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.

Feline cerebrovascular disease: clinical and histopathologic findings in 16 cats.
Sixteen cats with cerebrovascular disease confirmed via histology to be of nontraumatic and nonneoplastic origins are described. In addition, the anatomy of the arterial supply of the cat’s brain is reviewed. It is suggested that this unique arterial design may influence the incidence of cerebrovascular accidents in this species. Of the 16 cats reviewed, seven cats had ischemic infarctions, five had hemorrhagic infarctions, and four were diagnosed with intracranial hemorrhage. The median age was 8 yr and 9.5 yr in cats with infarctions and intracranial hemorrhages, respectively. Clinical signs were severe, acute, consistent with the localization of the cerebrovascular lesion, and influenced by underlying pathology. Four cats with infarction showed lateralized neurologic signs. Four cats with infarctions were diagnosed with pulmonary disease antemortem and three cats had hyperthyroidism. Cerebrospinal fluid analysis and computed tomography scans were available in two cats. None of the infarctions were grossly visible. All cats with hemorrhagic infarcts had severe liver pathology and nephritis was identified in four cats. Hypoxia was a feature in four cats and one cat suffered cardiac failure. In conclusion, the clinical picture is influenced by the type of cerebrovascular disease, the localization of the intracranial lesions, and any underlying pathology.


Effect of cyclosporine, dexamethasone, and human CTLA4-Ig on production of cytokines in lymphocytes of clinically normal cats and cats undergoing renal transplantation.
OBJECTIVE: To evaluate effects of cyclosporine, dexamethasone, and the immunosuppressive agent human CTLA4-Ig on cytokine production by feline lymphocytes in vitro and to assess patterns of cytokine production for 5 immunosuppressed renal transplant recipient cats. ANIMALS: 21 clinically normal cats and 5 immunosuppressed renal transplant recipient cats. PROCEDURES: Peripheral blood mononuclear cells were isolated from clinically normal cats and stimulated with concanavalin A (Con A; 10 μg/mL) alone or Con A with cyclosporine (0.05 μg/mL), dexamethasone (1 x 10(-7)M), a combination of cyclosporine-dexamethasone, or human CTLA4-Ig (10 g/mL). Cells from transplant recipients were stimulated with Con A alone. An ELISA was performed to measure production of interferon (IFN)-gamma, granulocyte macrophage-colony stimulating factor (GM-CSF), interleukin (IL)-2, IL-4, and IL-10. Proliferation of CD4+ and CD8+T cells from immunosuppressed cats were also evaluated. Pairwise comparisons were performed via a Wilcoxon signed rank test or Wilcoxon rank sum test. RESULTS: Cyclosporine, dexamethasone, cyclosporine-dexamethasone combination, and CTLA4-Ig caused a significant decrease in IL-2, IFN-gamma, and GM-CSF production. Cyclosporine and cyclosporine-dexamethasone, but not human CTLA4-Ig, caused a significant decrease in IL-10 production. High basal concentrations of IL-2 and IL-10 were identified in transplant recipients, and IL-10 was significantly increased in stimulated cultures. In immunosuppressed cats, there was a decrease in frequency of responders and proliferative capacity of CD4+ and CD8+T cells. CONCLUSIONS AND CLINICAL RELEVANCE: CTLA4-Ig successfully inhibited proinflammatory cytokines while sparing cytokines critical for allograft tolerance. These data may be useful for developing better strategies to prevent rejection while sparing other immune functions.

**Minimal change glomerulopathy in a cat.**
A 6-year-old domestic shorthair male castrated cat was evaluated for sudden onset of vomiting and anorexia. A diagnosis of hypereosinophilic syndrome (HES) was made, and the cat was treated with imatinib mesylate. The cat had an initial clinical improvement with the normalization of the peripheral eosinophil count. After approximately 8 weeks of treatment, lethargy and anorexia recurred despite the normal eosinophil count and a significant proteinuric nephropathy was identified. Treatment with imatinib was discontinued. Ultrasound guided renal biopsies exhibited histologic, ultrastructural, and immunostaining changes indicative of a minimal change glomerulopathy (MCG) which has not previously been reported in the literature in a cat. The proteinuria and HES initially improved while the cat was treated with more traditional medications; however, both the problems persisted for 30 months that the cat was followed subsequently. Previous studies demonstrating the safety and efficacy of imatinib in cats do not report any glomerular injury or significant adverse drug reactions, and the exact cause of this cat’s proteinuric nephropathy is uncertain. Nonetheless, the possibility of an adverse drug reaction causing proteinuria should be considered when initiating treatment with imatinib in a cat.


**Diagnosis and surgical management of a fractured atlas in a cat.**
A 6-month-old male-castrated domestic shorthair cat was presented shortly after being bitten on the neck by a large breed dog. On presentation the cat was non-ambulatory tetraparetic with preserved deep pain perception. Plain radiographs of the neck did not show any abnormalities. Computed tomography was performed and showed a right-sided depressed fracture of the dorsal lamina of the atlas. A partial dorsal laminectomy was performed to alleviate the spinal cord compression. The cat made a full recovery within 12 weeks of surgery.


**Evaluation of a nine-point body condition scoring system in physically inactive pet cats.**
OBJECTIVE: To compare results of body condition scoring by use of a 9-point scale with body composition determined by dual-energy x-ray absorptiometry (DEXA) in indoor-confined neutered domestic shorthair (DSH) pet cats. Animals-72 indoor-confined, adult neutered DSH pet cats (38 females and 34 males). PROCEDUREs: All cats underwent a physical examination including assessment of body weight (BW), body condition score (BCS; 1 = emaciated, 5 = ideal, and 9 = grossly obese), and girth. Urinalysis, CBC, and serum biochemical analysis were also performed. After the cats were confirmed healthy, they were anesthetized for body composition measurement via DEXA. Lean body mass, fat mass, and percentage body fat (%BF) were then evaluated. RESULTS: The correlation between %BF and BCS (r = 0.87) was superior to the correlations between %BF and BW (r = 0.74) and between %BF and girth (r = 0.78). Values for %BF differed significantly between all pairs of BCSs except BCSs 8 and 9. Within a BCS, the %BF was similar for male and female cats. The mean %BF for cats with a BCS of 5 was 32, which exceeded the upper reference limit of %BF generally
considered ideal (30). CONCLUSIONS AND CLINICAL RELEVANCE: The 9-point BCS scale appears useful for assessing %BF in DSH pet cats. Nevertheless, study findings could indicate a need for redefining the ideal BCS for inactive neutered cats to include a BCS of 4.

Lingual and renal lymphoma in a cat.
A domestic shorthair cat presented with a progressive history of polydipsia, lingual swelling and ulceration. The tongue was firm and grossly enlarged with associated regional lymphadenopathy. Surgical biopsies revealed lymphoma of the tongue. Following the procedure, the cat developed respiratory distress and was subsequently euthanased. Necropsy confirmed the diagnosis of lingual lymphoma and also identified lymphoma within the left kidney. This is the first report of lymphoma within the feline tongue in the literature.

Portal hypertension (PH) is the result of increased vascular resistance in the portal circulation, increased portal venous blood flow, or both. In veterinary medicine, where portal pressure is seldom measured directly, the diagnosis of PH often is inferred from identification of associated complications including multiple acquired portosystemic shunts, ascites, and hepatic encephalopathy. Likewise, treatment of PH primarily is aimed at controlling these complications. The goal of this review is to provide an update on the pathophysiology, diagnosis, and treatment of PH. The review draws from information in the veterinary hepatology literature, reviews, and consensus statements in human hepatology and the literature on experimental models of PH.

Assay of two 10% (w/v) fipronil spot-on formulations against feline infestations with Ctenocephalides felis.
A new fipronil-based spot-on formulation was evaluated against experimental flea infestations in cats in two studies. In both studies, eight cats served as negative controls (groups 1 and 4); on day 0, eight cats were treated with a 10% w/v fipronil-based spot-on solution (Effipro Spot-on, 0.5ml per cat, groups 2 and 5) and eight cats served as positive controls (Frontline Spot-on, 0.5ml per cat, groups 3 and 6). Each cat was infested on day -1 with 50 fleas (study 1) and weekly (day 7-day 56) with 100 fleas (study 2). Geometric mean flea counts obtained 48h after the treatment or each re-infestation were reduced by 99.0 and 98.3% in groups 2 and 3, respectively, on day 2, compared to the negative control group. Cats were protected from re-infestations with an efficacy >99% for 58 days in group 5 and for 37 days in group 6.
**Molecular characterization of Malassezia nana isolates from cats.**
Malassezia nana (M. nana) is a lipid-dependent yeast that has been isolated from cats and cows. Some sequence variability has been observed in the large subunit (LSU) and internal transcribed spacer (ITS) regions between strains isolated from cats and cows though these regions in M. nana isolates from cats alone have proven to be relatively conserved. In the present study, microsatellite PCR fingerprinting and beta-tubulin gene sequence analysis were carried out on M. nana isolates from cats to investigate the genetic diversity of this species. Although a relatively small number of isolates were available, the similarity in the sequences of the beta-tubulin and the microsatellite profiles indicate that a particular M. nana genotype colonizes cats. Moreover, all isolates obtained from animals with otitis externa had the same microsatellite fingerprinting pattern. Further studies of a wider population of M. nana isolates from other hosts and status disease are needed to establish that M. nana is a genetically homogeneous species. This is the first report of the characterization of the beta-tubulin gene in Malassezia spp.

**Comparison of the efficacy and adverse effects of sustained-release buprenorphine hydrochloride following subcutaneous administration and buprenorphine hydrochloride following oral transmucosal administration in cats undergoing ovariohysterectomy.**
OBJECTIVE: To compare the efficacy and adverse effects of sustained-release (SR) buprenorphine following SC administration and buprenorphine following oral transmucosal (OTM) administration in cats undergoing ovariohysterectomy. Animals-21 young healthy female cats. PROCEDURES: As part of anesthetic premedication (0 hours), 10 cats received buprenorphine (0.02 mg/kg) via OTM administration with additional doses at 12, 24, 36, 48, and 60 hours and 11 cats received an equivalent total dose as a single SC injection of SR buprenorphine (0.12 mg/kg). The SR product contained buprenorphine hydrochloride in a proprietary SR matrix. All other anesthetic drugs and a single postoperative dose of meloxicam were administered similarly to all cats. Behavioral and physiologic variables were recorded, and signs of pain were assessed by use of 2 pain assessment scales and von Frey filament testing in each cat prior to premedication administration (baseline), during recovery from anesthesia (RFA), and at 12, 24, 36, 48, 60, and 72 hours. RESULTS: Heart rate increased and temperature (determined via microchip transponder thermometry) decreased from baseline values during RFA in both groups. Compared with baseline values, pain scores were increased during RFA and at the 12- and 24-hour time points in both groups; von Frey scores were higher during RFA. Behavioral and physiologic variables did not differ significantly between groups at any time point. CONCLUSIONS AND CLINICAL RELEVANCE: In cats undergoing ovariohysterectomy, SC administration of a preoperative dose of SR buprenorphine appeared to have comparable efficacy and adverse effect profile as that of twice-daily OTM administration of buprenorphine before and after surgery.

**Duodenal perforation caused by Rhizomucor species in a cat.**
CLINICAL SUMMARY: A 7-month-old female Persian cat presented with gastrointestinal (GI) necrosis and perforation caused by Rhizomucor species. Unfortunately, the cat died of bacterial peritonitis and sepsis before a definitive diagnosis, based on histopathology and fungal culture, was achieved. PRACTICAL RELEVANCE: This appears to be the first reported case of GI disease caused by Rhizomucor species in a cat. Mucorales infections typically cause acute and rapidly progressive disease. As illustrated by this case, clinicians should be alert to the potentially fatal consequences of an opportunistic Rhizomucor species infection in their feline patients.

Safety of masitinib mesylate in healthy cats.
BACKGROUND: Masitinib mesylate is a PO-administered tyrosine kinase inhibitor developed both for human and animal diseases with activity against both mutated and wild type forms of the c-kit receptor and platelet-derived growth factor receptors alpha and beta, and is currently registered in Europe for the treatment of mast cell tumors in dogs. HYPOTHESIS/OBJECTIVES: The objective of this study was to determine if healthy cats can tolerate administration of masitinib without clinically relevant adverse effects. Animals: Twenty healthy research colony-specific pathogen-free cats. METHODS: This study was a prospective, randomized phase 1 clinical trial. Masitinib was administered PO to 20 healthy cats. Ten cats received 50 mg masitinib every other day for 4 weeks, and 10 cats received 50 mg masitinib daily for 4 weeks. RESULTS: Clinically relevant proteinuria was noted in 2/20 (10%) cats (both treated daily), and neutropenia was noted in 3/20 (15%) (seen in both treatment groups). An increase in serum creatinine concentration and adverse gastrointestinal effects were noted in some cats. CONCLUSIONS AND CLINICAL IMPORTANCE: Masitinib mesylate was tolerated in the majority of cats. Long-term administration and pharmacokinetic studies are needed to further assess the use of masitinib in cats.

Canine parvovirus type 2c infection in a kitten associated with intracranial abscess and convulsions.
A case of canine parvovirus type 2c (CPV-2c) infection in a 3-month-old feral kitten with a cerebral abscess and neurological disease is reported. The cat displayed ataxia and convulsions together with signs of gastroenteritis and profound alteration of the total and differential white blood cell counts. A parvovirus strain was detected by a TaqMan assay in the blood and faeces of the affected kitten, which was characterised as CPV by means of molecular assays but did not react with any of the CPV type-specific probes. By sequence and phylogenetic analyses of the VP2-protein gene, the CPV-2c strain displayed a non-coding mutation in the probe-binding region. Although the role of CPV-2c in this particular case is unclear, it is possible that it predisposed the kitten to the clinical signs seen. Continuous surveillance is needed to monitor future spreading of this CPV-2c mutant, and any associated clinical signs, in the dog and cat population.
**Temporo-mandibular joint condylectomy and its effect over occlusion in cats: cadaveric study.**

**OBJECTIVE:** To determine the effect of unilateral condylectomy on dental occlusion in cats.

**METHODS:** Twelve feline cadaver heads were randomly submitted to either a right or left unilateral condylectomy of the temporo-mandibular joint. The distance between the mandibular and maxillary canine tooth was measured before (B0) and after the unilateral condylectomy (P0). A right or left latero-lateral standardised force (4 N) was applied to the mandibular mentus area before and after the surgical procedure. These measurements were analysed with a linear model for repeated measures.

**RESULTS:** The comparative analysis between pre- and postsurgical values indicated no significant variation in teeth displacement following condylectomy between B0 and P0 measurements. Statistically significant differences were detected after either left or right condylectomy with respect to all measurements after application of the standardised forces. Occlusion changes are significant when comparing bites before and after surgery.

**CLINICAL SIGNIFICANCE:** Unilateral condylectomy causes a significant increase in latero-lateral amplitude of jaw movement which might clinically affect feline dental occlusion. Clinical studies are required to determine the effect of unilateral condylectomies on mastication and dental occlusion in feline patients.

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**Cross-species surveillance of Leptospira in domestic and peri-domestic animals in Mahalla City, Gharbeya Governorate, Egypt.**

A survey of 179 animals (black rats, dogs, sheep, buffaloes, cattle, donkeys, weasels, and cats) for Leptospira infection was conducted in Mahalla City (Lower Egypt). Blood, urine, and kidney were collected and tested by culture, microscopic agglutination test (MAT), and/or polymerase chain reaction (PCR). Among rats, 26% were positive by PCR, including 7% that were also positive by culture for L. interrogans serovars Grippotyphosa, Pyrogenes, and Icterohaemorrhagiae. L. borpetersenii serovar Polonica was isolated for the first time in Egypt in three rats. MAT titers >/= 1:800 were observed in 11% of rats and 12% of dogs. L. interrogans serovar Grippotyphosa was detected in one cat. Sheep and donkeys were negative for leptospirosis by all methods. Buffaloes and cattle were seropositive in 20% and 44% of animals, respectively. Data indicate that several pathogenic serovars are circulating in the animals, which may pose exposure risks and account for high rates of acute febrile illness.

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**Prevalence of antibody to Toxoplasma gondii in terrestrial wildlife in a natural area.**

We conducted a cross-sectional study from 2008 to 2009 to evaluate the occurrence of feral and wild cats and the risk of Toxoplasma gondii infection in terrestrial wildlife in a natural area in Illinois, USA.
Felids are definitive hosts for T. gondii and cats are a key component of rural and urban transmission of T. gondii. We selected four forest sites within the interior of the park and four edge sites within 300 m of human buildings. Feline and wildlife occurrence in the natural area was determined with the use of scent stations, motion-detection cameras, and overnight live trapping. Based on scent stations and trapping, feral cats used building sites more than forest sites (scent stations: P=0.010; trapping: P=0.083). Prevalence of T. gondii antibodies was determined with the use of the indirect immunofluorescent antibody test (IFAT) with a titer of 1:25 considered positive; T. gondii antibodies were detected in wildlife at all sites. Wildlife species were classified as having a large home range (LHR) or a small home range (SHR), based on published estimates and using a cutoff of 100 ha. Small-home-range mammals had a higher prevalence of antibody to T. gondii (odds ratio [OR]=4.2; P=0.018) at sites with a high frequency of cat occurrence (defined as >/= 9 cat occurrences across three detection methods); this finding indicates that feral cats are the most likely source of environmental contamination. Overall, the prevalence of antibody to T. gondii among LHR mammals was significantly higher than the prevalence among SHR mammals (OR=7.1; P<0.001). Small-home-range mammals are an essential part of T. gondii-antibody prevalence studies and can be used as sentinels for risk of disease exposure to humans and wildlife in natural areas. This study improves our understanding of ecologic drivers behind the occurrence of spatial variation of T. gondii within a natural area.

Ovariectomy or ovariohysterectomy?

Performances of different diagnostic tests for feline infectious peritonitis in challenging clinical cases.

OBJECTIVES: Feline infectious peritonitis (FIP) can be difficult to diagnose. Histopathology is considered the gold standard test but immunohistochemistry (IHC) is mandatory to confirm/exclude the disease. This study aimed to assess the performances of tests carried out in vivo or at postmortem examination in challenging cases in which FIP was confirmed or excluded based on IHC or on adequate follow-up. METHODS: Twelve cases (four without FIP, eight with FIP) were retrospectively studied. Clinical findings, serum protein electrophoresis (SPE), analysis of the effusions (AE), antifeline coronavirus serology, serum concentration of alpha1-acid glycoprotein (AGP) and histopathology were classified as consistent, doubtful or non-consistent with FIP. Sensitivity, specificity and concordance (kappa) with the final diagnosis were calculated. RESULTS: Concordance was absent for serology (kappa=−0.08) and AE (kappa=−0.52), poor for histopathology (kappa=0.09), fair for SPE (kappa=0.25) and perfect for AGP (kappa=1.00). Sensitivity was high for AGP (100%) and low for AE (50%), SPE (37.5%) and histopathology (37.5%). Specificity was high for AGP or histopathology (100%) and low for SPE (50%) and AE (0%). CLINICAL SIGNIFICANCE: IHC must always be performed to confirm FIP. If this is not possible, when histopathology is controversial, elevated AGP concentrations may support the diagnosis of FIP.

**Congenital diaphragmatic eventration in two closely related British Shorthair cats.**

Two closely related British Shorthair cats, which died after surgery performed in the dorsal position, were presented for dissection. In both, a thin, flaccid, enlarged transparent tendinous diaphragmatic portion protruded cranially into the thoracic cavity, forming a cupola in which left, right medial and quadrate hepatic lobes were encased in both cats and the stomach in one cat. Microscopically, no muscle fibres were observed in the membrane, but numerous hepatocytes and bile ducts were incorporated in its central part. The anomaly was diagnosed as a congenital diaphragmatic eventration.


**Inflammatory polyps of the nasal turbinates of cats: an argument for designation as feline mesenchymal nasal hamartoma.**

Inflammatory polyps of the nasal turbinates (IPNT) in cats are benign growths that are histologically distinct from feline nasopharyngeal polyps. Most cats with IPNT are presented at less than 1 year of age with sneezing, noisy breathing and epistaxis, but without mucoid or mucopurulent nasal discharge. Histologically, IPNT are characterised by the presence of woven bone as part of the proliferating stroma and erythrocyte-filled spaces. These unique histological features are analogous to nasal hamartomas (NH) of children, specifically chondromesenchymal hamartoma (NCMH) and sinonasal fibro-osseous hamartoma (SFOH), which also result in signs of nasal obstruction, sneezing and epistaxis. In our study, clinical and histopathological features in five cats with IPNT were compared with published descriptions of NH in children. We conclude that the terminology ‘feline mesenchymal nasal hamartoma’ provides a more accurate description of the disease currently termed IPNT, and has the added advantage of being consistent with its human counterpart.


**Feline intracranial meningioma with skull erosion and tumour extension into an area of skull hyperostosis.**

Skull hyperostosis is a frequently recognised feature of meningioma in feline and human patients, occurring at a frequency of around 4.5% of human cases. Evidence of osteolysis with extension of meningioma into, and in some cases through, the region of skull hyperostosis is much less commonly described in human patients. Here we present a 12-year-old cat with marked skull hyperostosis secondary to an intracranial meningioma, with magnetic resonance imaging and computed tomography evidence of tumour extension into the skull, centrally within the region of hyperostosis. Only a thin layer of bone was remaining between the mass and the extracranial region. Surgical resection of the region of skull demonstrating tumour invasion and the underlying mass resulted in good resolution of clinical signs and no post-surgical recurrence of meningioma within the 5 months follow-up period. Histopathological examination confirmed the mass to be fibroblastic meningioma.
Hypoxia-inducible factors (HIFs) play a key role in the cellular response experienced in hypoxic tumours, mediating adaptive responses that allow hypoxic cells to survive in the hostile environment. Identification and understanding of tumour hypoxia and the influence on cellular processes carries important prognostic information and may help identify potential hypoxia circumventing and targeting strategies. This review summarizes current knowledge on HIF regulation and function in tumour cells and discusses the aspects of using companion animals as comparative spontaneous cancer models. Spontaneous tumours in companion animals hold a great research potential for the evaluation and understanding of tumour hypoxia and in the development of hypoxia-targeting therapeutics.

This study was conducted to describe the ultrasonographic appearance and technique for the evaluation of sciatic nerve (ScN) in cats. An anatomical study was carried out using six feline cadavers to determine anatomic landmarks. An ultrasonographic ‘in vitro’ study was performed using eight pelvic limbs from four fresh feline cadavers to assess the ScN in three regions (glutea, femoralis and popliteal) using a 4-13MHz linear transducer. Five healthy adult experimental cats were employed for an ‘in vivo’ ultrasonographic study of the ScN using the same protocol described for the ‘in vitro’ study. The ultrasonographic images of the ScN were well correlated with those obtained in the anatomical study. The ScN was easily identified in all the approaches. The ScN was observed as a hypoechoic structure with internal echoes, outlined by hyperechoic lines. This study shows the usefulness of ultrasound to evaluate the entire pathology of the ScN in the cat.

A 7-year-old, spayed female Domestic Longhair cat was evaluated for a 6-week history of coughing. Thoracic radiography revealed a pleural effusion. Thoracic ultrasound revealed a pleural effusion and a focal lung mass. The cat underwent exploratory thoracotomy and a total left pneumonectomy was performed. Histopathology and cultures revealed fungal pneumonia and pyothorax caused by Aspergillus fumigatus. Abdominal ultrasound, repeat thoracic radiography, urinalysis with culture, and retroviral screening failed to detect evidence of systemic disease. The cat’s poorly regulated diabetes mellitus is suspected to be the predisposing factor allowing a fungal pulmonary infection to become established. At 18 months after surgery the cat was still disease-free. To our knowledge this is the first reported case of successful treatment of pulmonary aspergillosis in the cat.

In vitro susceptibility of canine and feline Escherichia coli to fosfomycin.

Therapeutic options for multi-drug resistant (MDR) Escherichia coli in dogs or cats are limited. The objective of this study was to establish in vitro susceptibility of canine and feline E. coli to fosfomycin. Two sources of isolates were categorized based on susceptibility as to no resistance (NDR), single drug resistance (SDR), multidrug resistance (MDR) or extreme drug resistance (XDR). Clinical isolates were collected from throughout the US from dogs (n=157) or cats (n=43) with naturally occurring infection between March 2008 and January 2010. Experimental isolates were collected from fecal samples of dogs treated with no drug (NDR), amoxicillin (expressing SDR) or enrofloxacin (expressing MDR or XDR). Fosfomycin minimum inhibitory concentrations (MIC) were determined using E-Test((R)). For clinical isolates, most (165/200) originated from the urinary tract, with the number of isolates per resistant category being: NDR (N=44, 22%), SDR (N=65, 32.5%), MDR (N=74, 37%), and XDR (N=17, 8.5%). Of these isolates, 99% (197/200) were susceptible to fosfomycin with the MIC(90) and MIC(50) being 2 and 1 mug/ml, respectively (range: 0.25-196 mug/ml). The number of experimental isolates in each category was NDR (3), SDR (23), MDR (38), and XDR (11) (29.3, 44, and 14.7%, respectively). Of these, 100% were susceptible to fosfomycin with MIC(90) and MIC(50) being 1.5 and 1 mug/ml (range: 0.38-4 mug/ml), respectively. The susceptibility of canine and feline MDR and XDR E. coli to fosfomycin at concentrations well below the susceptible breakpoint supports further investigation for its use when treating E. coli resistant to alternative antimicrobials.


Functional anatomy of the cheetah (Acinonyx jubatus) forelimb.

Despite the cheetah being the fastest living land mammal, we know remarkably little about how it attains such high top speeds (29 m s(-1)). Here we aim to describe and quantify the musculoskeletal anatomy of the cheetah forelimb and compare it to the racing greyhound, an animal of similar mass, but which can only attain a top speed of 17 m s(-1). Measurements were made of muscle mass, fascicle length and moment arms, enabling calculations of muscle volume, physiological cross-sectional area (PCSA), and estimates of joint torques and rotational velocities. Bone lengths, masses and mid-shaft cross-sectional areas were also measured. Several species differences were observed and have been discussed, such as the long fibred serratus ventralis muscle in the cheetah, which we theorise may translate the scapula along the rib cage (as has been observed in domestic cats), thereby increasing the cheetah’s effective limb length. The cheetah’s proximal limb contained many large PCSA muscles with long moment arms, suggesting that this limb is resisting large ground reaction force joint torques and therefore is not functioning as a simple strut. Its structure may also reflect a need for control and stabilisation during the high-speed manoeuvring in hunting. The large digital flexors and extensors observed in the cheetah forelimb may be used to dig the digits into the ground, aiding with traction when galloping and manoeuvring.


Pharmacovigilance in veterinary medicine in Chile: a pilot study.

Iraguen, D., Urcelay, S., San Martin, B. Pharmacovigilance in veterinary medicine in Chile: a pilot study.
study. J. vet. Pharmacol. Therap. 34, 108-115. In Chile, there is no present government policy to survey and analyse adverse drug reactions (ADRs) in the field of veterinary medicine. The intent of this study is to assess, for the first time, ADR frequency in treated animals. To this purpose, a 6-month period pilot study based on WHO recommendations was conducted to monitor ADRs in cats and dogs for frequently used drugs and common labelled signs. Of a total of 149 detected ADRs, 29 (6 in cats and 23 in dogs) were notified by means of ADR report forms, while the rest was identified after reviewing patient clinical records, thus evidencing strong under-reporting problems. More than 70% of ADRs were related to antimicrobials, vaccines and tranquilizers. In dogs, there was a significant effect on ADRs’ presentation when acepromazine, amoxicillin, carprofen, ivermectin, sextuple vaccine (polyvalent vaccine that confers immunity against canine distemper virus, canine parvovirus, Leptospira canicola, L. icterohemmoragiae, canine adenovirus type 2 and canine parainfluenza virus) and phytomenadione (subcutaneous injection) were administered. In the case of cats, a significant influence on ADRs was detected when acepromazine, amoxicillin or vitamin K was administered. Present results suggest the need for a pharmacovigilance programme in veterinary medicine for timely ADR-presenting drug detection and drug safety improvement.


**Bronchoscopic findings in 48 cats with spontaneous lower respiratory tract disease (2002-2009).**

BACKGROUND: Diagnosis of lower respiratory disease requires collection of airway samples to confirm the etiology of disease. Bronchoscopic evaluation is commonly performed in dogs but less information is available in cats. HYPOTHESIS: The presence and number of bronchoscopic abnormalities visualized during bronchoscopic evaluation of cats with lower respiratory disease will correlate with the type of disease and total and differential cell counts in bronchoalveolar lavage (BAL) fluid. ANIMALS: Forty-eight cats prospectively evaluated by a single bronchoscopist. METHODS: Bronchscopy was performed during clinical evaluation of cats presenting with cough, respiratory distress, or both. Cats were evaluated for airway hyperemia, stenosis, or collapse, mucus accumulation, bronchiectasis, and epithelial irregularities. Cats were placed into groups of bronchitis/"asthma," pneumonia, or neoplasia based on BAL findings, histopathology, and response to appropriate medical therapy. Summation of bronchial abnormalities and total and differential cell counts were compared among groups. RESULTS: Endobronchial abnormalities were common in cats with feline bronchitis/asthma, pneumonia, and neoplasia and no differentiating features were found. Excessive mucus accumulation was common (83%), followed by stenosis of bronchial openings and nodular epithelial irregularities (56%), airway hyperemia (54%), airway collapse (48%), and bronchiectasis (27%). Total bronchoscopic score and total cell count did not differ among groups, although differential cell counts were significantly different. A weak correlation ($R^2 = 0.16$, $P=.006$) between age and total bronchoscopic score was noted. CONCLUSIONS AND CLINICAL RELEVANCE: Bronchoscopic abnormalities are common in cats with lower respiratory tract disease, and visualization of the airways provides additional nonspecific clinical information in cats.


**Assay validation and diagnostic applications of major acute-phase protein testing in companion**
animals.
The use of major acute-phase proteins (APPs) for assessment of health and disease in companion animals has increased within the last decade because of increased knowledge in the field and increased access to appropriate assay systems for detection of relevant APPs, which are highly species specific. Despite evidence being restricted almost solely to proven excellent overlap performance of these markers in detecting inflammatory activity, clinically relevant studies at higher evidence levels do exist. The available body of literature shows a clear, but seemingly untapped, potential for more extended routine clinical use of major APP testing in companion animal medicine.


The aim of this study was to determine the prevalence of Tritrichomonas foetus infection and associated clinical signs in purebred cats in Germany, to investigate the role of co-infection, and identify determinants of infection. Faecal specimens accompanied by epidemiological questionnaires were scored and collected from 230 purebred cats. Faeces were examined for trichomonads and other enteroparasites. The prevalence of T foetus was 15.7% among cats and 18.5% among catteries. An abnormal faecal score and history of diarrhoea were observed in 64% and 61% of T foetus-positive cats, respectively, and correlated significantly with infection. Co-infection, observed in 36% of T foetus-infected cats, was not associated with diarrhoea. Norwegian Forest cats were infected significantly more often than other breeds. No association was found with any environmental factors. This study demonstrated a high prevalence of symptomatic T foetus infections in purebred cats in Germany. Co-infection with other enteroparasites did not worsen clinical signs of trichomonosis.

BACKGROUND: Fat-restricted diets have been advocated for dogs with diarrhea for many years. Recommendations for cats with diarrhea have varied between low-fat and high-fat diets, but there have been no published studies to support either recommendation. OBJECTIVES: The objective of this study was to compare the clinical responses of cats with chronic diarrhea to dietary management using either a high fat or a low fat, highly digestible diet. ANIMALS: Sixty pet cats with chronic diarrhea were recruited; 55 cats completed the study. METHODS: Randomized, double-blinded, controlled clinical trial. Upon completion of baseline measures, cats were fed 1 of 2 diets for 6 weeks, during which the owners recorded fecal scores daily using an illustrated fecal score chart ranging from 0 (very watery) to 100 (firm and dry). After 6 weeks, cats were reevaluated by the attending veterinarians.
RESULTS: Fecal scores improved significantly, with 78.2% of cats improving by at least 25 points on the 100-point scale or having a final fecal score of at least 66. Over one third of the cats developed normal stools. There were no differences in clinical responses between the diets. Clinical improvement was noted within the 1st week, and maximized within 3 weeks. CONCLUSIONS AND CLINICAL IMPORTANCE: These results show that dietary management can be helpful in cats with chronic diarrhea, but dietary fat content does not appear to affect the outcome. Cats that do not respond within 3 weeks should be evaluated further.


Nested case-control study of feline calicivirus viruria, oral carriage, and serum neutralizing antibodies in cats with idiopathic cystitis.

BACKGROUND: The epidemiology of feline calicivirus (FCV) infection in cats with idiopathic cystitis (FIC) has not been investigated by contemporary molecular biologic methods. OBJECTIVES: To determine the prevalence of and evaluate risk factors for FCV viruria, oral carriage, and virus neutralizing (VN) antibodies in cats with and without FIC. ANIMALS: Cats with nonobstructive FIC (n = 47), obstructive FIC (n = 22), and FCV upper respiratory tract infection (URI; n = 25), and healthy client-owned (n = 18) and colony-housed (n = 24) cats. METHODS: Oropharyngeal secretions and urine were evaluated with a FCV p30 gene-based real-time reverse-transcriptase polymerase chain reaction (RT-PCR) assay. Serum VN antibody titers were determined by a modified microtiter assay. Associations of risk factors with log-transformed antibody titers were determined by multivariable generalized linear regression. RESULTS: FCV viruria was detected in 4 (6%) and 3 (12%) cats with FIC and URI, respectively. In 3 FIC cats, viruria was unassociated with detectable oral virus carriage. Oral FCV carriage was detected in 7 (10%) FIC cats. Median antibody titers were significantly higher in cats with obstructive FIC (1:256), nonobstructive FIC (1:128), and URI (1:512) compared with healthy client-owned (1:16) and colony-housed (1:4) cats (P <.001). Other than disease, multivariate analysis did not identify any other explanatory variables for increased titers in cats with FIC or URI. CONCLUSIONS AND CLINICAL IMPORTANCE: FCV viruria was detected in cats with FIC and URI, however, its etiologic significance is uncertain. Serologic results suggest increased FCV exposure in FIC cats compared with controls. Further investigations are needed to clarify the potential role of FCV in FIC.


Ronidazole pharmacokinetics after intravenous and oral immediate-release capsule administration in healthy cats.

Ronidazole (RDZ) is an effective treatment for feline Tritrichomonas foetus infection, but has produced neurotoxicity in some cats. An understanding of the disposition of RDZ in cats is needed in order to make precise dosing recommendations. Single-dose pharmacokinetics of intravenous (IV) RDZ and immediate-release RDZ capsules were evaluated. A single dose of IV RDZ (mean 9.2mg/kg) and a 95mg immediate-release RDZ capsule (mean 28.2mg/kg) were administered to six healthy cats in a
randomized crossover design. Plasma samples were collected for 48 h and assayed for RDZ using high pressure liquid chromatography (HPLC). Systemic absorption of oral RDZ was rapid and complete, with detection in the plasma of all cats by 10 min after dosing and a bioavailability of 99.64 (+/- 16.54)%. The clearance of RDZ following IV administration was 0.82 (+/-0.07) ml/kg/min. The terminal half-life was 9.80 (+/-0.35) and 10.50 (+/-0.82) h after IV and oral administration, respectively, with drug detectable in all cats 48h after both administrations. The high oral bioavailability of RDZ and slow elimination may predispose cats to neurotoxicity with twice-daily administration. Less frequent administration should be considered for further study of effective treatment of T. foetus-infected cats.

Evaluation of the electroencephalogram in young cats.
OBJECTIVE: To characterize the electroencephalogram (EEG) in young cats. ANIMALS: 23 clinically normal cats. PROCEDURES: Cats were sedated with medetomidine hydrochloride and butorphanol tartrate at 2, 4, 6, 8, 12, 16, 20, and 24 weeks of age, and an EEG was recorded at each time point. Recordings were visually inspected for electrical continuity, interhemispheric synchrony, amplitude and frequency of background electrical activity, and frequency of transient activity. Computer-aided analysis was used to perform frequency spectral analysis and to calculate absolute and relative power of the background activity at each age. RESULTS: Electrical continuity was evident in cats >/= 4 weeks old, and interhemispheric synchrony was evident in cats at all ages evaluated. Analysis of amplitude of background activity and absolute power revealed significant elevations in 6-week-old cats, compared with results for 2-, 20-, and 24-week-old cats. No association between age and relative power or frequency was identified. Transient activity, which consisted of sleep spindles and K complexes, was evident at all ages, but spike and spike-and-wave discharges were observed in cats at 2 weeks of age. CONCLUSIONS AND CLINICAL RELEVANCE: Medetomidine and butorphanol were administered in accordance with a sedation protocol that allowed investigators to repeatedly obtain EEG data from cats. Age was an important consideration when interpreting EEG data. These data on EEG development in clinically normal cats may be used for comparison in future studies conducted to examine EEGs in young cats with diseases that affect the cerebral cortex.

What is your diagnosis? Diaphragmatic hernia.

Prevalence of fecal-borne parasites detected by centrifugal flotation in feline samples from two shelters in upstate New York.
Over a 3.5-year period, fecal samples from 1322 cats from two shelters and affiliated foster homes in upstate New York were processed for parasite detection by both 1.18spg zinc sulfate and 1.3spg sugar double centrifugal flotation. In 50.9% of the samples at least one parasite was detected. Overall, 18
different parasites ranging in prevalence from 0.2% to 21% were recovered. The most prevalent parasites of foster and shelter cats in this study were Cystoisospora species and Toxocara cati (21% prevalence, each). In order of percentage of positive samples, other findings were: Giardia species (8.9%), Aelurostrongylus abstrusus (6.2%), taeniid eggs (3.9%), Cryptosporidium species (3.8%), Aonchotheca species (3.7%), Euculeus species (2.3%), Ancylostoma species (2.2%), Cheyletiella species (2.0%), Dipylidium caninum (1.1%), Otodectes species, Toxoplasma-like oocysts and Sarcocystis species (0.8% each), Demodex and Spirometra species (0.4% each), and Alaria species and Felicola subrostratus (0.2% each).

An 11-year-old castrated male domestic medium hair cat was presented with neurological signs consistent with a right thalamocortical lesion. Computed tomography (CT) images revealed a heterogeneously, hyperattenuating, poorly contrast enhancing intra-axial mass within the right lateral ventricle. The histological diagnosis at post-mortem examination was vascular hamartoma with hemorrhage and necrosis. This is the first report of a vascular hamartoma affecting the thalamocortex in a geriatric cat. Also, this is the first time that CT images of a feline cerebral vascular hamartoma have been reported.

Bartonella species are Gram-negative, fastidious bacteria. Bartonella henselae is found in cats and transmitted to humans via cat scratches or bites causing cat-scratch disease, characterized by clinical symptoms with varying severity. The prevalence of bartonellosis among humans in Germany appears to be high, and severe clinical cases have been described. However, epidemiological data of B. henselae in cats are rare. In this study we determined the detection rates of Bartonella ssp. in cats by culture and real-time PCR. Furthermore, B. henselae isolates were genetically characterized by highly discriminatory amplified fragment length polymorphism (AFLP) and multilocus sequence typing (MLST). Bartonella spp. were isolated by culture from 11 (2.2%) of 507 blood samples. Out of 169 blood samples additionally analyzed by PCR, 28 (16.6%) were found positive for Bartonella spp., illustrating the advantage of PCR in Bartonella spp. detection. PCR-REA identified B. henselae in 27 cats and Bartonella claridgeiae in one cat. B. henselae isolates from different geographical regions in Germany were genetically characterized by AFLP and MLST. Both methods confirmed genetic diversity of B. henselae on the strain level. MLST identified 11 new sequence types, all of them assigned to three clonal complexes as determined by eBURST. AFLP typing revealed genetic relation among the B. henselae isolates from the same geographical region. Combining AFLP typing and MLST/eBURST analyses revealed that B. henselae of the same AFLP subcluster belonged to the same clonal complex. Altogether these results indicate that B. henselae may evolve clonally.
Morton CM, Grant D, Johnston L, Letellier IM, and Narbe R (2011) J Feline Med Surg 13:237-243. Clinical evaluation of meloxicam versus ketoprofen in cats suffering from painful acute locomotor disorders. The aim of this study was to evaluate the efficacy and palatability of meloxicam 0.5mg/ml oral suspension, compared to ketoprofen tablets in cats suffering from painful acute locomotor disorders. This single blinded, positively-controlled, randomised, multicentre trial involved 121 client owned cats. Cats received either meloxicam (0.5mg/ml oral suspension) at 0.1mg/kg on day 1 followed by 0.05mg/kg q 24h on days 2-5, or ketoprofen 5mg tablets at 1.0mg/kg q 24h for 5 days. The efficacy of the two treatments was assessed subjectively by clinicians on day 6 using a clinical sum score (CSS). Palatability and accuracy of dosing were also assessed. The baseline CSS was not significantly different between the groups, and after 5 days of treatment the CSS had decreased to a similar extent, reflecting a reduction in pain. There were no significant differences between the CSS of each group at day 6. Both treatments were well tolerated. Meloxicam was significantly more palatable than ketoprofen, and allowed for more accurate dosing. Meloxicam and ketoprofen are a safe and efficacious treatment for acute locomotor disorders in cats. Meloxicam (Metacam) may be associated with superior compliance in clinical practice due to the higher palatability, which results in better ease of administration.

Muhle M, Bleiholder A, Kolb S, Hubner J, Lochelt M, and Denner J (2011) Virology 412:333-340. Immunological properties of the transmembrane envelope protein of the feline foamy virus and its use for serological screening. The transmembrane envelope (TM) proteins of retroviruses are used as antigen in diagnostic immunoassays and they represent a conserved target for neutralizing antibodies. To analyze the situation in infections with the feline foamy virus (FFV), its recombinant TM protein was produced and used for ELISA and Western blot analyses. Screening sera from 404 German cats showed that 39% reacted against the TM protein, the same infection rate was determined using the Gag protein. Epitope mapping showed antibodies against the membrane proximal external region (MPER) of the TM protein in the sera from infected cats, but attempts to induce neutralizing antibodies by immunization with the recombinant TM protein failed. This is the first report demonstrating that the TM protein of the FFV is highly immunogenic and valuable for serological screening. Similar to HIV-1, but in contrast to different gammaretroviruses, immunization with the TM protein of FFV did not induce neutralizing antibodies.

Nakamura RK, Rishniw M, King MK, and Sammarco CD (2011) J Feline Med Surg 13:266-271. Prevalence of echocardiographic evidence of cardiac disease in apparently healthy cats with murmurs. The objective of this prospective study was to determine the prevalence of echocardiographic evidence of heart disease in apparently healthy cats with heart murmurs. Thirty-two privately owned domestic cats were examined. All cats were considered healthy on the basis of history and physical examination,
except for the finding of a heart murmur on auscultation. Cats on any medications (besides regular flea, tick and heartworm preventative) or that were pregnant or lactating were excluded from this study. The prevalence of echocardiographic evidence of heart disease in this population of cats was 53%. Therefore, identification of a heart murmur on routine physical examination in apparently healthy cats warrants further investigation.


**An azole-resistant isolate of Malassezia pachydermatis.**

Canine Malassezia dermatitis (MD) is frequently treated with systemic ketoconazole (KTZ) and itaconazole (ITZ). However, the antifungal susceptibility of clinical isolates of M. pachydermatis from dogs and cats to the azoles has not been well investigated. In the present study, the in vitro susceptibility of the standard strain (CBS1879: the neotype strain of M. pachydermatis) and 29 clinical isolates of M. pachydermatis to the azoles was measured by a modified CLSI M27-A2 test using modified Dixon medium as well as by the E-test. The minimum inhibitory concentrations (MICs) of the 30 isolates of M. pachydermatis (including the neotype strain) against KTZ and ITZ were <0.03 mug/ml by the two methods. The MICs of 1 clinical isolate (ASC-11) were 1 and 2 mug/ml against KTZ, and 2 and 8 mug/ml against ITZ, by the modified CLSI M27-A2 test and the E-test, respectively. Thus, isolate ASC-11 may be resistant to these azoles, making this the first report of a resistant isolate of M. pachydermatis to KTZ and ITZ.


**Subacute endotoxemia induces adipose inflammation and changes in lipid and lipoprotein metabolism in cats.**

Acute inflammation in humans is associated with transient insulin resistance (IR) and dyslipidemia. Chronic low-grade inflammation is a pathogenic component of IR and adipose tissue dysfunction in obesity-induced type 2 diabetes. Because feline diabetes closely resembles human type 2 diabetes, we studied whether lipopolysaccharide (LPS)-induced subacute inflammation, in the absence of obesity, is the potential primary cause of IR and metabolic disorders. Cats received increasing iv doses (10-1000 ng/kg(-1). h(-1)) of LPS (n = 5) or saline (n = 5) for 10 d. Body temperature, proinflammatory and metabolic markers, and insulin sensitivity were measured daily. Tissue mRNA and protein expression were quantified on d 10. LPS infusion increased circulating and tissue markers of inflammation. Based on the homeostasis model assessment, endotoxemia induced transient IR and beta-cell dysfunction. At the whole-body level, IR reverted after the 10-d treatment; however, tissue-specific indications of IR were observed, such as down-regulation of adipose glucose transporter 4, hepatic peroxisome proliferative activated receptor-gamma1 and -2, and muscle insulin receptor substrate-1. In adipose tissue, increased hormone-sensitive lipase activity led to reduced adipocyte size, concomitant with increased plasma and hepatic triglyceride content and decreased total and high-density lipoprotein cholesterol levels. Prolonged LPS-induced inflammation caused acute IR, followed by long-lasting tissue-specific dysfunctions of lipid-, glucose-, and insulin metabolism-related targets; this ultimately resulted in dyslipidemia but not whole-body IR. Endotoxemia in cats may provide a promising model
to study the cross talk between metabolic and inflammatory responses in the development of adipose tissue dysfunction and IR.


**Pulmonary rhodococcosis in a cat.**
Feline Rhodococcus equi infection is rare, despite the bacteria is widespread in the environment. R equi infection is typically observed in equine species but the infection has also been reported in dogs, cats and other domestic animals. There are a few reports regarding pulmonary R equi infection in cats and the disease appears to be limited to the skin and the subcutaneous tissue. This report describes the pathological, microbiological and the virulence features associated with an acute necrosuppurative pneumonia in a cat. To the best of our knowledge, this is the first report of feline pulmonary R equi infection in Italy.


**Diagnosis of intraocular lymphosarcoma in a dog by use of a polymerase chain reaction assay for antigen receptor rearrangement.**
CASE DESCRIPTION: A 12-year-old castrated male mixed-breed dog was evaluated because of blepharospasm and blindness affecting both eyes. CLINICAL FINDINGS: During examination and diagnostic testing of the dog, fine-needle aspirates of splenic nodules were examined microscopically and stage Vb multicentric large-cell lymphosarcoma was identified. Aqueocentesis was performed, and sample analysis revealed intraocular lymphosarcoma; B-cell neoplasia was confirmed by use of a PCR assay for antigen receptor rearrangement (PARR) performed on samples of aqueous humor. Secondary uveitis and glaucoma were detected bilaterally in addition to chronic superficial corneal ulcerations in the left eye. TREATMENT AND OUTCOME: Treatment for abdominal and intraocular lymphosarcoma involving administration of vincristine, l-asparaginase, cyclophosphamide, doxorubicin, and prednisone was initiated. Secondary uveitis and glaucoma were controlled with topical treatment; however, the corneal ulceration did not resolve. Seven weeks following diagnosis, the dog died as a result of complications related to systemic neoplasia and chemotherapy. CLINICAL RELEVANCE: In the dog of this report, intraocular lymphosarcoma was diagnosed via PARR performed on samples of aqueous humor. Moreover, the immunophenotype of the neoplastic cells was determined by use of that diagnostic technique. Because secondary uveitis is a common finding in dogs and cats with systemic lymphosarcoma, intraocular lymphosarcoma should be considered as a differential diagnosis; furthermore, investigation (eg, PARR performed on aqueous humor samples) to identify the presence of intraocular lymphosarcoma is warranted, thereby allowing targeted interventions to be considered in management of those patients.

Sensitivity of cytopathological examination in the diagnosis of feline sporotrichosis.
Sporotrichosis is caused by Sporothrix schenckii. The cat is the animal species most affected by this mycosis and plays an important role in the zoonotic transmission of this disease. The definitive diagnosis is made by isolation of the fungus in culture; however, cytopathological examination is frequently used in cats. Medical records from cats treated at Instituto de Pesquisa Clinica Evandro Chagas/Fiocruz, Rio de Janeiro, Brazil, between 2004 and 2006 were reviewed. Criteria for inclusion were a diagnosis by isolation of S schenckii in culture and cytopathological examination of the same lesion as that used for collection of the culture material. Eight hundred and six cats were included in the study. Yeast-like structures suggestive of S schenckii were observed in 636 cases. The sensitivity of the method was 78.9%. Its practicality, low cost and sensitivity validate cytopathology as a safe technique for the presumptive diagnosis of sporotrichosis in cats.

Toxicosis caused by melamine and cyanuric acid in dogs and cats: uncovering the mystery and subsequent global implications.
Several major pet-food and human-food safety incidents occurred worldwide between 2003 and 2008, causing illnesses and deaths in children, cats, dogs, and pigs. During the 2007 outbreak of renal failure in dogs and cats in the United States, veterinary diagnostic laboratories helped identify melamine and melamine analogues as contaminants in implicated food. In 2008, thousands of infants developed renal failure from exposure to melamine alone. Management of these outbreaks depends on the collaboration of veterinary and human laboratories and clinics, government agencies, academic institutions, and food industries, along with prompt communication and sharing of data.

Selectively reshaping a muscle phenotype: functional overload of cat plantaris.
INTRODUCTION: Functional overload (FO) of the fast plantaris muscle was studied in treadmill-exercised (FO-Ex) or sedentary (FO-Sed) adult cats. METHODS: Mechanical, phenotype, and kinematics analyses were performed. RESULTS: Plantigrade vs. normal digitigrade posture was observed early post-FO. Relative plantaris mass was greater in FO-Sed (10%) and FO-Ex (60%) cats than in controls 12 weeks post-FO. Specific tension was similar across groups, indicating functional hypertrophy. Fiber size was greater, percent slow fibers higher, percent Ila myosin heavy chain (MHC) higher, and IIx MHC lower in FO-Ex than controls. Twitch and half-relaxation times were longer, and the frequency-tension curve shifted toward that observed in slow muscles. Electromyography (EMG) and tendon force amplitudes during stepping were larger, and the yield (lengthening) phase occurred at a longer muscle length before compared with after FO. DISCUSSION: Reshaping the plantaris phenotype was highly dependent on the overload stimulus, indicating that electrical stimulation paradigms used during rehabilitation should be performed with the muscles under “loaded” conditions.

Mycobacterium microti infection in the cat: a case report, literature review and recent clinical experience.

OVERVIEW: Mycobacterium microti infection is infrequently described in cats in the veterinary literature. It can be one of a large number of possible differential diagnoses in a feline patient with dermal nodules and non-healing draining ulcers, and can occasionally spread to involve the lungs and/or other areas of the body. CASE SUMMARY: This report describes the clinical signs, eventual diagnosis and variable response to treatment in a cat in Switzerland with recurrent cutaneous M microti infection. Only after several diagnostic and therapeutic attempts, over more than 2 years, was the species of Mycobacterium finally identified and targeted therapy given. PRACTICAL RELEVANCE: For any cat in which there is even a low suspicion of mycobacterial infection, the authors recommend that an aggressive diagnostic approach is taken. Tissue specimens should be collected and frozen early on, and, as soon as acid-fast bacilli are detected, samples should be sent to a mycobacterial reference laboratory for definitive identification.

LITERATURE REVIEW: A review of the literature relating to the aetiopathogenesis, diagnosis and management of M microti infection in cats and dogs is included. This is supplemented with clinical and therapeutic experience gained from this case and other, unpublished cases managed over the past 15 years by one of the authors (DGM).


Blood contrast agents enhance intrinsic signals in the retina: evidence for an underlying blood volume component.

PURPOSE: To examine the extent to which neurovascular coupling contributes to stimulus-evoked intrinsic signals in the retina. METHODS: The retinas of five adult cats were examined in vivo. Animals were anesthetized and paralyzed for imaging stability. The retinas were imaged through a modified fundus camera capable of presenting patterned visual stimuli simultaneous with a diffuse near infrared (NIR). RESULTS: Injections of nigrosin increased signal strength by as much as 36.3%, and indocyanine green (ICG) increased signal magnitudes by as much as 38.1%. In both cases, intrinsic signals maintained a colocalized pattern of activation corresponding to the visual stimulus presented. The time course of the evoked signals remained unaltered. The spectral dependency of signal enhancement mirrored the absorption spectra of the injected dyes. CONCLUSIONS: The data are consistent with a neurovascular coupling effect in the retina. Patterned visual stimuli evoke colocalized NIR reflectance changes. The patterned decrease in reflectance was enhanced after nigrosin or ICG was injected into the systemic circulation. These findings suggest stimulus-evoked changes in blood volume underlie a component of the retinal intrinsic signals.


Diagnostic cytology in veterinary medicine: a comparative and evidence-based approach.

Diagnostic cytology is a core veterinary pathology service involving specimens from domestic animals, laboratory animals, and exotic species. Evidence-based application of cytopathology involves management of preanalytical factors, and thorough evaluation of the diagnostic accuracy of the technique in each species and for all specimen types. Unique to veterinary medicine is the reliance on
cytology as the basis for crucial medical decisions such as humane euthanasia, especially when the patient is critically ill or when financial considerations limit diagnostic and therapeutic options. This article reviews the cytologic criteria for the diagnosis of selected neoplastic and infectious diseases.

Pathology in practice. Severe chronic multifocal intramural fibrosing and eosinophilic enteritis, with occasional intralesional bacteria, consistent with feline gastrointestinal eosinophilic sclerosing fibroplasia. (FIESF).

Cross-sectional study of the prevalence and clinical features of osteoarthritis in 100 cats.
To assess clinical signs and relevance of osteoarthritis (OA) in cats, the radiographic prevalence of OA in the appendicular skeleton of 100 client-owned cats (>/= 6 years old) was assessed. Possible associations between radiographic OA, clinical locomotor system examination, and owner-perceived behavioural changes were evaluated. OA was most prevalent in the shoulders, elbows, hips and tarsal joints with 61% of cats having OA in at least one joint and 48% in more than one joint. Overall, clinical examination of the larger peripheral joints had the highest sensitivity and specificity for radiographic OA. Regression analysis showed age to be related to OA (P = 0.002), as were decreased mobility and grooming (P = 0.008), although there was a correlation with age. Finally, increased inappropriate elimination was associated with OA (P = 0.046). It was concluded that the prevalence of OA in cats is strikingly high and increases with age. OA in cats seems to be associated with behavioural changes.

Predator exposure-induced cerebral interleukins are modulated heterogeneously by behavioral asymmetry.
Predator exposure is a naturalistic stressor that is likely to elicit a stressful response pattern similar to those experienced in the real world. As a consequence of stress, HPA hormonal activity and the alteration of mediators such as cytokines may result. Behavioral asymmetry, as assessed by paw preference, exerted effects on immune responses and peripheral cytokine production, observed after exposure to the physical stimuli. Thus, we hypothesized that behavioral asymmetry can modulate mouse brain interleukins and HPA activity after exposure to an internally generated psychological stress source. To determine the impact of behavioral asymmetry, mice were divided into left- and right-pawed groups by paw preference. Then, the mice received either a single 60-min or a daily 60-min predator exposure (cat exposure) for 14 consecutive days. After receiving predator exposure, trunk blood was collected and brain tissues, including the cerebral cortex, hippocampus and hypothalamus, were separated. Plasma corticosterone (CS) was detected by EIA, and IL-1beta and IL-6 levels in the cortex, hippocampus and hypothalamus, were quantified by ELISA. The results revealed that predator stress, in particular chronic stress, could enhance plasma CS concentration and could alter IL-1beta and IL-6 concentrations in the cortex, hippocampus and hypothalamus. Simultaneously, predator stress-
induced CS and brain interleukin levels were modulated by behavioral asymmetry. The left-pawed mice showed a decreased variation in CS, less than right-pawed mice, and both left-pawed and right-pawed mice displayed heterogeneous direction and intensity of changes for IL-1beta and IL-6 in the cortex, hippocampus and hypothalamus after predator exposure. From these results, it can be concluded that the alteration of cytokines depends on the characteristics of the stressor. Furthermore, the asymmetric cytokine responses within the brain to a natural, psychological stressor may be involved in the immunomodulation of behavioral asymmetry. These findings likely reflect the flexibility in reactivity patterns of a population in response to various insults.


**Could controlling mammalian carnivores lead to mesopredator release of carnivorous reptiles?**

Emerging evidence increasingly illustrates the importance of a holistic, rather than taxon-specific, approach to the study of ecological communities. Considerable resources are expended to manage both introduced and native mammalian carnivores to improve conservation outcomes; however, management can result in unforeseen and sometimes catastrophic outcomes. Varanid lizards are likely to be apex- or mesopredators, but being reptiles are rarely considered by managers and researchers when investigating the impacts of mammalian carnivore management. Instances of mesopredator release have been described for Varanus gouldii as a result of fox and cat management in Australia, with cascading effects on faunal community structure. A meta-analysis showing extensive dietary niche overlap between varanids, foxes and cats plus a review of experimental and circumstantial evidence suggests mesopredator release of V. gouldii and about five other medium to large species of varanid lizard is likely in other regions. This highlights the need for managers to adopt a whole-of-community approach when attempting to manage predators for sustained fauna conservation, and that additional research is required to elucidate whether mesopredator release of varanids is a widespread consequence of carnivore management, altering the intended faunal responses.


**The examination of biophysical parameters of skin (transepidermal water loss, skin hydration and pH value) in different body regions of normal cats of both sexes.**

The purpose of this study was to evaluate transepidermal water loss (TEWL), skin hydration and skin pH in normal cats. Twenty shorthaired European cats of both sexes were examined in the study. Measurements were taken from five different sites: the lumbar region, the axillary fossa, the inguinal region, the ventral abdominal region and the left thoracic region. In each of the regions, TEWL, skin hydration and skin pH were measured. The highest TEWL value was observed in the axillary fossa (18.22g/h/m²) and the lowest in the lumbar region (10.53g/h/m²). The highest skin hydration was found in the inguinal region (18.29CU) and the lowest in the lumbar region (4.62CU). The highest skin pH was observed in the inguinal region (6.64) and the lowest in the lumbar region (6.39). Statistically significant differences in TEWL were observed between the lumbar region and the left side of the thorax region (P=0.016), the axillary fossa (P=0.0004), the ventral region (P=0.005), and the inguinal region (P=0.009). There were significant differences in skin hydration between the lumbar region and the left thorax (P=0.000003), the axillary fossa (P=0.002), the ventral abdomen (P=0.03), and the
inguinal region (P=0.0003) as well as between the thorax and the ventral abdomen (P=0.005). TEWL was higher in females (15g/h/m(2)) than in males (4.57g/h/m(2)). Skin hydration was higher in females (13.89CU) than in males (12.28CU). Significant differences were not found between males and females for TEWL and skin hydration. Skin pH was higher in males (6.94) than in females (6.54), which was significant (P=0.004).


Bladder reflexes evoked by stimulation of pudendal afferent nerves (PudA-to-Bladder reflex) were studied in normal and chronic spinal cord injured (SCI) adult cats to examine the reflex plasticity. Physiological activation of pudendal afferent nerves by tactile stimulation of the perigenital skin elicits an inhibitory PudA-to-Bladder reflex in normal cats, but activates an excitatory reflex in chronic SCI cats. However, in both normal and chronic SCI cats electrical stimulation applied to the perigenital skin or directly to the pudendal nerve induces either inhibitory or excitatory PudA-to-Bladder reflexes depending on stimulation frequency. An inhibitory response occurs at 3-10 Hz stimulation, but becomes excitatory at 20-30 Hz. The inhibitory reflex activated by electrical stimulation significantly (P<0.05) increases the bladder capacity to about 180% of control capacity in normal and chronic SCI cats. The excitatory reflex significantly (P<0.05) reduces bladder capacity to about 40% of control capacity in chronic SCI cats, but does not change bladder capacity in normal cats. Electrical stimulation of pudendal afferent nerves during slow bladder filling elicits a large amplitude bladder contraction comparable to the contraction induced by distension alone. A bladder volume about 60% of bladder capacity was required to elicit this excitatory reflex in normal cats; however, in chronic SCI cats a volume less than 20% of bladder capacity was sufficient to unmask an excitatory response. This study revealed the co-existence of both inhibitor and excitatory PudA-to-Bladder reflex pathways in cats before and after chronic SCI. However our data combined with published electrophysiological data strongly indicates that the spinal circuitry for both the excitatory and inhibitory PudA-to-Bladder reflexes undergoes a marked reorganization after SCI.


PRACTICAL RELEVANCE: Although the surgical management of feline congenital portosystemic shunts (CPSSs) is normally performed at specialist centres, a good knowledge of treatment options and prognosis is important for the general practitioner when advising clients. CLINICAL CHALLENGES: A variety of surgical techniques are described for the correction of CPSSs in cats. Choosing between the different techniques is a challenge, given the limited availability of evidence supporting one technique over another. In addition, postoperative complications, and in particular neurological complications, are seen more frequently in the cat than the dog and thus postoperative monitoring and treatment is critically important in feline patients. AUDIENCE: This article summarises current evidence in surgical management and is aimed at practising veterinarians, postgraduate students and specialists alike. EQUIPMENT: Surgical management of CPSSs typically requires advanced surgical
and critical care facilities. The precise nature will depend to some extent on the technique employed.

EVIDENCE BASE: The evidence base for decision making in the surgical management of CPSSs is relatively sparse. In reviewing the evidence that is available, as well as the areas in which information is still lacking, this article may hopefully serve as a stimulus for further investigation into this condition.


**Congenital portosystemic shunts in cats: investigation, diagnosis and stabilisation.**

PRACTICAL RELEVANCE: Although a relatively uncommon condition, the investigation, diagnosis and initial medical management of feline congenital portosystemic shunts is often undertaken within general practice. Early recognition and appropriate treatment are important to ensure a good outcome. CLINICAL CHALLENGES: Clinical signs associated with CPSSs in cats are extremely variable and can be intermittent. Signs can affect a variety of organ systems including the nervous system, and gastrointestinal and urinary tracts. Thus, the differential diagnosis list may be very long and a CPSS may not be suspected initially. More specific diagnostic tests and diagnostic imaging are indicated but may not be 100% accurate and may not be readily available to the general practitioner. AUDIENCE: This review highlights challenging aspects of the investigation and management of CPSSs for the practising veterinarian, but is also relevant to postgraduate students and provides a practical summary for specialists. PATIENT GROUP: In practice, domestic shorthairs make up the majority of cats with CPSSs. However, Siamese, Persian and Himalayan cats may be more commonly affected than other purebreeds. While cats with CPSSs are typically under 6 months old, the condition is seen in mature animals, which may not have exhibited clinical signs for months or years. EVIDENCE BASE: Despite several retrospective studies of cats with CPSSs, the evidence base for management of the condition remains limited.


**Feline cryptococcosis: impact of current research on clinical management.**

DISEASE SUMMARY: Cryptococcosis, principally caused by Cryptococcus neoformans and Cryptococcus gattii, is the most common systemic mycosis of cats worldwide. Cats may be infected following inhalation of spores from the environment, with the nasal cavity suspected as being the initial site of colonization and subsequent infection. Other sites of infection in cats are the skin, lungs, lymph nodes, central nervous system (CNS), eyes and, occasionally, periarticular connective tissue. Cryptococcosis can be diagnosed using serology (antigen testing), cytologic examination of smears, histopathology or culture. Treatment of localized disease is generally successful using azole antifungal drugs; however, cats with CNS involvement or disseminated disease require additional treatment with amphotericin B, with or without flucytosine. The prognosis is variable, depending on host and pathogen factors. Some cats require long-term (>1 year) treatment or indefinite therapy. PATIENT GROUP: Cats of any breed, gender and age may be affected. Retroviral status does not appear to be a risk factor for developing cryptococcosis and indoor cats are not protected from disease. GLOBAL IMPORTANCE: Feline cryptococcosis occurs worldwide, but is most frequently reported in Australia, western Canada and the western United States. Species and molecular type vary in different geographical regions and may affect clinical presentation and antifungal susceptibility patterns.
CLINICAL CHALLENGES: Serologic tests that detect cryptococcal antigen in serum are sensitive and specific, but false negatives can occur in cats with localized disease. Long-term drug therapy can be expensive and has the potential for toxicity. The extent to which the pathogenicity and antifungal susceptibility is affected by molecular type is currently under study. EVIDENCE BASE: This review draws on recent literature relating to epidemiology, CNS involvement and advanced diagnostic imaging to update clinicians regarding research findings relevant to clinical practice.

Evaluation of a manual biopsy device, the ‘Spirotome’, on fresh canine organs: liver, spleen, and kidneys, and first clinical experiences in animals.
Several methods for obtaining specimens from abdominal organs have been described. Imaging-guided biopsy, particularly ultrasound-guided biopsy, is the most frequently used in clinical trials. The aim of this study was to evaluate the diagnostic quality of histological samples obtained with a manual biopsy device (Spirotome) on biopsies of the liver, spleen, and kidney, in fresh canine organs and in live animals in a clinical trial. The study was divided into two different parts, one using normal fresh canine organs with a total of 60 biopsies, 20 of liver, spleen, and kidney, respectively; and one on clinical patients, including 35 biopsied lesions in 28 animals (25 dogs and three cats) for a total of 95 biopsies. All the biopsy samples were considered satisfactory from canine cadavers, and all specimens were diagnostic in clinical cases. The technique was accurate and safe and no major complications were noted.

Image-guided interventional procedures in the dog and cat.
Medical imaging is essential for the diagnostic workup of many soft tissue and bone lesions in dogs and cats, but imaging modalities do not always allow the clinician to differentiate inflammatory or infectious conditions from neoplastic disorders. This review describes interventional procedures in dogs and cats for collection of samples for cytological or histopathological examinations under imaging guidance. It describes the indications and procedures for imaging-guided sampling, including ultrasound (US), computed tomography (CT), magnetic resonance imaging and fluoroscopy. US and CT are currently the modalities of choice in interventional imaging.

Evaluation of a novel haematology analyser for use with feline blood.
A novel haematology analyser was evaluated for its use with feline samples. Complete blood cell counts, a five-part differential count, and reticulocyte numbers were determined, and the results compared with reference data. Coefficients of correlation, Passing-Bablok regression analysis and Bland-Altman difference plots with biases and 95% limits of agreement are reported. Precision and linearity were also studied. The instrument demonstrated very low imprecision, and the tested range of
linearity exceeded the reference ranges provided by the manufacturer. For all parameters except monocytes (r = 0.65), the analyser results correlated well with reference methods. Compared with the manual count of aggregated reticulocytes, the instrument showed good agreement with a positive bias. The optical platelet count correlated well with the manual chamber count. In conclusion the analyser was found to be highly reliable for the analysis of feline blood samples in a large veterinary laboratory.

Glucose monitoring in diabetic dogs and cats: adapting new technology for home and hospital care.
Glucose levels in dogs and cats with diabetes mellitus can be monitored using a variety of techniques. Selecting the best monitoring technique requires involvement of the pet owner, communication between the owner and veterinarian, and practicality of the method. Some of the techniques typically used in dogs and cats are identical to those used in human diabetic patients. The use of modern technology designed specifically for people is being used increasingly for the management of diabetes in dogs and cats and offers a new mechanism for monitoring glucose in diabetic animals.

Urodynamic evaluation of female cats with idiopathic cystitis.
OBJECTIVE: To compare values of urodynamic measurements of cats with idiopathic cystitis (IC) with previously published data for healthy female cats. ANIMALS: 11 female cats with IC.
PROCEDURES: 2 sequential cystometrograms and 2 urethral pressure profiles were obtained for each cat. All tracings were evaluated for evidence of overactive urinary bladder (OAB). Maximum urethral pressure (MUP), maximum urethral closure pressure (MUCP), and functional profile length were recorded. RESULTS: Only 3 cats had obvious micturition events. None of the 11 cats had evidence of OAB. Although not significant, threshold pressure was lower in cats with IC than in healthy cats (mean +/- SD, 89.0 +/- 12.0 cm H(2)O vs 75.7 +/- 16.3 cm H(2)O, respectively); however, the total volume infused was significantly lower in cats with IC (4.8 +/- 2.1 mL/kg vs 8.3 +/- 3.2 mL/kg). The MUCP was significantly higher in cats with IC than in healthy cats (158.0 +/- 47.7 cm H(2)O vs 88.9 +/- 23.9 cm H(2)O, respectively). The MUP was also significantly higher in all portions of the urethra in cats with IC. CONCLUSIONS AND CLINICAL RELEVANCE: No evidence of OAB was identified in any cat evaluated; therefore, medications used to target this abnormality did not appear justified. The high MUCP in cats with IC suggested that alpha(1)-adrenoceptor antagonists or skeletal muscle relaxants may be useful in this disease, and if these data were applicable to male cats, then alpha(1)-adrenoceptor antagonism may help prevent recurrent obstructive IC. Further studies are indicated to determine the effects, if any, these drugs might have in cats with IC.

Appearance and distribution of stromal myofibroblasts and tenascin-C in feline mammary
tumors.

Myofibroblasts and extracellular matrix protein tenascin-C (Tn-C) are known to be implicated in cancer progression in human cancer. In feline mammary tumors that are a suitable model for human breast cancer, however, little is known about stromal myofibroblasts and no information is available on the expression of Tn-C. Feline samples of normal mammary glands and proliferating mammary lesions were routinely processed and serial sections were cut and immunostained with anti-alpha-smooth muscle actin (alpha-SMA) or Tn-C antibody. Myofibroblasts were not included in the stroma of 90% (9/10) of normal mammary gland tissues, 92% (12/13) of adenosis, and 63% (5/8) of simple adenomas. On the other hand, all 40 simple carcinomas contained stromal myofibroblasts to a varied extent. Tn-C expression was detected in the stroma of 92% (37/40) of carcinomas, and its global distribution almost coincided with that of myofibroblasts. In addition, Tn-C immunoreactivity was occasionally observed in the basement membrane zone around ducts in some cases of normal mammary glands and benign lesions, but barely observed in the stroma. These results suggest that stromal myofibroblasts may be a major cellular source of Tn-C and be involved in malignant progression of feline mammary tumor.


**Feline ureteral strictures: 10 cases (2007-2009).**

BACKGROUND: Feline ureteral obstructions have emerged as a common problem. Ureteral strictures rarely are reported as a cause and the predisposing factors and clinical course of this condition have not been described. OBJECTIVES: Evaluate cases of feline ureteral strictures and characterize historical features, clinical signs, diagnostic imaging, surgical and endoscopic findings, histopathology, treatment modalities, and short- and long-term outcomes. ANIMALS: Ten cats diagnosed with ureteral strictures based on compatible findings from at least 2 of the following: ultrasonography, ureteropyelography, surgical exploration, or histopathology. METHODS: Retrospective study. RESULTS: Median age, serum creatinine concentration, and size of the renal pelvis were 12 years, 3.7 mg/dL, and 11.75 mm, respectively. Six of 10 cats had hypechoic periureteral tissue on ultrasound examination at the stricture site. Four cats had evidence of a circumcaval ureter at surgery. Eight cats had an intervention including ureteral stent placement (n = 6) and traditional surgery (n = 2). Seven of 8 cats had decreases in serum creatinine concentration and renal pelvic parameters preceding discharge and 6 had persistently improved results at their last examination. All patients survived to discharge. Median survival time was > 294 days (range, 14 to > 858 days) with 6/10 cats still alive. CONCLUSIONS AND CLINICAL IMPORTANCE: Ureteral strictures may occur in cats secondary to ureteral surgery, inflammation, a circumcaval ureter, impacted ureterolithiasis, or for unknown causes. With appropriate and timely intervention, the prognosis for long-term survival is good. In addition to ureteral reimplantation or ureteronephrectomy, ureteral stenting or SC ureteral bypass may be considered as future therapeutic options.