this study was 81%. CONCLUSIONS: This study demonstrated that the incidence of hyperlactatemia in sick cats being admitted for hospitalization in a private referral center was 23%, and that lactate concentration on admission and serial lactate measurements over time were not prognostic in this group of hospitalized cats. Future studies are needed to evaluate the prognostic utility of lactate and serial lactate measurements in specific disease states and in a larger population of critically ill cats.

Symmetric Dimethylarginine: Improving the Diagnosis and Staging of Chronic Kidney Disease in Small Animals.
Relford R, Robertson J, Clements C

Chronic kidney disease (CKD) is a common condition in cats and dogs, traditionally diagnosed after substantial loss of kidney function when serum creatinine concentrations increase. Symmetric
dimethylarginine (SDMA) is a sensitive circulating kidney biomarker whose concentrations increase earlier than creatinine as glomerular filtration rate decreases. Unlike creatinine, SDMA is unaffected by lean body mass. The IDEXX SDMA test introduces a clinically relevant and reliable tool for the diagnosis and management of kidney disease. SDMA has been provisionally incorporated into the International Renal Interest Society guidelines for CKD to aid staging and targeted treatment of early and advanced disease.

**Effect of tibial tuberosity advancement on cranial tibial subluxation in the feline cranial cruciate deficient stifle joint: An ex vivo experimental study.**
Retournard M, Bilmont A, Asimus E, Palierne S, Autefage A

The effects of Tibial Tuberosity Advancement (TTA) on Cranial Tibial Subluxation (CTS) and Tibial Rotation Angle (TRA) were evaluated in a model of feline Cranial Cruciate Ligament (CrCL)-deficient stifle joint. Ten hindlimbs of adult cats were used. Quadriceps and gastrocnemius muscles were simulated using cables, turnbuckles and a spring. An axial load of 30% body weight was applied. The stifle and talocrural joint angles were adjusted to 120°. Patellar tendon angle (PTA), CTS and TRA were measured radiographically before and after CrCL section, after TTA and after additional advancement by 1 and 2mm. CrCL section resulted in a CTS of 8.1±1.5mm and a TRA of 18.4±5.7°. After TTA, PTA was significantly decreased from 99.1±1.7° to 89.1±0.7°; CTS and TRA did not change significantly (7.8±1.0mm and 15.9±5.7° respectively). Additional advancement of the tibial tuberosity by 1mm did not significantly affect CTS and TRA. Additional advancement of the tibial tuberosity by 2mm significantly reduced the PTA to 82.9±0.9°. A significant decrease of CTS (6.9±1.3mm) and TRA (14.7±3.6°) was also observed. A lack of stabilization of the CrCL deficient stifle was observed after TTA in this model of the feline stifle. Even though the validity of the model can be questioned, simple transposition of the technique of TTA from the cat to the dog appeared hazardous.

**Factors influencing common diagnoses made during first-opinion small-animal consultations in the United Kingdom.**
Robinson NJ, Dean RS, Cobb M, Brennan ML

It is currently unclear how frequently a diagnosis is made during small-animal consultations or how much of a role making a diagnosis plays in veterinary decision-making. Understanding more about the diagnostic process will help direct future research towards areas relevant to practicing veterinary surgeons. The aim of this study was to determine the frequency with which a diagnosis was made, classify the types of diagnosis made (and the factors influencing these) and determine which specific diagnoses were made for health problems discussed during small-animal consultations. Data were gathered during real-time direct observation of small-animal consultations in eight practices in the United Kingdom. Data collected included characteristics of the consultation (e.g. consultation type), patient (e.g. breed), and each problem discussed (e.g. new or pre-existing problem). Each problem discussed was classified into one of the following diagnosis types: definitive; working; presumed; open; previous. A three-level multivariable logistic-regression model was developed, with problem (Level 1) nested within patient (Level 2) nested within consulting veterinary surgeon (Level 3). Problems without a previous diagnosis, in cats and dogs only, were included in the model, which had a binary outcome variable of definitive diagnosis versus no definitive diagnosis. Data were recorded for 1901 animals presented, and data on diagnosis were gathered for 3192 health problems. Previous diagnoses were the most common diagnosis type (n=1116/3192; 35.0%), followed by open
The variables remaining in the final model were patient age, problem history, consultation type, who raised the problem, and body system affected. New problems, problems in younger animals, and problems raised by the veterinary surgeon were more likely to result in a definitive diagnosis than pre-existing problems, problems in older animals, and problems raised by the owner. The most common diagnoses made were overweight/obese and periodontal disease (both n=210; 6.6%). Definitive diagnoses are rarely made during small-animal consultations, with much of the veterinary caseload involving management of ongoing problems or making decisions around new problems prior to a diagnosis being made. This needs to be taken into account when considering future research priorities, and it may be necessary to conduct research focused on the approach to common clinical presentations, rather than purely on the common diagnoses made. Examining how making a diagnosis affects the actions taken during the consultation may shed further light on the role of diagnosis in the clinical decision-making process.

Cutaneous Lymphoma at Injection Sites: Pathological, Immunophenotypical, and Molecular Characterization in 17 Cats.
Vet Pathol (2016) 53:823-832
Feline primary cutaneous lymphomas (FPCLs) account for 0.2% to 3% of all lymphomas in cats and are more frequently dermal nonepitheliotropic 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.

Rebound hyperglycaemia in diabetic cats.
Roomp K, Rand J
OBJECTIVES: Rebound hyperglycaemia (also termed Somogyi effect) is defined as hyperglycaemia caused by the release of counter-regulatory hormones in response to insulin-induced hypoglycaemia, and is widely believed to be common in diabetic cats. However, studies in human diabetic patients over the past quarter century have rejected the common occurrence of this phenomenon. Therefore, we evaluated the occurrence and prevalence of rebound hyperglycaemia in diabetic cats. METHODS: In a retrospective study, 10,767 blood glucose curves of 55 cats treated with glargine using an intensive blood glucose regulation protocol with a median of five blood glucose measurements per day were
evaluated for evidence of rebound hyperglycaemic events, defined in two different ways (with and without an insulin resistance component). RESULTS: While biochemical hypoglycaemia occurred frequently, blood glucose curves consistent with rebound hyperglycaemia with insulin resistance was confined to four single events in four different cats. In 14/55 cats (25%), a median of 1.5% (range 0.32-7.7%) of blood glucose curves were consistent with rebound hyperglycaemia without an insulin resistance component; this represented 0.42% of blood glucose curves in both affected and unaffected cats. CONCLUSIONS AND RELEVANCE: We conclude that despite the frequent occurrence of biochemical hypoglycaemia, rebound hyperglycaemia is rare in cats treated with glargine on a protocol aimed at tight glycaemic control. For glargine-treated cats, insulin dose should not be reduced when there is hyperglycaemia in the absence of biochemical or clinical evidence of hypoglycaemia.

**Utilization of Feeding Tubes in the Management of Feline Chronic Kidney Disease.**

Ross S  
Esophagostomy feeding tubes are useful, and in many cases essential, for the comprehensive management of cats with moderate to advanced chronic kidney disease (CKD). They should be considered a lifelong therapeutic appliance to facilitate the global management of cats with CKD thus providing improved therapeutic efficacy and quality-of-life. Esophagostomy tubes facilitate the maintenance of adequate hydration and increase owner compliance by facilitating the administration of medications. Finally, feeding tubes provide a means to deliver a stage-appropriate dietary prescription for cats with CKD and maintain an adequate nutritional plane in a patient that otherwise would be subject to chronic wasting.

**Comparison of 3 Handling Techniques for Endoscopically Obtained Gastric and Duodenal Biopsy Specimens: A Prospective Study in Dogs and Cats.**

Ruiz GC, Reyes-Gomez E, Hall EJ, Freiche V  
BACKGROUND: Limited evidence exists in the literature regarding whether a specific mount is preferable to use for processing endoscopically obtained gastrointestinal biopsy specimens. HYPOTHESIS/OBJECTIVES: To compare 3 methods of handling endoscopically obtained gastrointestinal biopsy specimens from collection to laboratory processing and to determine if any technique produced superior results. ANIMALS: Twenty-three dogs and cats presented for gastrointestinal signs. METHODS: Prospective study of dogs and cats presented with gastrointestinal signs to a veterinary teaching referral hospital which underwent upper gastrointestinal endoscopy. Biopsy specimens were taken from the stomach and duodenum and submitted to the laboratory using 3 techniques: mounted on a cucumber slice, mounted on a moisturized synthetic foam sponge, and floating free in formalin. The techniques were compared with regard to the specimens’ width, orientation, presence of artifacts, and pathologist’s confidence in diagnosis. RESULTS: Twenty-three patients were included, with a total of 528 biopsies collected. Specimens on cucumber slice and on sponge were significantly wider (P < .001 and P = .001, respectively) compared to those floating free in formalin (mean width of 3.81 versus 3.31 and 2.52 mm, respectively). However, specimens on synthetic sponge had significantly fewer artifacts compared to those on cucumber slice (P = .05) and those floating free in formalin (P = .02). Confidence in the diagnosis also was superior with the sponge technique over floating free specimens (P = .002). CONCLUSIONS AND CLINICAL IMPORTANCE: The use of mounted gastrointestinal biopsy specimens was superior over the use of specimens floating free in formalin. This technique improved the quality of the specimens and the pathologist’s confidence in their histopathologic interpretation.
Schaefer S, Kooistra HS, Riond B et al.  
OBJECTIVES: The aim of the study was to evaluate circulating insulin-like growth factor-1 (IGF-1), feline pancreas-specific lipase (fPLI) and total thyroxine (TT4) concentrations and urinary corticoid-to-creatinine ratio (UCCR) as indicators for the prevalence of acromegaly, pancreatitis, hyperthyroidism and hypercortisolism in cats with diabetes mellitus. METHODS: Blood and urine samples were collected from diabetic cats treated in primary care clinics in Switzerland and the Netherlands. Standardised questionnaires and physical examination forms provided clinical information from owners and veterinarians. Laboratory testing included serum biochemistry profile analysis and measurement of circulating fructosamine, IGF-1, fPLI, and TT4 concentrations and UCCR. CT of the pituitary gland was performed using a multidetector computed tomography scanner. RESULTS: Blood samples were available from 215 cats and urine samples were collected at home from 117 cats. Age ranged from 2-18 years (median 12 years) and body weight from 2.7-12.3 kg (median 5.5 kg). Sixty-five percent of the cats were castrated male and 35% were female (33% spayed); 82% were domestic shorthair cats. Eighty percent of cats received a porcine insulin zinc suspension, 19.5% insulin glargine and 0.5% a human neutral protamine hagedorn insulin. Thirty-six of 202 (17.8%) cats had IGF-1 concentrations >1000 ng/ml. Serum fPLI, and TT4 concentrations and UCCR were increased in 86/196 (43.9%), 9/201 (4.5%) and 18/117 cats (15.3%), respectively. Prevalence did not differ between countries. CONCLUSIONS: Hyperthyroidism is rare, whereas increased fPLI concentration, possibly reflecting pancreatitis, is common in diabetic cats. The high UCCR may reflect activation of the hypothalamus-pituitary-adrenal axis, which also occurs in diabetic humans. The percentage of cats with increased IGF-1 was high but lower than reported in recent studies.

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  
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.
Assessment of the effects of dalteparin on coagulation variables and determination of a treatment schedule for use in cats.
Schönig JC, Mischke RH

**OBJECTIVE** To determine a treatment protocol for SC administration of dalteparin to cats on the basis of currently available detailed pharmacokinetic data and to assess the effect of SC administration of dalteparin to cats on coagulation variables such as activated partial thromboplastin time (aPTT), thrombin time, and results for thromboelastometry, compared with effects on anti-activated coagulation factor X (anti-Xa) activity. **ANIMALS** 6 healthy domestic shorthair cats. **PROCEDURES** Cats received 14 injections of dalteparin (75 anti-Xa U/kg, SC) at 6-hour intervals. Blood samples were collected before and 2 hours after the first and second injections on days 1, 2, and 4. Anti-Xa activity was measured by use of a chromogenic substrate assay, aPTT and thrombin time were measured by use of an automated coagulometer, and viscoelastic measurements were obtained with thromboelastometry. **RESULTS** 2 hours after the second injection, the target peak anti-Xa activity range of 0.5 to 1.0 U/mL was achieved in all cats, whereas median trough values remained below this range. Peak anti-Xa activity had only minimal effects on coagulation variables; the maximum median ratio for aPTT (in relationship to the value before the first dalteparin injection) was 1.23. **CONCLUSIONS AND CLINICAL RELEVANCE** Results of this study indicated that this treatment protocol resulted in reproducible anti-Xa activity in cats that was mostly within the targeted peak range of anti-Xa activity recommended for humans. Treatment in accordance with this protocol may not require routine coagulation monitoring of cats, but this must be confirmed in feline patients.

Goblet cell density and distribution in cats with clinically and histologically normal conjunctiva.
Sebbag L, Reilly CM, Eid R, Maggs DJ

**OBJECTIVE:** The aim of this study was to evaluate goblet cell density (GCD) and distribution in cats without clinical evidence of ocular surface disease and without histologic evidence of conjunctival disease. **ANIMALS STUDIED:** Fourteen Domestic Shorthair cats euthanized for reasons unrelated to this study. **PROCEDURES:** Before euthanasia, cats were verified using slit-lamp biomicroscopy and fluorescein staining to be free of eyelid or ocular surface abnormalities. Immediately after euthanasia, bilateral conjunctival specimens including third eyelid (TEL) were collected, routinely processed, and stained with periodic acid-Schiff and hematoxylin and eosin. Thirteen conjunctival regions were identified. For each region, GCD was expressed as the percentage of goblet cells/200 basal epithelial cells. **RESULTS:** Mean GCD ranged widely by region: anterior surface of the TEL = 48.8%, fornicial regions = 47.0%, palpebral regions = 38.5%, bulbar regions = 19.6%, and posterior surface of the TEL = 12.6%. The anterior surface of the TEL had significantly higher GCD than did the bulbar and the palpebral regions, but not the fornicial regions. Bulbar conjunctiva had significantly lower GCD than did all other conjunctival regions except the posterior surface of the TEL. No significant difference was noted between GCD of male versus female cats, dorsal versus ventral regions, or lateral versus medial regions. **CONCLUSIONS:** Although conjunctival GCD ranged widely by region, the anterior surface of the TEL appears to be an excellent location for assessing conjunctival goblet cells in cats because this area has high GCD and is more readily accessible than is the palpebral, fornicial, or bulbar conjunctiva.

Pharmacokinetic modeling of penciclovir and BRL42359 in the plasma and tears of healthy cats to optimize dosage recommendations for oral administration of famciclovir.
Sebbag L, Thomasy SM, Woodward AP, Knych HK, Maggs DJ

OBJECTIVES To determine, following oral administration of famciclovir, pharmacokinetic (PK) parameters for 2 of its metabolites (penciclovir and BRL42359) in plasma and tears of healthy cats so that famciclovir dosage recommendations for the treatment of herpetic disease can be optimized.

ANIMALS 7 male domestic shorthair cats. PROCEDURES In a crossover study, each of 3 doses of famciclovir (30, 40, or 90 mg/kg) was administered every 8 or 12 hours for 3 days. Six cats were randomly assigned to each dosage regimen. Plasma and tear samples were obtained at predetermined times after famciclovir administration. Pharmacokinetic parameters were determined for BRL42359 and penciclovir by compartmental and noncompartmental methods. Pharmacokinetic-pharmacodynamic (PK-PD) indices were determined for penciclovir and compared among all dosage regimens. RESULTS Compared with penciclovir concentrations, BRL42359 concentrations were 5- to 11-fold greater in plasma and 4- to 7-fold greater in tears. Pharmacokinetic parameters and PK-PD indices for the 90 mg/kg regimens were superior to those for the 30 and 40 mg/kg regimens, regardless of dosing frequency. Penciclovir concentrations in tears ranged from 18% to 25% of those in plasma. Administration of 30 or 40 mg/kg every 8 hours achieved penciclovir concentrations likely to be therapeutic in plasma but not in tears. Penciclovir concentrations likely to be therapeutic in tears were achieved only with the two 90 mg/kg regimens. CONCLUSIONS AND CLINICAL RELEVANCE In cats, famciclovir absorption is variable and its metabolism saturable. Conversion of BRL42359 to penciclovir is rate limiting. The recommended dosage of famciclovir is 90 mg/kg every 12 hours for cats infected with feline herpesvirus.

Does Secondary Renal Osteopathy Exist in Companion Animals.
Segev G, Meltzer H, Shipov A

Secondary renal hyperparathyroidism is an inevitable consequence of chronic kidney disease. In human patients, the disease is associated with decreased bone quality and increased fracture risk. Recent evidence suggests that bone quality is also decreased in companion animals, more pronouncedly in cats compared with dogs, likely because of a longer disease course. The clinical significance of these findings is yet to be determined. However, clinicians should keep in mind that animals with chronic kidney disease have decreased bone quality and increased fracture risk.

Efficacious and safe dose of praziquantel for the successful treatment of feline reservoir hosts with opisthorchiasis.
Sereerak P, Upontain S, Tangkawattana P, Mallory FF, Sripa B, Tangkawattana S
Parasitol Int (2016)

Opisthorchiasis caused by Opisthorchis viverrini is a major food-borne zoonosis in Greater Mekong sub-region. Even though campaigns discouraging the consumption of raw fish have been launched to public, the disease still remains highly endemic. The unsuccessful eradication of the disease is probably because of the persistence of the parasite in animal reservoir hosts, particularly felids. Praziquantel (PZQ) is the drug of choice for morbidity control of opisthorchiasis in humans and animals. However, there is no specific study on its dosage regimen for feline opisthorchiasis. Thus, the effective treatment dose of PZQ, as well as its adverse effects, was evaluated in O. viverrini infected cats. Twenty-eight infected male and female cats from the endemic area of Khon Kaen and Mahasarakham Provinces, Thailand were enrolled in this study. Physical, hematological, blood chemical and urine examinations were analyzed, as indicators of health status, on the day before and 30 days after treatment. Intensity of the infections was determined by the formalin-ethyl acetate sedimentation technique. Cats were equally allotted into the low infection group of 14 cats with egg count per gram of feces (EPG) <300 and the
high infection group of 14 cats with EPG higher than 300. Cats in each group were equally divided into two subgroups of 7 cats; thus, there were two low infection subgroups (L1 and L2 subgroups) and two high infection subgroups (H1 and H2 subgroups). A single dose of 25mg/kg PZQ was orally administered to each cat in the L1 and H1 subgroups and a single oral dose of 40mg/kg PZQ was administered to the L2 and H2 subgroups. Complete clearance of O. viverrini eggs was found in all cats in the L1, L2 and H2 subgroups; thus, the cure rate (CR) and egg reduction rate (ERR) were 100%. However, partial clearance was observed in two cats with high EPG (1502 and 1518) in the H1 subgroup, which received 25mg/kg PZQ. Regards, CR and ERR for these two animals was 71.4 and 99.5%. No significant difference among the 4 subgroups was seen. Almost all hematological, blood chemical and urinalysis data were within normal ranges, except for the eosinophilia and an increase of alanine aminotransferase (ALT). Hookworm infection seen in all cats would cause eosinophilia. As for drug safety, there was no side effect observed in any cats. In conclusion, this study suggested that 40mg/kg PZQ is a highly effective and safe dosage for the treatment of feline reservoir hosts of human opisthorchiasis.

Retrospective analysis of cutaneous lesions in 23 canine and 17 feline cases of coccidiodomycosis seen in Arizona, USA (2009-2015).
Simões DM, Dial SM, Coyner KS, Schick AE, Lewis TP
Vet Dermatol (2016)
BACKGROUND: Coccidioidomycosis is a fungal disease caused by the dimorphic saprophytic fungus Coccidioides immitis or C. posadasii. Primary pulmonary infection can disseminate to cutaneous and subcutaneous tissues, or less commonly direct cutaneous inoculation may occur.
HYPOTHESIS/OBJECTIVES: To characterize the historical, clinical, diagnostic and treatment findings in dogs and cats with cutaneous manifestation of coccidiodomycosis. ANIMALS: Twenty three dogs and seventeen cats diagnosed between 2009 and 2015 in Arizona, USA. METHODS: Retrospective review of medical records from dogs and cats from an endemic area with a confirmed diagnosis via histopathology, cytology and/or culture, and skin lesions. RESULTS: Age of affected dogs ranged from 14 weeks to 13 years (median = 7 years), whereas cats ranged from 3 to 17 years (median = 9 years). Subcutaneous nodules were the most common lesions in both species. Lesions were distributed widely and not often found over sites of bone infection. In 75% of dogs and 54.5% of cats with cutaneous lesions there were clinical signs of systemic illness, supporting the diagnosis of cutaneous disseminated disease. Four dogs and four cats had localized lesions with no systemic illness, consistent with possible primary cutaneous infection. The most common mode of diagnosis was cytology identification in both species. Fluconazole was the most commonly prescribed antifungal drug. CONCLUSIONS AND CLINICAL IMPORTANCE: Coccidioidomycosis is the most common mycosis of dogs and cats in endemic regions and cutaneous signs of the disease may be an initial presenting complaint. This study identified a variety of cutaneous manifestations of the disease in dogs and cats and should be recognized by clinicians.

Utility of antigen testing for the diagnosis of ocular histoplasmosis in four cats: a case series and literature review.
Smith KM, Strom AR, Gilmour MA et al.
CASE SERIES SUMMARY: This case series describes the clinical utility of antigen testing for the diagnosis of feline ocular histoplasmosis. Four cats with suspected (n = 2) or confirmed (n = 2) ocular histoplasmosis are described: three from Oklahoma and one from California. In one case, serial urine antigen tests, as well as a serum antigen test for Histoplasma capsulatum, were negative; however, light
microscopy identified microorganisms consistent with H capsulatum in ocular tissues at necropsy. In a further two cats with recurrent ocular histoplasmosis following long-term systemic antifungal therapy, Histoplasma species urine antigen concentrations were negative, but both cats improved clinically following systemic antifungal therapy and remained in apparent clinical remission after treatment cessation (9-16 months). The final cat displayed profound bilateral endophthalmitis; however, Histoplasma species antigen testing of vitreous humor and subretinal fluid from the left eye was negative. Intraliesional organisms were detected on histopathology of both eyes, and H capsulatum was subsequently isolated and sequenced from tissue of one eye. RELEVANCE AND NOVEL INFORMATION: These cases highlight the potential difficulty in definitively diagnosing ocular histoplasmosis in cats when conducting antigen testing of serum, urine and even ocular fluids. Although antigen testing has previously proven useful in the diagnosis of disseminated feline histoplasmosis, it may not be adequate in cats with only ocular signs.

**Efficacy of a single dose of trazodone hydrochloride given to cats prior to veterinary visits to reduce signs of transport- and examination-related anxiety.**

Stevens BJ, Frantz EM, Orlando JM et al.

**OBJECTIVE** To evaluate the efficacy of a single dose of trazodone for reducing anxiety in cats during transport to a veterinary hospital and facilitating handling during veterinary examination. **DESIGN** Double-blind, placebo-controlled, randomized crossover study. **ANIMALS** 10 healthy client-owned cats (2 to 12 years of age) with a history of anxiety during transport or veterinary examination. **PROCEDURES** Each cat was randomly assigned to first receive trazodone hydrochloride (50 mg) or a placebo PO. The assigned treatment was administered, and each cat was placed in a carrier and transported by car to a veterinary clinic, where it received a structured veterinary examination. Owners scored their cat’s signs of anxiety before, during, and after transport and examination. The veterinarian also assessed signs of anxiety during examination. After a 1- to 3-week washout period, each cat received the opposite treatment and the protocol was repeated. **RESULTS** Compared with placebo, trazodone resulted in a significant improvement in the cats’ signs of anxiety during transport. Veterinarian and owner scores for ease of handling during veterinary examination also improved with trazodone versus the placebo. No significant differences were identified between treatments in heart rate or other physiologic variables. The most common adverse event related to trazodone administration was signs of sleepiness. **CONCLUSIONS AND CLINICAL RELEVANCE** Oral administration of a single dose of trazodone to cats prior to a veterinary visit resulted in fewer signs of transport- and examination-related anxiety than did a placebo and was generally well tolerated by most cats. Use of trazodone in this manner may promote veterinary visits and, consequently, enhance cat welfare.

**Use of an ophthalmic formulation of megestrol acetate for the treatment of eosinophilic keratitis in cats.**

Stiles J, Coster M

**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 ofonce daily to once weekly to maintain remission of disease. No ocular irritatio
tion 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.

Stranieri A, Giordano A, Bo S, Braghiroli C, Paltrinieri S
OBJECTIVES: The aim of this study was to evaluate whether the frequency of electrophoretic changes in serum of cats with feline infectious peritonitis (FIP) changed in recent years vs past years.
METHODS: Agarose gel electrophoresis (AGE) and capillary zone electrophoresis (CZE) from cats with FIP and healthy cats recorded in the periods 2004-2009 and 2013-2014 were retrospectively analysed. Relative and absolute values of each electrophoretic fraction were recorded and the number of cats showing single or combined electrophoretic changes consistent with FIP (hypoalbuminaemia, inverted albumin to globulin [A:G] ratio, increased total protein, total globulin, alpha (α)2-globulin and gamma (γ)-globulin concentration) were counted. Additionally, a visual analysis of electrophoretograms was also performed. Results for the two time periods were statistically compared.
RESULTS: The details of 91 AGE procedures (41 from cats with FIP and 50 from healthy cats) and 45 CZE procedures (26 from cats with FIP and 19 from healthy cats) were obtained from the database. No significant differences between the two time periods were found both in FIP and in healthy cats analysed with CZE and in healthy cats analysed with AGE. Compared with 2004-2009, cats with FIP sampled in 2013-2014 with AGE showed a significantly lower concentration of total protein, γ-globulins and total globulins, and a significantly higher A:G ratio and percentage of albumin and α2-globulins. Using both AGE and CZE, in recent years the proportion of cats with high α2-globulins without gammopathy and the proportion of cats with gammopathy alone decreased. With a visual approach, the number of patterns considered as dubious increased in the second period with AGE (non-statistically significant). CONCLUSIONS AND RELEVANCE: The frequency of electrophoretic abnormalities in cats with FIP decreased in recent years, independently of the technique employed. Although the mechanism responsible for this change was not investigated in this study, this altered frequency may decrease the diagnostic accuracy of serum protein electrophoresis for FIP.

Domestic cats seropositive for Felis catus gammaherpesvirus 1 are often qPCR negative.
Felis catus gammaherpesvirus 1 (FcaGHV1) is a newly described virus that infects domestic cats. To identify FcaGHV1 antigens, we developed an immunofluorescent antibody assay by expressing FcaGHV1 open reading frames (ORFs) in feline cells and incubating fixed cells with sera from FcaGHV1-positive cats. Of the seven ORFs tested, ORF52 and ORF38 had the strongest, most consistent antibody responses. We used recombinant ORF52 and ORF38 proteins to develop two FcaGHV1 ELISAs. These assays were used to detect reactivity in cats previously tested by qPCR for FcaGHV1 in blood cell DNA. Results indicated 32%FcaGHV1 seroprevalence, compared to 15% qPCR-evaluated prevalence (n=133); all but one qPCR positive animal was seropositive. ELISA results confirmed infection risk factors previously identified by qPCR: geographic location, male sex, and adult age. These data suggest that FcaGHV1 is a common infection of domestic cats that has a
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seropositive but often qPCR negative state characteristic of herpesviral latency.

**Passive immunization does not provide protection against experimental infection with Mycoplasma haemofelis.**
Sugiarto S, Spiri AM, Riond B et al.
*Vet Res* (2016) 47:79
Mycoplasma haemofelis (Mhf) is the most pathogenic feline hemotropic mycoplasma. Cats infected with Mhf that clear bacteremia are protected from Mhf reinfection, but the mechanisms of protective immunity are unresolved. In the present study we investigated whether the passive transfer of antibodies from Mhf-recovered cats to naïve recipient cats provided protection against bacteremia and clinical disease following homologous challenge with Mhf; moreover, we characterized the immune response in the recipient cats. Ten specified pathogen-free (SPF) cats were transfused with pooled plasma from cats that had cleared Mhf bacteremia; five control cats received plasma from naïve SPF cats. After homologous challenge with Mhf, cats were monitored for 100 days using quantitative PCR, hematology, blood biochemistry, Coombs testing, flow cytometry, DnaK ELISA, and red blood cell (RBC) osmotic fragility (OF) measurement. Passively immunized cats were not protected against Mhf infection but, compared to control cats, showed significantly higher RBC OF and B lymphocyte (CD45R/B220(+) ) counts and occasionally higher lymphocyte, monocyte and activated CD4(+) T lymphocyte (CD4(+)CD25(+) ) counts; they also showed higher bilirubin, total protein and globulin levels compared to those of control cats. At times of peak bacteremia, a decrease in eosinophils and lymphocytes, as well as subsets thereof (B lymphocytes and CD5(+), CD4(+) and CD8(+ ) T lymphocytes), and an increase in monocytes were particularly significant in the passively immunized cats. In conclusion, passive immunization does not prevent bacteremia and clinical disease following homologous challenge with Mhf, but enhances RBC osmotic fragility and induces a pronounced immune response.

**Influence of alterations in heart rate on left ventricular echocardiographic measurements in healthy cats.**
Sugimoto K, Fujii Y, Ogura Y, Sunahara H, Aoki T
*J Feline Med Surg* (2016)
OBJECTIVES: The purpose of this study was to evaluate the effect of sudden alterations in heart rate (HR) on left ventricular (LV) wall thickness and dimensions determined by echocardiography in healthy cats. METHODS: Six experimental cats were used. All cats were anaesthetised and HR was controlled with right atrial pacing. The interventricular septum, left ventricular free wall thickness at end diastole (IVSd and LVFWd, respectively), left ventricular end-diastolic and end-systolic diameter (LVIDd and LVIDs, respectively) and shortening fraction (FS) of each cat were assessed using echocardiography at pacing rates of 120, 130, 140, 150, 160, 170 and 180 ppm. RESULTS: There were significant relationships between HR and IVSd, LVFWd, LVIDd, LVIDs and FS. As the HR increased, LV wall thickness increased and chamber dimensions got smaller in a linear fashion. The maximum and minimum differences in wall thickness between 120 ppm and 180 ppm were 2.0 mm and 0.7 mm in single measurements, respectively. CONCLUSIONS AND RELEVANCE: LV wall thickness and dimensions were significantly influenced by alterations in HR.

**Effect of modified live or inactivated feline herpesvirus-1 parenteral vaccines on clinical and laboratory findings following viral challenge.**
Summers SC, Ruch-Gallie R, Hawley JR, Lappin MR
OBJECTIVES: The objective was to investigate the effect of one dose of an inactivated feline herpesvirus-1 (FHV-1), feline calicivirus (FCV) and panleukopenia virus (FPV) vaccine (FVRCP) or one dose of a modified live (ML) FVRCP vaccine on clinical signs and shedding of FHV-1 in specific pathogen-free kittens after challenge with FHV-1 7 days after vaccination. METHODS: Twenty-four FHV-1 seronegative 5-month-old kittens were randomized into three groups of eight kittens. Group 1 kittens were maintained as unvaccinated controls, group 2 kittens were administered one dose of the inactivated FVRCP vaccine subcutaneously (SC) and group 3 kittens were administered one dose of the ML FVRCP vaccine SC. All 24 cats were administered FHV-1 by nasal and oropharyngeal inoculation 7 days later and were observed daily for clinical signs of illness for 21 days. RESULTS: In the 21 days after FHV-1 challenge, both groups of vaccinated cats were less likely to be clinically ill (indicated by lower cumulative clinical scores) than control cats (P <0.001). There was no statistical difference in total clinical score between the two vaccinated groups (P = 0.97). Although the total clinical score was similar between both vaccines, signs of respiratory disease were significantly fewer in the kittens vaccinated with the inactivated FVRCP vaccine compared with the MLV FVRCP (P = 0.005) during the period after inoculation when the majority of clinical disease was observed. CONCLUSIONS AND RELEVANCE: Parenteral administration of either the inactivated FVRCP vaccine or the MLV FVRCP vaccine can decrease clinical signs of illness due to FHV-1 on a day 7 challenge when compared with controls. Use of either vaccine product is indicated in cats at risk of acute exposure to FHV-1.

Enterohelial Helicobacter spp. in cats with non-haematopoietic intestinal carcinoma: a survey of 55 cases.
Swennes AG, Parry NM, Feng Y et al.
Several enterohelial Helicobacter spp. (EHS) have been isolated from cats. Despite the reported association between EHS infection and intestinal neoplasia in other species, this association has not been explored in cats. In this study, 55 non-haematopoietic feline intestinal carcinoma cases were histopathologically evaluated. In contrast with prior reports, large intestinal (LI) carcinoma was observed with greater frequency (61 %) relative to small intestinal (SI) carcinoma (35 %). There was a significant association between intestinal location and animal gender. Of males examined, 83 % had LI carcinoma, while no such trend was observed in females. Previously described associations between Siamese breed and intestinal carcinoma could not be definitively confirmed, although the Siamese breed may be predisposed to SI carcinoma location. Of all carcinomas examined in this study, 62 % were classified as adenocarcinoma, although mucinous adenocarcinoma (28 %) and solid carcinoma (11 %) were also identified. Tumours were all moderately or poorly differentiated. When considered by intestinal location and histopathologic classification, LI adenocarcinoma was associated with significantly advanced mean age (13 years) when compared to SI adenocarcinoma and LI mucinous adenocarcinoma (mean, 9 years in both cases), which were also frequently encountered. To determine whether EHS might play a role in feline intestinal neoplasia, Helicobacter genus- and species-specific fluorescence in situ hybridization was performed. Of these carcinoma cases, 56 % were positive for Helicobacter spp. and one or more species-specific assay for Helicobacterbilis, Helicobactercanis or Helicobactermarmotae. The presence of EHS was significantly associated with both LI location (68 %) and mucinous adenocarcinoma (92 %). These findings suggest a role for intestinal bacteria in non-haematopoietic feline intestinal neoplasia.

Mother-offspring recognition in the domestic cat: Kittens recognize their own mother’s call.
Szenzi P, Bánszegi O, Urrutia A, Faragó T, Hudson R
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 58:568-577, 2016.

Cilia-associated bacteria in fatal Bordetella bronchiseptica pneumonia of dogs and cats.
Taha-Abdelaziz K, Bassel LL, Harness ML, Clark ME, Register KB, Caswell JL
Bordetella bronchiseptica frequently causes nonfatal tracheobronchitis, but its role in fatal pneumonia is less recognized. Our study evaluated histologic identification of cilia-associated bacteria as a method for diagnosis of B. bronchiseptica pneumonia. Cases of fatal bronchopneumonia were studied retrospectively, excluding neonates and cases of aspiration pneumonia, minor lung lesions, or autolysis. The study population comprised 36 canine and 31 feline cases of bronchopneumonia. B. bronchiseptica was identified in 8 of 36 canine and 14 of 31 feline cases based on immunohistochemistry (IHC) using serum from a rabbit hyperimmunized with pertactin, PCR testing (Fla2/Fla12), and/or bacterial culture data when available. Of these, IHC was positive in 4 canine and 7 feline cases, PCR was positive in 8 canine and 14 feline cases, and B. bronchiseptica was isolated in 2 of 5 canine and 3 of 9 feline cases tested. Examination of histologic sections stained with hematoxylin and eosin revealed bronchial cilia-associated bacteria in 4 of 36 canine and 5 of 31 feline cases; these were all positive by IHC and PCR. The presence of cilia-associated bacteria had been noted in the pathology report for only 2 of these 9 cases. Thus, the presence of cilia-associated bacteria seems frequently overlooked by pathologists, but is a diagnostically significant feature of B. bronchiseptica pneumonia. A specific diagnosis of B. bronchiseptica pneumonia is important because it suggests primary or opportunistic bacterial pneumonia rather than aspiration pneumonia, and because of the risk of animal-to-animal transmission of B. bronchiseptica, the availability of vaccines for disease prevention, and the potential zoonotic risk to immunocompromised pet owners.

Genetic characterization of feline bocavirus detected in cats in Japan.
Takano T, Takadate Y, Doki T, Hohdatsu T
Arch Virol (2016) 161:2825-2828
Feline bocavirus (FBoV) has been classified into three genotypes (FBoV1-FBoV3). FBoVs are mainly detected in feces. In the present study, we collected rectal swabs from cats in Japan and examined the samples for the presence of FBoV. The FBoV infection rate was 9.9 % in 101 cats. No significant association was observed between FBoV infection and clinical symptoms. Based on the full-length NS1 protein, the three strains of FBoVs detected in the present study shared high homologies with the genotype 2 FBoV POR1 strain. This is the first study to report FBoV in Japan.

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  
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.

**Diagnosis and Outcome of Periosteal Chondrosarcoma in Two Cats.**  
Thompson E, Fauber AE, Pool RR  
*J Am Anim Hosp Assoc* (2016) 52:312-318  
Two cats, both over 10 yr old, were presented for evaluation of non-painful bony proliferations on the appendicular skeleton. These proliferations were identifiable via palpation. Radiographs showed a smooth, proliferative bony lesion of the distal femur (case 1) and tarsus (case 2) with mild soft tissue swelling. Surgical debulking with incomplete resection was performed in each cat. Subsequent histopathology resulted in a diagnosis of periosteal chondrosarcoma (PC). Although both cats have experienced local recurrence, both are still alive more than 2.5 yr after mass debulking. Periosteal chondrosarcoma is a differential diagnosis in proliferative cortical bony lesions near an articular surface in older cats. Partial resection of these masses can lead to an excellent quality of life, and proper diagnosis can avoid amputation or even euthanasia.

**Autochthonous feline leprosy caused by Mycobacterium sp. strain Tarwin affecting a cat from...**
the Central Coast of New South Wales.
CASE REPORT: A 5-year-old Domestic Shorthair-cross was presented with a raised, alopecic skin nodule affecting the external surface of the right upper lip with an adjacent second smaller satellite lesion. Fine needle aspiration cytology revealed numerous intracellular and extracellular negatively stained bacilli. Histopathology confirmed granulomatous inflammation with multinucleate giant cell formation and abundant intracellular acid-fast bacilli, consistent with a mycobacterial aetiology. PCR testing of the fresh tissue from the satellite lesion and subsequent sequence analysis identified Mycobacterium sp. strain Tarwin. The skin lesion was surgically excised and clarithromycin 62.5 mg twice daily was administered to the cat for 25 days. CONCLUSION: There was no recurrence of the lesion at the time of writing, 16 months after the surgery. This is the second autochthonous case of feline leprosy caused by M. sp. strain Tarwin originating in New South Wales, Australia.

Treatment of feline giardiasis during an outbreak of diarrhoea in a cattery: potential effects on faecal Escherichia coli resistance patterns.
Tysnes KR, Luyckx K, Cantas L, Robertson LJ
OBJECTIVES: An outbreak of diarrhoea involving 16 cats at a cattery in Norway was investigated. Treatment and control of the outbreak were the primary objectives, but the effects of treatment on the antimicrobial resistance profiles of Escherichia coli isolated from faeces were also investigated.
METHODS: Faecal samples were investigated for Giardia cysts by immunofluorescence microscopy, and multi-locus genotyping was performed to determine the Giardia genotype. Faecal E coli were assessed, before and after treatment for giardiasis, for antimicrobial resistance. RESULTS: The outbreak was probably caused by Giardia duodenalis, Assemblage F. Although infection was eliminated in most cats following treatment with fenbendazole, over 30% of the infected cats required a second treatment round (combined fenbendazole and metronidazole). Investigation of sensitivity to antibacterial drugs of E coli that had been isolated both prior to and following treatment demonstrated that fenbendazole treatment may select for resistant bacteria. CONCLUSIONS AND RELEVANCE: Controlling Giardia infections in dense cat populations can be challenging, and requires strict hygiene measures. In cases where fenbendazole alone does not result in treatment success, a combination treatment with fenbendazole and metronidazole may be effective. Although this study did not include untreated controls, we suggest that the potential for changes in gut microbiota and antimicrobial resistance development should be considered when choosing antiprotozoal drugs, particularly in cases of treatment failure and where repeat treatment is required.

Management of Proteinuria in Dogs and Cats with Chronic Kidney Disease.
Vaden SL, Elliott J
Proteinuria is a negative prognostic indicator for dogs and cats with chronic kidney disease. A normal dog or cat should excrete very little protein and have a urine protein:creatinine ratio that is less than 0.4 or less than 0.2, respectively; persistent proteinuria above this magnitude warrants attention. Administration of angiotensin converting enzyme inhibitors and/or angiotensin receptor blockers, blood pressure control and nutritional modification are considered a standard of care for renal proteinuria. Renal biopsy and administration of immunosuppressive agents should be considered in animals with glomerular proteinuria that have not responded to standard therapy. Targeted patient monitoring is essential when instituting management of proteinuria.
Metal projectile injuries in cats: review of 65 cases (2012-2014).
Vnuk D, Capak H, Gusak V, Maticic D, Popovic M, Brkljaca Bottegaro N
OBJECTIVES: The objective of this study was to compare the prevalence of different types of injuries caused by various types of projectiles among urban, suburban and rural cats of different ages in order to predict the type of injury sustained. METHODS: For the period 1 January 2012 to 30 April 2014, the medical records of cats with metal projectile injuries (PIs) were searched from the archive of the university's small animal diagnostic imaging centre. Age, sex, owner address, admission during a weekend or on a working day, month of admission, projectile position (head and neck; thoracic region; abdominal region, including lumbosacral spine; forelimbs; and hindlimbs, including tail), number of projectiles, presence of a wound and fracture related to the projectile, and the type of projectile were recorded for each cat. RESULTS: Sixty-five cats with PIs were admitted during the defined period. In 38.5% of cats the projectiles found upon radiography were incidental findings. The frequency of PIs peaked in March. Airgun projectiles were found in 80.0% of the cats. PIs in two or more body regions were found in 29.2% of the cats. Among the cats that had only been shot in one body region, the projectile was most frequently found in the abdominal region, including the lumbosacral spine (41.3%). CONCLUSIONS AND RELEVANCE: These results might prompt clinicians to evaluate closely and screen for feline PIs in emergency situations.

Evaluation of the influence of atipamezole on the postoperative analgesic effect of buprenorphine in cats undergoing a surgical ovariohysterectomy.
Warne LN, Beths T, Carter JE, Whitem T, Bauquier SH
OBJECTIVE: To evaluate the influence of atipamezole on postoperative pain scores in cats. STUDY DESIGN: Controlled, randomized, masked clinical trial. ANIMALS: Twelve healthy female domestic cats. METHODS: Cats admitted for ovariohysterectomy (OVH) surgery were randomly allocated to group atipamezole (n = 6) or group saline (n = 6) and were premedicated with buprenorphine 20 µg kg(-1) intramuscularly (IM) and alfaxalone 3.0 mg kg(-1) subcutaneously (SC). Anaesthesia was induced with alfaxalone intravenously (IV) to effect and maintained with isoflurane in oxygen. Ten minutes after extubation, cats from group atipamezole received IM atipamezole (0.0375 mg kg(-1)) whereas group saline received an equivalent volume [0.0075 mL kg(-1) (0.003 mL kg(-1) IM)] of 0.9% saline. A validated multidimensional composite scale was used to assess pain prior to premedication and postoperatively (20 minutes after extubation). If postoperative pain scores dictated, rescue analgesia consisting of buprenorphine and meloxicam were administered. Pain score comparisons were made between the two groups using a Mann-Whitney exact test. Results are reported as the median and range. RESULTS: Preoperatively, all cats scored 0. At the postoperative pain evaluation, the pain scores from group atipamezole [16 (range, 12-20)] were not significantly different from group saline [18 (range, 15-23)] (p = 0.28). All cats required rescue analgesia post-operatively. CONCLUSIONS AND CLINICAL RELEVANCE: Atipamezole (0.0375 mg kg(-1) IM) administration did not significantly affect the postoperative pain scores in cats after OVH. Preoperative administration of buprenorphine (20 µg kg(-1) IM) did not provide adequate postoperative analgesia for feline OVH.

Outcome After Pneumonectomy in 17 Dogs and 10 Cats: A Veterinary Society of Surgical Oncology Case Series.
Wavreille V, Boston SE, Souza C et al.
**OBJECTIVE:** To report the signalment, presenting clinical signs, surgical complications, histologic diagnosis, postoperative complications, and outcome of dogs and cats undergoing pneumonectomy.

**STUDY DESIGN:** Retrospective case series; multicenter study.

**ANIMALS:** Client-owned dogs (n=17) and cats (n=10).

**METHODS:** Signalment, clinical signs, side affected, surgical data, preoperative diagnostic tests (including complete blood count, serum biochemistry, cytologic diagnosis, chest radiographs, and computed tomography), histologic diagnosis, surgical complications, adjunctive therapy, and date and cause of death were collected from records of dogs and cats that underwent pneumonectomy. Survival estimates and complication were assessed.

**RESULTS:** Seventeen animals had a left-sided pneumonectomy performed (12 dogs, 5 cats) and 10 animals had a right-sided pneumonectomy (5 dogs, 5 cats). Fourteen animals were diagnosed with neoplasia (52%). The overall incidence of complications for dogs and cats were 76 and 80%, respectively, with major complications in 41 and 50%, respectively. Respiratory complications (persistent pleural effusion, oxygen dependence, persistent increased respiratory rate, or coughing) were the most frequent complications. No animals died or were euthanatized intraoperative or within the first 24 hours postoperative. One dog (6%) and 2 cats (20%) died, or were euthanatized in the first 2 weeks postoperative.

**CONCLUSION:** Based on this case series, right and left pneumonectomy can be performed with low perioperative mortality in dogs and cats, with some animals experiencing prolonged survival.

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**The protective rate of the feline immunodeficiency virus vaccine: An Australian field study.**

Westman ME, Malik R, Hall E, Harris M, Norris JM

*Vaccine* (2016) 34:4752-4758

A case-control field study was undertaken to determine the level of protection conferred to client-owned cats in Australia against feline immunodeficiency virus (FIV) using a commercial vaccine. 440 cats with outdoor access from five Australian states/territories underwent testing, comprising 139 potential cases (complete course of primary FIV vaccinations and annual boosters for three or more years), and 301 potential controls (age, sex and postcode matched FIV-unvaccinated cats). FIV status was determined using a combination of antibody testing (using point-of-care test kits) and nucleic acid amplification, as well as virus isolation in cases where results were discordant and in all suspected FIV-vaccinated/FIV-infected cats (‘vaccine breakthroughs’). Stringent inclusion criteria were applied to both ‘cases’ and ‘controls’; 89 FIV-vaccinated cats and 212 FIV-unvaccinated cats ultimately satisfied the inclusion criteria. Five vaccine breakthroughs (5/89; 6%), and 25 FIV-infected controls (25/212; 12%) were identified, giving a vaccine protective rate of 56% (95% CI 20 to 84). The difference in FIV prevalence rates between the two groups was not significant (P=0.14). Findings from this study raise doubt concerning the efficacy of Fel-O-Vax FIV® under field conditions. Screening for FIV infection may be prudent before annual FIV re-vaccination and for sick FIV-vaccinated cats. Owners should not rely on vaccination alone to protect cats against the risk of acquiring FIV infection; other measures such as cat curfews, the use of ‘modular pet parks’ or keeping cats exclusively indoors, are recommended.

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**Histologic and immunohistochemical predictors of clinical behavior for feline diffuse iris melanoma.**

Wiggans KT, Reilly CM, Kass PH, Maggs DJ


**OBJECTIVE:** To determine histologic and immunohistochemical predictors of metastasis of feline diffuse iris melanoma (FDIM).

**ANIMALS:** Globes from 47 client-owned cats enucleated for FDIM between January 1985 and December 2013.

**PROCEDURES:** Hematoxylin and eosin-stained sections...
were evaluated for neoplastic invasiveness and cell morphology, necrosis within the neoplasm, inflammation, and glaucoma. Sections were immunolabeled with antibodies against melan-A, PNL2, E-cadherin, or B-Raf, and label intensity, percentage of labeled cells, and label homogeneity were semi-quantitatively graded. Medical records were evaluated, and referring veterinarians and clients were contacted to determine whether cats developed metastasis following enucleation. The log-rank test or Cox proportional hazards model was used to determine associations between histologic or immunohistochemical parameters and metastasis. RESULTS: Metastasis was suspected or confirmed in 9/47 (19%) cats. Extrascleral extension, necrosis within the neoplasm, a mitotic index of >7 mitoses in 10 high-power (×400) fields, choroidal invasion, and increased E-cadherin and melan-A label intensity were each associated with increased rate of metastasis. PNL2 label homogeneity was associated with decreased rate of metastasis. Decreased PNL2 label intensity and an increasing percentage of neoplastic cells labeled for melan-A each approached significance for increased rate of metastasis. CONCLUSIONS: We report four histologic and three immunohistochemical parameters helpful in determining cats at risk of metastasis of FDIM. Further studies should determine if B-Raf mutations identified in human malignant melanomas are found in cats with FDIM and assess benefits of adjunctive therapy following enucleation of eyes with FDIM bearing poor prognostic indicators.

**Serum Cystatin C Concentrations in Cats with Hyperthyroidism and Chronic Kidney Disease.**

Williams TL, Dillon H, Elliott J, Syme HM, Archer J


**BACKGROUND:** Currently, no test can accurately predict the development of azotemia after treatment of hyperthyroidism. Serum cystatin C concentrations (sCysC) might be less influenced by changes in body muscle mass and so better indicate the presence of concurrent chronic kidney disease (CKD) in hyperthyroidism. **HYPOTHESES:** sCysC will be higher in hyperthyroid cats that develop azotemia compared with hyperthyroid cats that remain nonazotemic after treatment; sCysC will be higher in nonhyperthyroid cats with azotemic CKD than healthy older cats, and sCysC will decrease after treatment of hyperthyroidism. **ANIMALS:** Ninety-one cats treated in first opinion practice.

**METHODS:** Case-control study. sCysC were compared between hyperthyroid cats which developed azotemia within 4 months of successful treatment of hyperthyroidism (pre-azotemic group) and hyperthyroid cats which remained nonazotemic after treatment (nonazotemic group), and between nonhyperthyroid cats with azotemic CKD and healthy older cats. sCysC were also compared between hyperthyroid cats before treatment and at time of establishment of euthyroidism. Data are presented as median [25th, 75th percentile]. **RESULTS:** Baseline sCysC were not different between the pre-azotemic and nonazotemic groups (1.9 [1.4, 2.3] mg/L versus 1.5 [1.1, 2.2] mg/L, respectively; P = .22). sCysC in nonhyperthyroid cats with azotemic CKD and healthy older cats were not significantly different (1.5 [1.0, 1.9] mg/L versus 1.2 [0.8, 1.4] mg/L, respectively; P = .16). sCysC did not change significantly after treatment of hyperthyroidism (pretreatment 1.8 [1.2, 2.3] mg/L, after treatment 1.6 [1.1, 2.4] mg/L; P = .82). **CONCLUSIONS AND CLINICAL IMPORTANCE:** sCysC do not appear to be a reliable marker of renal function in hyperthyroid cats.

**Therapeutic Management of Feline Chronic Gingivostomatitis: A Systematic Review of the Literature.**

Winer JN, Arzi B, Verstraete FJ

*Front Vet Sci* (2016) **3**:54

Feline chronic gingivostomatitis (FCGS) is a disease characterized by protracted and potentially debilitating oral inflammation in cats, the etiology of which is currently unknown. The purpose of this review is to apply an evidence-based medicine approach to systematically review and critically
evaluate the scientific literature reporting the outcome of medical and surgical management of FCGS. Those articles meeting inclusion criteria were reviewed and assigned an “Experimental Design Grade” (EDG) and an “Evidence Grade” (EG) in order to score relative strength of study design and produced data. Studies were evaluated and compared, especially highlighting the treatments, the outcomes, and the therapeutic success rates. This review found a lack of consistency between articles’ data, rendering direct comparison of results unreliable. The field of FCGS research, and ultimately patient care, would benefit from standardizing studies by adopting use of a consistent semi-quantitative scoring system and extending follow-up duration. Future researchers should commit to large prospective studies that compare existing treatments and demonstrate the promise of new treatments.


Does categorisation of lymphoma subtypes according to the World Health Organization classification predict clinical outcome in cats.

Wolfesberger B, Skor O, Hammer SE et al.

*J Feline Med Surg* (2016)

OBJECTIVES: The purpose of this study was to specify lymphoma subtypes according to the World Health Organization (WHO) classification in a group of cats and to investigate their potential prognostic value. METHODS: Records of cats from the University of Veterinary Medicine Vienna suffering from lymphoma were reviewed in this retrospective study. To diagnose various subtypes specified in the WHO classification, histopathological and immunohistochemical examinations, as well as clonality assays in some cases, were performed. RESULTS: Of the 30 cats included in this study and classified according to the WHO guidelines, peripheral T-cell lymphoma was the most prevalent lymphoma subtype (37% of cases; n = 11), followed by diffuse large B-cell (23%; n = 7), intestinal T-cell (10%; n = 3), T-cell-rich B-cell (10%; n = 3), large granular lymphocytic (7%; n = 2), anaplastic large T-cell (7%; n = 2), B-cell small lymphocytic (3%; n = 1) and T-cell angiotropic lymphoma (3%; n = 1). The median survival time (MST) was 5.4 months (range 6 days to 2.2 years), with two cats still alive after 1.7 and 2.0 years, respectively. Treating cats prior to chemotherapy with glucocorticoids did not worsen their prognosis. Adding to chemotherapy, radiotherapy or surgery did not improve the clinical outcome. We observed that patients with intestinal T-cell lymphoma lived significantly longer (MST 1.7 years) than those with a diffuse large B-cell (MST 4.5 months) or peripheral T-cell lymphoma (MST 6.1 months). Cats with T-cell-rich B-cell lymphoma survived significantly longer (MST 1.2 years) than those with a diffuse large B-cell lymphoma. CONCLUSIONS AND RELEVANCE: A detailed diagnosis of feline lymphoma can be obtained by allocating different subtypes according to the WHO classification. From the eight detected lymphoma subtypes, two, intestinal T-cell lymphoma and T-cell-rich B-cell lymphoma, showed promising survival times in cats.

The prevalence of intestinal nematodes in cats and dogs from Lancashire, north-west England.

Wright I, Stafford K, Coles G

*J Small Anim Pract* (2016) 57:393-395

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, four for Ancylostoma species and single case for 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.

Clinical findings and treatment outcomes for cats diagnosed with patent ductus arteriosus in the UK: a retrospective study of 19 cases (2004-2012).
Wustefeld-Janssens BG, Burrow R, Mõtsküla P, Martin M, Dukes-McEwan J
Vet Rec (2016) 179:17
Patent ductus arteriosus (PDA) is infrequently reported in cats and represents between 1-7.3 per cent of left to right shunting cardiac congenital anomalies. The objective of this study was to report the presenting complaints, clinical examination findings, diagnostic findings, treatment outcomes and survival times in cats diagnosed with a PDA in the UK. Medical records from three major UK referral centres were searched for cats that were diagnosed with PDA from January 2004 to December 2012. Data obtained for analysis included: signalment, clinical examination findings including murmur characteristics, diagnostic imaging findings, treatment outcomes and survival times. Nineteen cats were included in the analysis. The most common reason for referral was investigation of an incidentally detected heart murmur without clinical signs (13/19; 68 per cent). Pulmonary arterial hypertension (PAH) was diagnosed in seven (37 per cent) cats and those cats with PAH were significantly more likely to present with signs of disease (P=0.004). Median survival time in cats that were diagnosed with PDA and died due to cardiac causes was 898 days (interquartile range 459-1011 days). The median survival time of those cats that had an additional congenital anomaly was significantly shorter to those cats without a congenital anomaly (P=0.008).

Evidence-based veterinary dermatology: a review of published studies of treatments for Otodectes cynotis (ear mite) infestation in cats.
Yang C, Huang HP
Vet Dermatol (2016) 27:221-e56
BACKGROUND: Otodectes cynotis (ear mite) accounts for 50-80% of cases of otitis externa in cats. Various treatment options exist but evidence-based reviews on treatments for this parasite have not been conducted. HYPOTHESIS/OBJECTIVES: The purpose of this study was to systematically review the efficacy of treatments for Otodectes cynotis infestation in cats, to provide recommendations for their use and to suggest methodologies for future clinical trials and research. METHODS: Electronic searches were carried out using the PubMed, CAB Direct and Thomson Reuters Web of Science; relevant topics were hand searched. The review was restricted to peer reviewed articles without limitation of language and publication date; only in vivo studies were included. The data were extracted and tabulated, then compared with regard to study design. With only a few randomized and controlled trials (RCTs) available, it was not possible to perform a meta-analysis of the pooled data. RESULTS: A total of 27 trials published between 1978 and 2015 fulfilled the selection criteria; 17 different pharmacological interventions were identified. There were two blinded RCTs and 25 open uncontrolled trials. CONCLUSIONS AND CLINICAL IMPORTANCE: There is fair evidence for recommending spot-on 10% imidacloprid +1% moxidectin or selamectin, once or twice 30 days apart, while there is
insufficient evidence for or against recommending all other medications due to the quality of study designs in spite of their high efficacies. Future blinded RCTs, using placebo or appropriate active drugs, are required; outcome measurements on both clinical and microbiological and parasitological improvement, and proper follow-up periods are recommended.

**Hypochloremia in cats - prevalence and associated diseases.**
Zeugswetter FK, Pagitz M, Friedrich MS
*Tierarztl Prax Ausg K Kleintiere Heimtiere* (2016) 44:237-244
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 als well as the high proportion of azotemic or diabetic animals support the concept of compensatory acidosis induced hypochloremia. CLINICAL RELEVANCE: Hypochloremia should prompt the clinician to perform blood-gas analysis. Diabetes mellitus (especially ketoacidosis) and renal disease should be included in current algorithms for the evaluation of hypochloremic patients.

**Identification and genomic characterization of a novel species of feline anellovirus.**
Here, a novel feline anellovirus strain (named FelineAV621 and GenBank no. KX262893) was detected in two cats with diarrhea. The complete genome of FelineAV621 is 2409 nt long with a G+C content of 56.67 %, including three open reading frames (ORFs). Phylogenetic analysis based on the amino acid sequence of the putative capsid protein (ORF1) indicated that FelineAV621 belonged to a novel anellovirus species inside a clade containing the seal anellovirus, canine TTVs, and porcine TTVs, but was distant from all the previous feline anelloviruses.

**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.

**Diagnostic value of Light’s criteria and albumin gradient in classifying the pathophysiology of pleural effusion formation in cats.**

Zoia A, Drigo M


The primary aim of this study was to assess whether human Light’s criteria with the cut-off values previously published for cats are useful and superior to the traditional veterinary classification in diagnosing pathophysiology of fluid formation in cats with pleural effusion. The secondary aim was to assess if the albumin gradient (ALBg) is a reliable criterion for differentiating exudates from transudates in patients with pleural effusion thought to be transudative by clinical criteria but identified as exudative by Light’s criteria. Nineteen client-owned cats with pleural effusion were studied. The aetiology of the pleural effusion was used to establish the pathophysiology of its formation. Parameters measured or calculated undergoing statistical analysis included Light’s criteria, total protein and total nucleated cell count in the pleural effusions, and the ALBg. Based on the pathophysiology of fluid formation there were seven transudates caused by increased hydrostatic pressure and 12 exudates. There was a significant difference in the accuracy of the Light’s criteria in correctly classifying origin of the pleural fluid formation compared with the traditional veterinary classification (84% vs 53%). ALBg values were significantly different between transudates and exudates. One of the three transudates misclassified as exudates by Light’s criteria was correctly identified as a transudate by the ALBg. In conclusion, pleural effusion should be classified as either a transudate or an exudate using Light’s criteria. In cats with pleural effusion thought to be transudative by clinical criteria, but identified as exudative by Light’s criteria, the ALBg may further help in correctly differentiating exudates from transudates.