ABSTRACT NO.: 001
Establishing a reproducible method for the culture of primary equine corneal cells
R. L. Mathes,*, U. M. Dietrich,† T. M. Krunkowsky,‡ D. J. Hurley‡ and A. J. Rebert*†
∗Department of Small Animal Medicine and Surgery, College of Veterinary Medicine, University of Athens, Greece, Athens, GA, USA, †Department of Anatomy and Radiology, College of Veterinary Medicine, University of Georgia, Athens, GA, USA, ‡Department of Population Health, College of Veterinary Medicine, University of Georgia, Athens, GA, USA

Purpose: To establish a reproducible method for the culture of primary equine corneal epithelial cells, keratocytes and endothelial cells and to describe each cell's morphologic characteristics, immunocytochemical staining properties and conditions required for cryopreservation.

Methods: Corneas from eight horses recently euthanized for reasons unrelated to this study were used. Corneas were excised from three individual horses for cell isolation. The cells were plated, grown in culture and continued for several passages. Each cell type was characterized by morphology and immunocytochemical staining. Results: Three equine corneal cell types were successfully grown in culture. Cultured corneal endothelial cells were large, hexagonal cells with a moderate growth rate. Keratocytes were small, spindle cells that grew slowly. Epithelial cells had heterogeneous morphology and grew slowly. The endothelial cells and keratocytes stained positive for vimentin and were morphologically distinguishable from each other. The epithelial cells stained positive for cytokeratin. Keratocytes and endothelial cells were able to be cryopreserved and recovered. The cryopreserved cells maintained their morphological and immunocytochemical features after cryopreservation and recovery.

Conclusion: This work establishes reproducible methods for isolation and culture of all three equine corneal cells. Cell morphology and cytoskeletal element expression for each cell type is also described. This has not been reported for veterinary corneal cell culture. University of Georgia Veterinary Ophthalmology Research Fund (VOBF).

ABSTRACT NO.: 002
Serum antibodies against alpha A- and B-crystallin in American Cocker Spaniels
N. Kanemaki,*, Y. Kondo,† Y. Ichikawa* and D. E. Brooks*†
∗Veterinary Teaching Hospital, Azabu University, Japan, †College of Veterinary Medicine, University of Florida, Gainesville, FL, USA

Purpose: To evaluate serum antibody levels against alpha A- and B-crystallins in American Cocker Spaniel dogs (ACSs).

Methods: Frozen lenses were homogenized, and water-soluble lens protein collected. The alpha A- and B-crystallins were separated with gel electrophoresis and evaluated by Western immunoblot analysis. Results: Seventy-one ACSs were evaluated including 57 with mature cataracts, 2 dogs with immature cataracts, 2 dogs with IOL implantation, 6 glaucomatous dogs, 4 dogs with retinal disease, 5 others with ocular surface abnormalities, and 9 normal ACS dogs. The incidence of serum antibody against alpha A-crystallin (41.9%) in ACSs with eye diseases was higher than that of antibody against alpha B-crystallin (4.8%) in dogs with eye problems. In normal dogs, the serum antibody against alpha A-crystallin (53.6%) was higher than that of antibody against alpha B-crystallin (22.2%). Serum antibodies against alpha A-crystallins were detected in dogs with various categories of eye disease. The serum antibody against alpha A-crystallin in cataractous dogs was relatively low compared to that in normal dogs. The intensity of alpha A-crystallin antibody titers in hypermature cataractous dogs associated with uveitis was significantly lower than in cases without uveitis. Conclusions: The formation of lens-crystallin antibodies is lower in normal ACS, and varies with the degree of cataract maturation in ACS.

ABSTRACT NO.: 003
Vascular endothelial growth factor (VEGF) in diabetic and non-diabetic canine cataract patients
K. L. Abrams,*, P. F. Stahl,* K. J. Kauper† and S. Elliot†
∗Veterinary Ophthalmology Services, Inc, Warwick, RI, USA, †Neathorpe USA, Inc, Lincoln, RI, USA

Purpose: To measure vascular endothelial growth factor (VEGF) levels in aqueous humor, serum, and plasma in diabetic and non-diabetic cataractous dogs.

Methods: Canine VEGF was assayed in the plasma and serum of 32 dogs (20 diabetic, 12 non-diabetic) and aqueous humor in 57 eyes of those dogs (59 diabetic, 18 non-diabetic) undergoing phacoemulsification, using a commercial canine VEGF assay. Statistical analysis was performed using Fisher's PLSD, t-test, and regression analysis to compare values by diabetic status, duration of diabetes, age, weight, gender, left vs. right eye, and blood condition. Results: Plasma, but not serum or aqueous VEGF values of diabetic dogs were significantly greater than non-diabetic dogs (P < 0.019). Older non-diabetic dogs had higher VEGF values than younger (6–10 and 11–15 years) dogs (P = 0.0002 and 0.0001, respectively). There was a high correlation of aqueous VEGF between left and right eyes in all patients. Serum and plasma VEGF values in females were significantly higher than males in both groups. Conclusion: Similar to human diabetic patients, VEGF values in canine diabetic plasma is significantly greater than non-diabetics. However, aqueous humor values of VEGF in diabetic dogs were not greater than non-diabetics, whereas, aqueous VEGF values in human diabetics are elevated and correlate with the severity of diabetic retinopathy.

ABSTRACT NO.: 004
Transfrontal orbitotomy in the dog
N. Wallin-Hakansson and B. Wallin-Hakansson
Referral Animal Hospital Stromsholm, Sweden

Purpose: To describe an adaptable and easy method for orbitotomy in the dog. Methods: A three step technique for orbitotomy was developed and applied in nine consecutive cases. The steps are: 1) a subcutaneous arch resection laterally, temporally, muscle elevation medially and zygomatic process osteotomy anteriorly-dorsally. The entire orbit is accessed with excellent exposure and latitude for surgical manipulation. Osteotomies are closed using cerclage wire. Soft tissues are sutured routinely. Facial nerve, lacrimal nerve and lacrimal gland functions are preserved. The procedure can easily be converted into an orbital exenteration. Results: Access to the orbit was sufficient in all cases. Anatomically correct closure was achieved. Complications included immediate, reversible swelling in two cases and mild in seven. Wound infection or emphysema did not occur. Postoperative discomfort appeared limited. No other complications attributable to the operative procedure occurred. Blinding and lacrimal function as determined by Schirmer tear test 1 were preserved. Follow-up time ranged from 12 months to 4 years. Conclusions: Transfrontal orbitotomy in the dog offers excellent exposure and latitude for orbital manipulation. Complications are minimal. Anatomically correct closure is easy and postoperative discomfort limited. No funding and grants.

ABSTRACT NO.: 005
Local anesthetic retrobulbar block reduces postoperative pain following enucleation of canine eyes: a randomized, placebo controlled, double-masked clinical trial
K. E. Myrna, E. Bentley and L. J. Smith
Department of Surgical Sciences, School of Veterinary Medicine, University of Wisconsin, Madison, WI, USA

Purpose: To assess the efficacy of retrobulbar bupivicaine nerve block on postoperative analgesia following enucleation of canine eyes. Methods: Client-owned dogs admitted to the veterinary medical teaching hospital for routine enucleation were enrolled with owner consent and randomly assigned to a treatment (bupivicaine) or placebo (saline) group. Baseline subjective pain scores were recorded. Anesthesia consisted of hydromorphone and midazolam preoperatively, thoracopetal or propofol for induction and isofluorane in oxygen for maintenance. An inferior-temporal palpebral retrobulbar injection of either saline or bupivicaine was administered. Transpalpebral enucleation surgery was performed. Pain scores were recorded at 0.25, 0.5, 1, 2, 4, 6, 8, and 24 hours after extubation by observers masked to treatment groups. Results: Time-to-treatment failure (TTF) averaged 0.53 h among the nine failure dogs with the shortest TTF being 0.1 h and the longest 2 h. The study suggests that retrobulbar administration of bupivicaine in dogs, with traditional premedication, is an effective form of adjunctive analgesia and significantly reduces the need for additional postoperative analogues after enucleation surgery. Funded by a grant from the American College of Veterinary Ophthalmologists Vision for Animals Foundation.

ABSTRACT NO.: 006
Cellular localization of Visudyne® as a function of time after local injection for photodynamic therapy: an investigation into the mechanisms of tumor cell death
L. D. Barnes, E. A. Giuliano and J. Ota
Department of Veterinary Medicine and Surgery, College of Veterinary Medicine, University of Missouri, Columbia, MO, USA

Purpose: To evaluate the time effect of local injection of Visudyne® after local injection. Methods: A squamous cell carcinoma (SCC) cell line (A-411) was injected into right and left dorsolateral subcutaneous tissue of six mice. In experiment 1 (Exp 1) and 2 (Exp 2), the treatment (T) was a local injection of Visudyne® (Novartis®, Priority Health Care, FL, 0.1 mg/cm²), and control (C) tumors received an equal dose of 5% dextrose in water (D5W). Mice were randomly subdivided into two groups (A & B; n = 5/group). Mice in Exp 1A and B were sacrificed 1 minute (min) and 30 minutes (mins) after local injection, respectively. Experiment 1 tumors were evaluated by fluorescence microscopy to determine drug localization. Experiment 2A and B tumors were laser irradiated 1 and 10 mins after injection, respectively and evaluated by transmission electron microscopy (TEM) to determine ultrastructural tumor cell damage. Results: Fluorescence was detected within the cytoplasm of T tumors in both Exp 1A and B. Significance was detected in fluorescence intensity between T1 min vs. T10 mins (P = 0.03) and between T1 min and C1 min tumors (P = 0.01), respectively. Tumors in Exp 2 demonstrated cellular rounding of apoptosis. Fluorescence microscopy demonstrated higher Visudyne® concentration within SCC cytoplasm of 1 min compared to 10 min tumors. Transmission electron microscopy results revealed that tumors treated by photodynamic therapy (PDT) within 10 mins of local injection underwent cellular apoptosis. Supported by the ACVO Vision for Animals Foundation Grant.

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ABSTRACT NO.: 007
Safety assessment of intracapsular moxifloxacin in canine eye undergoing lens replacement surgery
J. C. Wolfer
Islington Animal Clinic, Toronto, ON, Canada
Purpose: To evaluate the safety of intracapsular moxifloxacin HCl 0.5% (Vigamox) in canine eyes undergoing lens replacement surgery. Method: Cultures of total of 100 g of mononuclear cells were infected with the use of 4.5 g of moxifloxacin HCl at a dose of 100 μg/ml of monocytes. The injection was performed into the lens capsule at the end of cataract surgery in 20 dogs, 29 eyes. The first two patients acted as controls, with each dog receiving the test compound in one eye and the other, respectively. Results: All were evaluated for any reactions such as rise in IOP, corneal edema, uveitis, glaucoma, fibrin formation or chorioretinits, on post-operative days 1, 7, 14, 21. Patient evaluation included measurement of IOP, pupil size, and anterior chamber depth. Results: In all eyes treated there were no complications that were attributed to the use of intracapsular moxifloxacin. Conclusion: Intracapsular moxifloxacin HCl, at a dose of 100 μg/ml, is safe in the canine eye.

ABSTRACT NO.: 008
Expression of TLR-2, TLR-4, TRAP and IL-6 genes in normal canine eyes and in an eye with idiopathic uveitis, a pilot study
J. Ota-Kuroki*, A. M. Stoker†, H. J. Sims‡, C. P. Moore†, J. W. Pearce*, D. Busut† and K. Kuroki*†
*Midwest Veterinary Referral Center, Chesterfield, MO USA; †Comparative Orthopaedic Laboratory, University of Missouri-Columbia, Columbia, MO, USA; ‡Department of Veterinary Medicine and Surgery, University of Missouri-Columbia, Columbia, MO, USA.
Purpose: To investigate the expression of toll-like receptor-2 (TLR-2), TLR-4, tartrate-resistant acid phosphatase (TRAP) and interleukin-6 (IL-6) in normal canine eyes and in an eye with idiopathic uveitis. Methods: Anterior uveal tissue was collected from 14 normal eyes of 7 dogs and one eye with canine idiopathic uveitis. Real time polymerase chain reaction (PCR) was performed with TLR-2, TLR-4, TRAP and IL-6 gene specific primers. In order to confirm TLR-4 expression at the protein level, TLR-4 immunofluorescence was also evaluated in all tissues. Results: TLR-2, TLR-4, TRAP and IL-6 gene expressions were detected by RT-PCR in all anterior uveal tissues examined. Expression levels of TLR-2, TLR-4, TRAP, and IL-6 in the anterior uveal tissue was 6.6, 3.9, 18.5 and 2.3 times higher respectively in the eye with uveitis compared to the normal eyes. TLR-4 immunofluorescence was observed in all normal uveal tissues examined and also in the eye with idiopathic uveitis. Strongly TLR-4 immunostaining was observed in the case of idiopathic uveitis. Conclusion: This study demonstrated the presence of TLR-2, TLR-4, TRAP and IL-6 expression in normal canine anterior uveal tissues. Expression of these genes in the anterior uveal tissue appears to be increased in canine idiopathic uveitis compared to normal controls. We anticipate that these results could play a significant role in disease initiation and progression of canine idiopathic uveitis and warrants further evaluation and case recognition.

ABSTRACT NO.: 009
Efficient gene delivery in the equine cornea
D. G. Buss*, A. Sharma†, E. A. Giuliano* and R. R. Mohan†
*College of Veterinary Medicine, University of Missouri-Columbia, Columbia, MO, USA; †Harry S. Truman Memorial Veterani Hospital, Columbia, MO, USA.
Purpose: To determine whether a combination of latanoprost 0.005%/timolol 0.5% (LAT) (Pro Fibron, Allergan) administered by suprachoroidal injection has any effect on intraocular pressure (IOP), pupil size, and heart rate in normal dogs. Methods: Thirty-two normal dogs were divided into four groups: (a) saline group (N = 8); (b) 50 μl of suprachoroidal saline injection (N = 8); (c) 50 μl of suprachoroidal latanoprost injection (N = 8); (d) 50 μl of suprachoroidal latanoprost/timolol injection (N = 8). At 2 through 9 h post-dose on days 2 and 5, IOP, PS, and HR were measured at 0, 2, 4, 6, 8, and 9 h after dosing. Results: There was no significant difference in IOP, PS, or HR between the saline groups on days 2 and 5. On days 2 through 5, dogs in the suprachoroidal saline group had a significantly lower IOP and a trend towards larger pupil size in comparison to the latanoprost/timolol group. Conclusion: The combination of latanoprost/timolol does not significantly lower IOP, pupil size, or increase heart rate in normal dogs.

ABSTRACT NO.: 010
Bilateral optic atrophy in cynomolgus macaques used in toxicologic research
*Comparative Ophthalmic Research Laboratories, University of Wisconsin-Madison, Madison, WI, USA; ††Center for Veterinary Science Laboratories Inc, Madison, WI, USA.
Purpose: To determine whether a combination of latanoprost 0.005%/timolol 0.5% (LAT) (Pro Fibron, Allergan) administered by suprachoroidal injection has any effect on intraocular pressure (IOP), pupil size, and heart rate in normal dogs. Methods: Seventeen normal dogs were randomly assigned to four groups: (a) saline group (N = 8); (b) 50 μl of suprachoroidal saline injection (N = 8); (c) 50 μl of suprachoroidal latanoprost injection (N = 8); (d) 50 μl of suprachoroidal latanoprost/timolol injection (N = 8). At 2 through 9 h post-dose on days 2 and 5, IOP, PS, and HR were measured at 0, 2, 4, 6, 8, and 9 h after dosing. Results: There was no significant difference in IOP, PS, or HR between the saline groups on days 2 and 5. On days 2 through 5, dogs in the suprachoroidal saline group had a significantly lower IOP and a trend towards larger pupil size in comparison to the latanoprost/timolol group. Conclusion: The combination of latanoprost/timolol does not significantly lower IOP, pupil size, or increase heart rate in normal dogs.

ABSTRACT NO.: 011
Long-term control of equine recurrent uveitis using a suprachoroidal cyclosporine matrix reservoir drug delivery device
*North Carolina State University, Raleigh, NC, USA; †The Ohio State University, Columbus, OH, USA; ‡New Bolton Center, University of Pennsylvania, PA, USA; §University of Florida, Gainesville, FL, USA; †Brescia, Italy, ‡‡University of Veterinary Science, Vienna, ††University of Illinois, Urbana, IL, USA.
Purpose: Recurrent uveitis (ERU) in the most common cause of blindness in horses. ERU is a T-cell mediated disease that is well controlled with cyclosporine (CaA) (Gilger et al., 1995). The purpose of this study was to determine the long-term efficacy and duration of effect of a single, suprachoroidal matrix reservoir implant releasing CaA. Methods: Horses with ERU were implanted with a 6 mm diameter, 23 mg, reservoir matrix CaA implant in the deep temporal muscle adjacent to the suprachoroidal space. Horses were followed-up greater than 1 year were examined for frequency of flares, long-term complications, and visual status at last recheck. Results: Of 60 eyes of 54 horses, 15 horses (25%) had recurrence of ERU after the intramuscular CaA device. In 21 eyes of 14 horses, all were judged as successful. Conclusions: The deep temporal muscle adjacent to the suprachoroidal space was safe and effective in the long-term control of ERU. Since flares did not increase after the theoretical depletion of the CaA(1-2 years), auto-reactive T-cells may undergo energy without subsequent recurrence of disease. Support: State NC, USDA, NVU Rece (Veterinary Research Fund) (Gilger JC (none); Salmon JH (none); Wilkie DA (none); Uter M (none); Komaromy A (none); Brooks D (none); Stoppini R (none); Ledbetter EC (none); Nell B (none); Labelle A (none).
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ABSTRACT NO.: 015
Descemet's membrane fragmentation in recurrent "orange" deep stromal abscesses in the horse
University of Florida, Gainesville, FL, USA

Purpose: To describe the clinical and histologic findings in eight horses with recurrent "orange" deep stromal abscesses (DSA).
Methods: Retrospective medical records study of horses affected with "orange" DSA that appeared following the apparent resolution of the original disease that required medical or surgical therapy. Data collected from the medical records included signalment, types of ocular lesions, type of therapy performed, length of follow-up, complications and visual outcomes.
Results: Medical records of eight horses that had "orange" DSA at the University of Florida Veterinary Medical Center from 2004 to 2007 were reviewed. Six cases occurred following lamellar keratoplasty, and two cases following medical therapy of DSA. Histology of the corneas found many neutrophils, macrophages, lymphocytes, plasma cells and multinucleated giant cells, and multifocally fragmented Descemet's membrane. Gram stain of the corneal scrapings were positive for F. necrophorum. Histology of the corneas found many neutrophils, macrophages, lymphocytes, plasma cells and multinucleated giant cells, and multifocally fragmented Descemet's membrane. Gram stain of the corneal scrapings were positive for F. necrophorum. Histology of the corneas found many neutrophils, macrophages, lymphocytes, plasma cells and multinucleated giant cells, and multifocally fragmented Descemet's membrane. Gram stain of the corneal scrapings were positive for F. necrophorum. Histology of the corneas found many neutrophils, macrophages, lymphocytes, plasma cells and multinucleated giant cells, and multifocally fragmented Descemet's membrane. Gram stain of the corneal scrapings were positive for F. necrophorum. Histology of the corneas found many neutrophils, macrophages, lymphocytes, plasma cells and multinucleated giant cells, and multifocally fragmented Descemet's membrane. Gram stain of the corneal scrapings were positive for F. necrophorum. Histology of the corneas found many neutrophils, macrophages, lymphocytes, plasma cells and multinucleated giant cells, and multifocally fragmented Descemet's membrane. Gram stain of the corneal scrapings were positive for F. necrophorum.
Conclusions: Recurrent DSA do not appear to be related to traumatic micropuncture. Active "infection" was indicated by the presence of bacteria and neutrophils in the anterior chamber. The finding of mast cells directly within the epithelium is a distinctive feature of this condition. We speculate an allergic or viral etiology.

ABSTRACT NO.: 016
Conjunctival lymphoma in the horse
*University of Florida, Gainesville, FL, USA, †Ohio State University, Columbus, OH, USA, ‡Gencove Eye Valley Clinic, Scotstree, NY, USA

Purpose: To describe the clinical findings and visual outcome of medical and surgical therapy for conjunctival lymphoma in the horse. Methods: Retrospective medical records study of horses that had conjunctival lymphoma at the University of Florida Veterinary Medical Center, Ohio State University, NY, North Carolina State University, University of Tennessee, and Scotland State University, Blacksburg, VA, USA were reviewed. Data collected from the medical records included signalment, clinical descriptions of ocular lesions, and therapeutic outcomes. Results: Thirteen cases of conjunctival lymphoma were diagnosed in 12 horses. The age of onset was 7 to 20 years. Lesions were nodular or diffuse. Treatment consisted of resection, chemotherapy, or combined therapy was considered good initially in 15/20 cases, although four horses were euthanized with systemic disease signs within 10 months. Nine horses were euthanized and the postmortem examination revealed that seven of the 13 cases had evidence of lymphoma in the lymph nodes, liver, and spleen. The tumour was found in the oral cavity in two cases. Conclusions: The prognosis for these cases is generally good, unless diffuse disease was present at initial presentation.

ABSTRACT NO.: 017
Equine subepithelial keratonyctosis
D. E. Brooks, C. E. Plummer, K. P. Barrie, S. E. Blackwood, C. M. Nunnery and G. Ben-Shlomo
Department of Large Animal Clinical Sciences, University of Florida, Gainesville, FL, USA

Purpose: To describe clinical findings in equine subepithelial keratonyctosis (SEK). Methods: Retrospective medical records study of horses that had subepithelial keratonyctosis at the University of Florida Veterinary Medical Center from 2007 to 2009 were reviewed. Data collected from the medical records included signalment, clinical descriptions of ocular lesions, and therapeutic outcomes. Results: Fourteen horses with unilateral SEK were diagnosed. They included three Quarterhorse geldings, two Morgan geldings, one Morgan mare, one Arabian mare, one Thoroughbred mare, one Thoroughbred gelding, one Appaloosa mare, two warmblood geldings and one Holstein mare. Multifocal punctate subepithelial keratonyctosis were present in all eyes. Interstitial keratitis was seen in all eyes. Immunohistochemistry for smooth muscle actin was performed. Histologic sections of the corneas were submitted for histologic examination. Results: Five of the 14 cases had histologic evidence of ductal obstruction. The clinical condition of the bulbar conjunctiva was diagnosed in 20 horses. The age at presentation was 14 ± 7 years. Lesions were nodular or diffuse. Treatment consisted of resection, chemotherapy, or combined therapy. Conclusions: This is the first clinical report of non-incisive subepithelial keratonyctosis in the horse and may represent a preliminary phase of keratonyctosis.

ABSTRACT NO.: 018
Anesthetic recovery following corneal surgery in horses (2006–2008)
M. E. Utter, L. M. Getman and K. Wegner
New Bolton Center, School of Veterinary Medicine, University of Pennsylvania, Kennett Square, PA, USA

Purpose: To evaluate the hypotheses suggested by prior research that horses undergoing ocular surgery require an increased minimum anesthetic requirement when compared to anesthetic requirements for non-ocular surgeries using a case control retrospective design. Methods: Records from 58 corneal surgeries performed in 2006–2008 were matched to a control on patient age, anesthesia time, surgery time, recovery time, ASA status, surgery date and anesthetic. Corneal surgeries included conjunctival, corneal and amnion grafts. Emergency surgeries and dual procedures were excluded. Recovery scores from 1 to 5 were assigned to each case and compared using a Mann–Whitney test. Quality of match between cases and controls was evaluated on matching variables using a Student's t-test. Values of P < 0.05 were considered significant. Results: There was no statistical difference between groups in mean recovery scores. There was no statistical difference between groups in mean recovery scores. There was no statistical difference between groups in mean recovery scores. There was no statistical difference between groups in mean recovery scores. There was no statistical difference between groups in mean recovery scores.
Conclusions: Horses recovering from general anesthesia following corneal surgery appear at no greater risk than horses recovering from non-ocular surgeries.
non-UV absorbing CL group and the contralateral control eyes. Conclusions: MNDs can be induced within the cornea by UV exposure and are associated with many pathologic inflammatory cascades. Ascorbate is a scavenger of free radicals in the aqueous humor and can decrease following UV exposure. DNA damage and apoptosis were induced in both the corneal and lens by UV exposure. These data show that UV-blocking CL is capable of protecting the cornea, aqueous humor, and crystalline lens from these UV-induced pathological processes. Ocular proteases are UV-induced, and the cartilage and lens may be especially attractive to UV-induced processes. Significant results in the study. Primary ocular CHV-1 infection was experimentally induced in the dogs by ocular inoculation and the presence of reactive viremia was later confirmed by administration of an immunosuppressive dosage of systemic corticosteroid. Twelve months following experimental CHV-1 reactivation, dogs were administered either topical prednisolone acetate (1.0% ophthalmic suspension, one drop, OU, q6h) or placebo (artificial tear solution, one drop, OU, q6h) for 28 days. After a 14 day washout period, the treatment groups were reversed. Ophthalmic examinations, ocular sample real-time quantitative CHV-1 polymerase chain reaction assays, and CHV-1 serum neutralization (SN) titers were performed at regular intervals. The frequency of clinical ocular disease, ocular viral shedding, and 4-fold elevations in CHV-1 SN titers were statistically compared between control and treatment groups. Results: Viral reactivation was not detected more frequently in dogs administered topical ocular prednisolone than dogs administered placebo as determined by clinical ocular disease recrudescence, ocular viral shedding, and SN titers. Conclusions: This study suggests administration of topical ocular prednisolone with the evaluated drug concentration, dosing frequency, and treatment duration is sufficient to result in suppression of CHV-1 reactivation. Systemic administration of locally administered corticosteroid may be insufficient to reactiviate latent virus and produce recurrent disease. Support: ACVO Vision for Animals Foundation.

ABSTRACT NO.: 026
The analgesic effect of intracameral lidocaine on intraoperative and postoperative pain for phacoemulsification in dogs
S. A. Park,* Y. W. Park,* W. G. Son,† T. H. Kim,* J. S. Ahn,* J. T. Ahn,* S. E. Kim,* I. Lee† and K. M. Seo‡
*Department of Veterinary Ophthalmology, College of Veterinary Medicine, Seoul National University, Seoul, Republic of Korea, †Department of Veterinary Anesthesiology, College of Veterinary Medicine, Seoul National University, Seoul, Republic of Korea

Objective: To evaluate the intra- and post-operative analgesic effect of intracameral lidocaine for phacoemulsification in dogs. Methods: Twelve healthy beagle dogs were randomly assigned to one of two treatments: 2% lidocaine 0.3 ml or BSS 0.3 ml. Pre-anesthetic medication included acepromazine, ceftazolin, and topical tropicamide. Anesthesia was induced with propofol and maintained with isoflurane. The initial end-tidal isoflurane concentration was maintained at 1.2%. Heart rate, respiratory rate, arterial blood pressure, body temperature, inspired and end-tidal isoflurane concentration, and oxygen saturation were recorded every 5 min. The allocated agent was injected intracameral following aspiration of the same volume of aqueous. Ten minutes after injection, phacoemulsification was performed. After the start of surgery, the isoflurane concentration was adjusted according to heart rate and mean arterial blood pressure. Pain scores were recorded before surgery and at 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 6, 8, 16, and 24 h after surgery. Any dog that had a mean change score of 28 of any pain score was sedated to maintain normal pain score. Results: No significant difference was found in the BSS group compared to the lidocaine group. The mean change score was significantly shorter in the BSS group (1.4 ± 1.2 h) compared to the lidocaine group (4.9 ± 1.2 h; P = 0.014). Conclusions: Intracameral lidocaine had a significant intra- and post-operative analgesic effect in dogs undergoing phacoemulsification surgery. Support: BK21 program.

ABSTRACT NO.: 027
Retinoid replacement therapy with 9-cis retinal improves visual performance in RPE65 mutant dogs
P. M. Gearhart,* D. A. Thompson,† C. C. Gearhart* and S. M. Petersen-Jones†
*Department of Small Animal Clinical Sciences, College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA; †Department of Ophthalmology and Visual Sciences, Department of Biological Chemistry, University of Michigan Medical School, Ann Arbor, MI, USA

Purpose: To investigate the effect of RPE65 gene replacement therapy with 9-cis retinal in RPE65 mutant dogs. Methods: Three犬 received intravitreal injections of 9-cis retinal and one dog was inconclusive, although both dogs showed improved ERGs. Of 2 dogs undergoing subjective vision evaluation following a single 9-cis retinal injection, 1 dog showed subjective improvement following intravitreal 9-cis retinal injection and one dog was inconclusive.
testing, both dogs showed improved vision following intravitreal 9-μl retinal injection. Repeat injection in the same eye in both of these dogs showed no improvement in vision testing.

**Conclusions:** Intravitreal injection of 9-μl retinal in dogs showed no significant differences in the number of POH episodes between dogs treated with carbachol (47%), latanoprost (29%), or dogs that received no adjunctive therapy (33%). There were no significant differences in mean aqueous fluid grade between eyes treated with carbachol (1.7 ± 1.1) or latanoprost (1.8 ± 1.7). The carbachol (1.4 ± 1.4) and latanoprost (1.7 ± 0.4) treated eyes did not differ from eyes receiving no adjunctive therapy (1.7 ± 0.4).

**Discussion:** Topical 0.005% latanoprost or intracameral injection of 0.1 ml of 0.01% carbachol did not reduce POH or cause increased intraocular inflammation compared to dogs not receiving adjunctive therapy after PA of cataracts.

**ABSTRACT NO.: 034**

Early and late treatment of corneal neovascularization by subconjunctival injection of bevacizumab in a rabbit model of limbal stem cell deficiency

K. T. Kuo,* W. L. Chen,† N. T. Lin,* F. H. Hu† and C. T. Lin*†

*School of Veterinary Medicine, National Taiwan University, Taipei, Taiwan, †Department of Ophthalmology, College of Medicine, National Taiwan University, Taipei, Taiwan

Purpose: To compare the difference of early and late subconjunctival injection of bevacizumab in the treatment of corneal neovascularization (NV) and conjunctivalization in a rabbit model of limbal insufficiency. Methods: After creating limbal insufficiency by mechanical limbal injury in rabbits, 2.5 mg subconjunctival bevacizumab was injected twice per week immediately (early treatment group) or 1 month later (late treatment group) for one month. Digital photography was recorded to evaluate the corneal NV and opacity. Immunohistochemistry staining of K3, K4, K12, K13 and MUC5 in corneal tissue samples was performed 1 month after treatment. Results: Conjunctival neovascularization was significantly inhibited in both treatment groups compared to the untreated group. Histopathologic findings in K3 (+), K4 (+), K12 (+), K13 (+) and MUC5 (+) in the early treatment group but not in the late treatment group compared to the untreated group. Conclusion: Early subconjunctival injection of bevacizumab was effective in inhibiting corneal NV and conjunctivalization manifested by cellular markers of the cornea. The first two authors contributed equally.
ABSTRACT NO.: 037  
Effect of an embryonic-like bioscaffold in dogs with persistent insolent ulcerers  
J. Urbanz* and C. W. Woods†  
*Eye Care for Animals, Scottsdale, AZ, USA  †TR BioSurgical, LLC, Scottsdale, AZ, USA  
Purpose: This study’s purpose is to evaluate a novel bioscaffold’s corneal repair properties in dogs with persistent insolent ulcerers. The bioscaffold consists of a unique collagen co-polymer that structurally resembles the tertiary structure of the embryonic extracellular matrix; thereby exposing several growth factors and small molecular weight peptides that cause infiltrating cells to form a “tissue-like” repair mechanism. Methods: This is an ongoing prospective, controlled field study in 20 dogs with persistent insolent ulcerers, randomly assigned into bioscaffold and control groups. After baseline ophthalmic examination, the bioscaffold or saline were applied to the ulceration, and the contralateral eye was injected with CNTF. Results: Interim: A total of 15 patients have completed the study, 6 bioscaffold patients and 9 control patients. At day 14, 41% of control patients had complete corneal healing compared to 67% from the bioscaffold group. The bioscaffold group had a 67% reduction in blepharospasm compared to only 18% in the control group, with an additional 15% exhibiting complete resolution. Conclusion: Interim: This data supports the embryonic-like bioscaffold improves corneal healing and reduces blepharospasm. One possible explanation is the bioscaffold provides a structural matrix for infiltrating cells such as stem cells, progenitor cells and fibroblasts to hasten corneal surface repair. Funding Sources: TR BioSurgical, LLC, C.P. E.  
ABSTRACT NO.: 039  
Effect of tapetum on vision in extremely low light in labrador retrievers  
M. H. Neanderland* and L. M. Occelli†  
*Animal Eye Clinic, Norwalk, CT, USA  †Hilicht, France  
Purpose: To determine if the presence or absence of an ophthalmoscopically visible tapetum affects the performance of a Labrador Guide Dog in extremely low light conditions. Methods: Retinal photoreceptive, indirect and slit lamp ophthalmoscopies were performed on the eyes of 214 Labrador Retrievers, the breeding stock for Guiding Eyes for the Blind. The purpose of the study was to determine whether the tapetum affects the dog’s vision function and preservation of retinal structure, the dog has become an important species to investigate disease mechanisms, and facilitate translation of new therapies to human patients. To facilitate these studies, we describe the use of different imaging modalities in dogs that are used in the assessment of patients with inherited retinal diseases. Methods: We have used a combination of functional magnetic resonance imaging (fMRI), optical coherence tomography (OCT) and infrared/autofluorescence imaging of the retina in dogs having naturally occurring mutations in the RPE65, RPGR, RHO and CNGB3. Mutations in these genes, respectively, cause LCA, XLRP, RP and achromatopsia in humans. This is the first time that CNGB3 has been analyzed in dogs before and after successful gene therapy. These results have been correlated with ERG and OCT evaluation. Results: In the dog, there is a significant variation in the different imaging modalities and the functional/structural outcomes in the naturally occurring diseases, and following successful retinal gene therapy. Comparison of in vivo with the ex vivo results provide novel resolution between the pathology and OCT. Conclusions: The different imaging approaches show excellent correlation with the histopathology, and provides a basis for improved interpretation of imaging outcomes. The abilities to study both the patient and the animal model with the same imaging modalities will allow for a better understanding of the disease processes, and facilitate future translational studies. Supported by the Vision for Animals Foundation, NIH grants EY006855, EY017549, EY019304, K12EY015398, FBE, ON The International Prize, and the Van Sloan Fund.  
ABSTRACT NO.: 040  
Superficial keratopathy for the treatment of canine multifocal retinopathy  
G. D. Aguirre*, S. J. Lindauer*, K. Wickström*, S. Abounen*†  
*Vet Ophthalmology, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA, USA  †Vetinary Clinic Akkuti, Finland  §Department of Basic Veterinary Sciences and Department of Medical Genetics, Folkhalsan Institute of Genetics, University of Helsinki, Helsinki, Finland  ‡Baker Institute, Cornell University, Itbwa, NY, USA  
Purpose: Multifocal retinopathies (MDM) are associated with various retinopathies in man and dog, in the latter species the disease termed canine multifocal retinopathy (CMR). The ability to pursue detailed molecular and clinical studies in the dog to investigate disease mechanisms and potential therapeutic approaches in the way related to mMDM has been made difficult because the dog is an important model organism to carry out these studies. To investigate the influence of multifocal retinopathies in the dog, and identify additional disease variants, selected dogs with a retinal phenotype compatible with mMDM were screened for mutations in FMD2, and identified changes evaluated for disease association. Methods: DNA was isolated following standard protocols from blood or buccal swabs of Lapponian Herder dogs (LHs) from Finland with ascertained clinical diagnosis. Coding exons of FMD2 were amplified as previously described (Guziewicz et al., 2006), and sequences were aligned to published wild type sequence. Results: LHs carries two homozygous mutations in exon 10, a deletion leading to a frame change (CF1A8, hp 57949995, Cdel, Pro463FS), and a point mutation (CF1A8, hp 57949988, G > T). The latter leads to a stop codon at hp 498 if coupled with deletion, or a Gly489Val substitution in the absence of the deletion. Within the investigated pedigree, these two mutations are completely linked, and associated with the disease phenotype. Neither of the mutations was found in a screen of samples from dogs with retinal changes of 25 additional breeds from Finland. Conclusions: We describe an additional mutation in the FMD2 gene in the Lapponian Herder breed, and refer to the involved disease locus as cmr1. These results indicate that cmr1 has a larger impact on the general dog population than was initially thought, and will further contribute to ongoing studies to understand the molecular basis of mutations in FMD2 and define and correlate observed of observed genotypes with the respective phenotypes. Support FBE, NEI/NIH/EY017549, NIH, Van Sloan Fund, Academy of Finland, Signal Nucleus Foundation, P, I, (Aguirre, Aguirre).  
ABSTRACT NO.: 041  
Retinal/ cortical imaging in dog retinal degeneration models  
G. D. Aguirre*, G. M. Acland*, G. K. Aguirre†, T. S. Alemán†  
*§ W. A. Beltran,* A. V. Cideciyan,§ W. W. Hauswirth,†  
§ G. J. Jacobson§ and A. M. Komáromy*  
*Vet Ophthalmology, School of Veterinary Medicine, University of Pennsylvania, Kennett Square, PA, USA  †Vet Ophthalmology, School of Medicine, University of Pennsylvania, Philadelphia, PA, USA  ‡Vet Ophthalmology, Florida State University, Tallahassee, FL, USA  
Purpose: Many primary diseases of the photoreceptor or RPE in the dog are caused by mutations in the genes that cause inherited diseases in human patients, and the phenotypes in both species are strikingly similar. Coupled with recent advances in gene therapy that showed rescued function and preservation of retinal structure, the dog has become an important species to investigate disease mechanisms, and facilitate translation of new therapies to human patients. To facilitate these studies, we describe the use of different imaging modalities in dogs that are used in the assessment of patients with inherited retinal diseases. Methods: We have used a combination of functional magnetic resonance imaging (fMRI), optical coherence tomography (OCT) and infrared/autofluorescence imaging of the retina in dogs having naturally occurring mutations in the RPE65, RPGR, RHO and CNGB3. Mutations in these genes, respectively, cause LCA, XLRP, RP and achromatopsia in humans. This is the first time that CNGB3 has been analyzed in dogs before and after successful gene therapy. These results have been correlated with ERG and OCT evaluation. Results: In the dog, there is a significant variation in the different imaging modalities and the functional/structural outcomes in the naturally occurring diseases, and following successful retinal gene therapy. Comparison of in vivo with the ex vivo results provide novel resolution between the pathology and OCT. Conclusions: The different imaging approaches show excellent correlation with the histopathology, and provides a basis for improved interpretation of imaging outcomes. The abilities to study both the patient and the animal model with the same imaging modalities will allow for a better understanding of the disease processes, and facilitate future translational studies. Supported by the Vision for Animals Foundation, NIH grants EY006855, EY017549, EY019304, K12EY015398 and P30EY015853, Foundation for Fighting Blindness.
ABSTRACT NO.: 044
Aqueous humor vascular endothelial growth factor in dogs with intraocular disease
C. A. Sandberg,* I. P. Herring,† W. R. Huckle,* T. LeRoith,* J. Phillip Pickett* and J. H. Rossmeisl†
*Department of Small Animal Clinical Sciences, Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA, USA
†Department of Biomedical Sciences and Pathology, Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA, USA
Purpose: To examine levels of vascular endothelial growth factor (VEGF) in aqueous humor (AF) of dogs with intraocular disease and to evaluate the association of AH VEGF levels with pre-surgical inflammation and wartime (PWF) formation. Methods: Aqueous humor samples (n = 226 from 178 dogs) and nuchal plasma samples (n = 101) were collected from dogs with a variety of intraocular diseases (including primary cataract, diabetic cataract, primary glaucoma, uveitis, retinal disease, multiple metastatic melanomas, choroidal detachment, lens luxation and intraocular neoplasia), as well as 11 ophthalmically normal control dogs. Systemic disease status, treatment course and ophthalmic examination were recorded for clinical cases. Aqueous and plasma VEGF was assayed via ELISA validated for canine VEGF. Available histopathology samples were examined for the presence of PIFM and categorized as none, focal, pre-iridal or diffuse. Results: Compared to normal controls, AH VEGF was significantly elevated for all intraocular disease (P < 0.05) except for primary and diabetic cataract. Systemic disease had no significant effect on AH VEGF (P > 0.05), but corticosteroids and prostaglandin administration significantly affected AH VEGF levels at all AH VEGF time points. It was found in the vitreous and in the peripheral blood in significantly higher levels in dogs with fibrovascular PIFM (P = 0.003), but not cellular (P = 0.1704) or fibrous/vascular PIFM (P = 0.0667). There was no association between AH and plasma VEGF levels. Conclusions: These results are consistent with the hypothesis that AH VEGF plays a role in the causation or progression of a variety of canine intraocular disorders. Our approach for ophthalmic examination by high resolution photography used in this elephant could be applicable for future cases. Owing to the fact that the special treatment he received might play an important role on developing this rare condition, a combination of medical therapy and environmental control are both required to provide the best outcome possible.

ABSTRACT NO.: 047
Topical nalbuphine or oral tramadol as analgesics for corneal pain in dogs: a pilot study
J. S. Clark,* E. Bentley† and L. J. Smith†
*Eye Care for Animals, IL, USA, †Department of Surgical Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, Madison, WI, USA
Purpose: To compare the effectiveness of oral tramadol and topical nalbuphine in the treatment of corneal pain in dogs. Methods: A total of 14 male dogs were divided into three treatment groups (dogs were sedated following anesthesia IM IV). 1. 4 mg/kg tramadol IV and a 6 mm corneal epithelial wound was created in the right eye (OD) of all dogs. Sedation was reversed with atipamezole IM. All dogs received pre/post ophthalmic examinations. Post operatively, Group NB (n = 5) received topical 1% preservative-free nalbuphine, Group TR (n = 5) received topical 4 mg/kg PO q4h and topical steroid saline OD q4h. Group CNTRL (n = 4) received topical sterile saline OD q4h and an oral placebo tablet q4h. Dogs were scored q8 hours. Group TR (n = 5) received tramadol (4 mg/kg) PO q4h and topical steroid saline OD q4h. Group CNTRL (n = 4) received topical sterile saline OD q4h and an oral placebo tablet q4h. Dogs were scored q8 hours. Group NB (n = 5) received no treatment. Results: There was no significant difference between groups (P > 0.184). Mean time to rescue was 9.16 h. All corneal wounds were healed by 94%. Conclusions: Although oral tramadol appears to be a viable option for the treatment of corneal pain. Topical nalbuphine appears to be effective as saline when used in the treatment of corneal pain, as demonstrated by the high incidence of treatment failure in dogs receiving nalbuphine.

ABSTRACT NO.: 048
Stability of 0.5% cidofovir under various storage conditions for up to 6 months
J. Stiles,* R. M. Pogranichny† and W. E. Gwinn†
*School of Veterinary Medicine, University, West Lafayette, IN, USA, †Department of Veterinary Clinical Sciences, Veterinary Teaching Hospital Pharmacy, West Lafayette, IN, USA, ‡Department of Comparative Pathobiology, Veterinary Teaching Hospital Pharmacy West Lafayette, IN, USA
Purpose: To evaluate the effect against feline herpesvirus (FHV-1) of 0.5% cidofovir solution when stored for up to 6 months. Methods: Cidofovir (Vistide® Gilead USA) was diluted with sterile saline to a 0.5% concentration in plastic and glass vials and stored at 4°C, -20°C and -80°C. At time zero, the effect of fresh cidofovir was evaluated against FHV-1 in 180 d. At time point 180 d, 180 d, cidofovir under each of the different storage conditions was used in a virus titration assay to assess the stability of the drug. Results: At each time point each of the different storage conditions cidofovir reduced viral titer by 4 logs (P < 0.001). There was no effect on time, storage temperature, or storage vial material on the antiviral activity of the drug (P > 0.05).
Conclusions: Cidofovir 0.5% solution is stable for up to 6 months in either glass or plastic at 4°C, -20°C and -80°C.

ABSTRACT NO.: 049
A histologic series of secondary uveal melanomas in eleven dogs
K. R. Malzard,* A. Hoffman,* C. S. Schubert† and R. R. Dubielzig†
*Eye Care For Animals, Pasadena, CA, USA, †School of Veterinary Medicine, University of Wisconsin, Madison, WI, USA
Purpose: To describe the clinical and histological features of a series of eleven canine cases of secondary uveal melanomas. Methods: Eleven canine cases of secondary uveal melanomas were prospectively examined at the Comparative Ocular Pathology Laboratory of Wisconsin (COPLow). Age, primary site of origin, time to metastasis, presenting ophthalmic signs, and histologic descriptions were recorded. Results: Dogs were between 6 and 15 years, with an average age of 9 years. Most were large breed dogs and distant primary tumor sites were of the oral cavity, distal limbs (digits), and skin. Prior to enucleation, 10/11 cases showed signs of anterior uveitis and 4/11 were diagnosed with secondary glaucoma. 4/11 cases presented with anterior uveal masses of varying pigment (light tan to dark brown). 8/11 tumors presented in the iris and/or ciliary body and 3/3 presented in the iris/ciliary body and choroid. All of the tumors were highly choroidal and 6/11 were of retinal detachment type. Tumors arose from the digits, 3/11 were from the oral cavity (palate or gingival) and 2/11 were cutaneous on the lip. The average time from primary tumor to diagnosis was 2 years (range 1 month–4 years) after the initial diagnosis of malignant melanoma. Conclusions: Ocular examination of localized and generalized malignant melanomas is the number of intraocular metastatic melanomas previously studied. Furthermore, all dogs with a suspected uveal tumor should receive a thorough physical examination including the digits, oral cavity, and integument even if the uveal mass is in a nonmalignant, visual eye.

ABSTRACT NO.: 050
Combined diode endoscopic cyclophotocoagulation and Ex-Press™ shunt goniopuncture in four cases of canine glaucoma
E. A. Lutz and J. S. Sapienza
Long Island Veterinary Specialists, Plainview, NY, USA
Purpose: To evaluate the immediate and long-term results of transbleb Ex-Press® (SR-50) shunt in combination with diode endoscopic cyclophotocoagulation (ECP) as a means for blunting post-operative intraocular pressure (IOP) spikes. Methods: Four eyes from four dogs with glaucoma were treated...
ABSTRACT NO.: 051
Diode endoscopic cyclophotocoagulation in pseudophakic and aphakic dogs with secondary glaucoma
E. A. Lutz and J. S. Sapienza
Long Island Veterinary Specialists, Plainview, NY, USA
Purpose: To evaluate the use of a diode laser for endoscopic cyclophotocoagulation in pseudophakic and aphakic dogs with secondary glaucoma following primary cataract removal. Methods: A total of 15 dogs (9 > 17 eyes) with secondary glaucoma were treated with a laser approach to endoscopic cyclophotocoagulation (ECP). ECP laser procedures were retrospectively reviewed. Patients received ECP for glaucoma refractory to medical therapy (intraocular pressure (IOP) > 25 mmHg on 2 or more agents). Twelve eyes had previous goniotomy surgery, and five eyes had previous laser trabeculoplasty and laser cyclotherapy. The left eye was affected in 10/17 cases, and the right eye in 7/17 cases. One dog had bilateral Endo-Optiks Gold implants. One eye had a Gold implant replaced with an upgraded model. Concomitant surgery was performed in 7/17 cases and included Ex-Press shunt gonioimplantation in 4/17 eyes. The mean IOP of all eyes measured with the AV was 11.79 mm/Hg. This value is not statistically different than those obtained in left eyes, this is of little to no clinical significance. Conclusions: To evaluate the postoperative clinical course of a novel glaucoma shunt, which changes aqueous humor from the anterior chamber to the space in dogs with primary glaucoma. Methods: A retrospective study was conducted on eight dogs in which a novel glaucoma-shunt (SOLX Gold) was implanted in the dog eye. Six dogs were affected with primary open-angle glaucoma (POAG), and two dogs were affected with angle-closure glaucoma. Conclusions: The SOLX Gold shunt can be easily implanted after several procedures, but failure to control the IOP resulted in poor IOP control in 6/9 eyes with loss of vision in 6/9 eyes. A larger series of patients with longer follow-up will be beneficial to further evaluate the long-term effects of this novel glaucoma shunt.

ABSTRACT NO.: 057
Functional assessment and safety of irrigation with 5-Fluorouracil in a sealed-capsule irrigation device in the dog eye
J. M. Histed, B. Nadelstein and R. V. English
Animal Eye Care, Chesapeake, VA, USA
Purpose: Pharmacologic modulation of lens epithelial cell (LEC) activity is an expanding area, limited by the ability to deliver agents to the desired location without collateral toxicity. Sealed-capsule irrigation is designed to allow targeting of LECs during cataract surgery. This study was designed to help prevent posterior capsule opacification (PCO). 5-Fluorouracil (5-FU) is a pyrimidine used to inhibit DNA synthesis and proliferation of epithelial cells during postoperative scarring. The purpose of this study was to demonstrate the use of a sealed-capsule irrigation device in a clinical setting, as well as to study the safety of irrigation with 5-FU via application of such a system. Results will help guide future studies on the use of sealed-capsule irrigation in a clinical setting.

ABSTRACT NO.: 055
Comparison of two tonometers (TonoPen-VET® and TonoPen-AVIA®) in canine patients
J. J. Studer,* R. D. Ring* and M. E. Payton†
*The Animal Ophthalmology Clinic, Dallas, TX, USA, †Department of Statistics, Oklahoma State University, Stillwater, OK, USA
Purpose: To compare intraocular pressure (IOP) values obtained with the TonoPen® VET (TP) and the TonoPen AVIA® (AV) application tonometers in clinically normal eyes of dogs. Methods: Sixty clinically normal dogs were enrolled in the study. There was no significant difference between the two IOPs after obtaining the measurements. The mean IOP of all eyes measured with the TP was 11.15 mm/Hg and the mean IOP of all eyes measured with the AV was 11.79 mm/Hg. This value is not statistically significant. Conclusions: While there are minor differences, the two applanation tonometers are comparable in their measurement of IOP with a side by side factor as follows. Group 1 (TP1) (0.758 ± 0.217), 0.983 (0.686–1.121), and 0.918 (0.702–1.186); in the mean IOP of all eyes measured with the AV was 11.79 mm/Hg. This value is not statistically significant (P = 0.0658). Conclusions: While there are minor differences, the two tonometers are comparable in the measurement of IOP with a side by side factor as follows. Group 1 (TP1) (0.758 ± 0.217), 0.983 (0.686–1.121), and 0.918 (0.702–1.186); in the mean IOP of all eyes measured with the AV was 11.79 mm/Hg. This value is not statistically significant (P = 0.0658). While the order of procedures (instrument used or eye measured) performed was not statistically or clinically significant. Sealed-capsule irrigation is an effective method for delivery of 5-FU which can be used in a clinical setting. Sealing capsules is a useful method for reducing PCO. Methods: six- to twelve-month-old mongrel dogs were used in this study. Each dog had one eye treated with the AV and the other eye treated with the TP. Both eyes were treated with the same technique. Results: There were no significant differences between the two tonometers. Conclusion: The SOLX Gold shunt can be easily implanted after several procedures, but failure to control the IOP resulted in poor IOP control in 6/9 eyes with loss of vision in 6/9 eyes. A larger series of patients with longer follow-up will be beneficial to further evaluate the long-term effects of this novel glaucoma shunt.
in included in the study. One randomly selected eye received application of the sealed-capsule irrigation system and irrigation with 5-FU 50 mg/mL and the contralateral eye received standard cataract surgery and served as a control. Safety of 5-FU was evaluated by comparing aqueous flare, central corneal thickness, and preoperative and postoperative ocular pain. The results of the ocular pain test were 32 mm/min. No signs of alterations were observed in the left eye.

Results:
- For the 4-point block, the median accuracy was 100.8 mm/min. The accuracy of the 4-point block was significantly greater than the other techniques.
- The 4-point block was associated with the lowest amount of variation in accuracy.
- The accuracy of the 4-point block was similar to the 4-point retrobulbar injection technique.

Conclusions:
The 4-point block was an effective technique for anesthetizing the anterior eye chamber and was associated with the lowest amount of variation in accuracy. The 4-point block was also associated with the lowest amount of variation in corneal thickness, indicating that it was the least traumatic technique.

ABSTRACT NO.: 016
Retinal Pigment Epithelium (RPE) autotransplantation in porcine eyes
I. Fernandez-Bueno,*‡ J. M. Gonzalez-Orden,† M. Regueiro-Puertas,*‡ J. Marrado,*‡ D. Hilleto,* E. Rodriguez de la Rua* and J. C. Pastor‡
*IOBa, University of Valladolid, Spain; †IBIOMED, University of León, Spain
Purpose: RPE transplantation is considered a hopeful treatment for age-related macular degeneration (AMD). The purpose of this study is to improve a RPE autotransplantation technique, previously described by Van Meurs, in pigs eyes, in order to use it as a control group in future studies. Methods: A total of 8 pigs (8 eyes) were operated on. In brief, standard 20G pars plana vitrectomy and lensectomy were performed using an Accurus Vitrectomy System (Alcon, TX, USA). Ten milliliters of vitreous humor was obtained (CA) of the donor nasal retina by bimanual technique using vitreous forceps and scissors (Alcon/Grieshaber, Switzerland). RPE graft was then placed under the central retina using a Valon’s forceps (D.O.R.C., France). The RPE graft was sutured with interrupted 10-0 silk sutures. Results: No difference in aqueous flare values between control and study eyes in all patients (n = 1). Mean postoperative corneal thickness was 24.9% greater than preoperatively. There was no difference between the study eyes and control eyes in all patients (p = 0.21). No leakage of 5-FU was detected in these patients. Mean corneal thickness in all control eyes (n = 6) postoperatively was 3.5% greater than preoperatively. In patients where a good seal was formed (n = 5) postoperative mean corneal thickness was 8.3% greater. When leakage of 5-FU occurred (n = 1) mean postoperative corneal thickness was 24.9% greater than preoperatively. There was no difference in aqueous flare levels between control and study eyes in all patients (n = 3). A sealed-capsule irrigation system capable of inhibiting LECs and PCO is feasible in dogs and was safe with no clinically detectable collateral damage when no leakage occurs. However, adequate modification of the system could increase safety and usability in the canine eye.

ABSTRACT NO.: 058
Efficacy and duration of proparacaine and tetracaine topical ophthalmic formulations on equine corneal sensitivity
K. L. Sharrow-Reabe,* W. M. Townsend and J. O. Campbell
College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA
Purpose: This study compared the efficacy and duration of three topical ophthalmic anesthetic formulations after application to the equine cornea. Methods: A masked study was undertaken on 20 normal eyes of 10 healthy horses. Each eye was randomly assigned to one of four groups. Proparacaine hydrochloride (0.5% tetracaine solution, 0.5% tetracaine gel, or saline control). Corneal anesthesia was measured by determining the corneal touch threshold (CTT) of each eye with a Cochet-Bonnet aesthesiometer. Results: The mean preoperative CTT was 12.0 ± 10.0 mm. Proparacaine significantly reduced the sensory response to the Cochet-Bonnet aesthesiometer compared to the saline control. Proparacaine was superior to tetracaine gel for corneal anesthesia. The maximum efficacy for each treatment was reached 10 minutes post-application. The visual acuity of the control eyes did not change relative to the orbital fissure and intraconal accuracy. Conclusions: Proparacaine is an effective, long-lasting topical anesthetic for horses.

ABSTRACT NO.: 059
Periocular cutaneous mast cell tumors in cats: evaluation of surgical excision (3 cases, 1996-2009)
K. W. Montgomery,*‡ A. A. de Wet†‡,‡ S. M. Aquino,*‡ and E. C. Ledbetter‡
*College of Veterinary Medicine, Cornell University, Ithaca, NY, USA
†The Animal Medical Center, ‡Long Island Veterinary Specialists, Plainview, NY, USA
Purpose: To describe feline periocular cutaneous mast cell tumors (CMCT) and evaluate rates of local recurrence and metastases as well as survival time following surgical excision. Methods: Medical records of 33 cats diagnosed with periocular CMCT were reviewed; cats were included for this study if they had complete excision. A masked study was undertaken on 20 normal eyes of 10 healthy horses. Each eye was randomly assigned to one of four groups. Proparacaine hydrochloride (0.5% proparacaine, 0.5% tetracaine solution, 0.5% tetracaine gel, or saline control). Corneal anesthesia was measured by determining the corneal touch threshold (CTT) of each eye with a Cochet-Bonnet aesthesiometer. Results: The mean preoperative CTT was 12.0 ± 10.0 mm. Proparacaine significantly reduced the sensory response to the Cochet-Bonnet aesthesiometer compared to the saline control. Proparacaine was superior to tetracaine gel for corneal anesthesia. The maximum efficacy for each treatment was reached 10 minutes post-application. The visual acuity of the control eyes did not change relative to the orbital fissure and intraconal accuracy. Conclusions: Proparacaine is an effective, long-lasting topical anesthetic for horses.

ABSTRACT NO.: 060
Limbal allograft transplantation in a dog with alkali-induced ulceration
F. L. C. Brito,*‡ U. Cunha†‡ and J. L. Laus‡
*Universidade Federal Rural de Pernambuco – Unidade Académica de Garanhuns, Pernambuco, Brazil; †Universidade Federal do Parná – Campus de Paulista, Paulista, Brazil; ‡Faculdade de Ciências Agrárias e Veterinárias, UNESP, Jaboticabal, Departamento de Clínica e Cirurgia Veterinária, São Paulo, Brazil
Purpose: We report here the case of a 1-month-old female mongrel dog with a history of chemical burns, which developed ulceration of the cornea. Methods: The dog was reluctant to open the right eye. Ophthalmic examination revealed blepharo-palpebral edema, episclera, discrete chemosis, conjunctival hyperemia, and diffuse corneal edema involving the limbus. The fluorescein test was positive and the result of the Schirmer tear test was 32 mm/min. No signs of alterations were observed in the left eye. Results: On the basis of these findings, alkali-induced ulcerative keratitis was diagnosed, and corneal transplantation was performed. Corneal vascularization was observed by the third postoperative day, with an increase in vessel density on subsequent days and small areas of corneal opacity and transparency. On postoperative day 21, vessels were still present in moderate numbers and small areas of corneal transparency were observed close to the transplant. On day 30 and 45, the corneal allograft and central vascular density and integrity in all areas of transparency were observed close to the transplanted limbus. Conclusions: The present results show that limbal allograft transplantation is a feasible procedure for the therapeutic management of alkali-induced corneal ulcers, since it prevents large-scale conjunctivitis and permits to safe the eye.© 1990 American College of Veterinary Ophthalmologists, Veterinary Ophthalmology, 12, 390–409

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ABSTRACT NO.: 064
Effects of continuous infusion of dopamine or dobutamine in intraocular pressure in association with cardiovascular parameters in dogs anesthetized with isoflurane
F. L. C. Brito,* M. G. Sousa,† R. Cararetto,* A. B. De Nardi,* N. Nunes‡ and J. L. Laus‡
*Universidade Federal Rural de Pernambuco – Unidade Acadêmica de Garanhuns, Pernambuco, Brazil; †Universidade Federal do Tocantins – UTF, Campus de Araguatins, Tocantins, Brazil; ‡São Paulo State University – UNESP, Department of Veterinary Medicine and Surgery, College of Agriculture and Veterinary Sciences, Campus of Jaboticabal, São Paulo, Brazil
Purpose: The primary objective was to compare outcomes for patients with cataracts that either received no therapy, topical medical therapy only, or phacoemulsification with intraocular lens implantation.

Methods: Medical records of dogs diagnosed with cataracts at the Western College of Veterinary Medicine were reviewed retrospectively. Patients were divided into three groups of patients that did not receive therapy, patients that received topical medical treatment only, and (3) patients that underwent phacoemulsification with intraocular lens implantation. Outcome of treatment was compared using the Cox proportional hazards model. Results: Median follow up time for all patients was 83 days. Failure occurred in all untreated cases (8 of 8 eyes) and was 64.5 and 255 times more likely than failure in animals treated with medical therapy or medical and surgical therapy, respectively. Failure was 8 times higher in dogs receiving medical treatment (20 of 35 eyes) only when compared to dogs undergoing phacoemulsification with intraocular lens implantation (7 of 34 eyes). For both medically and surgically-treated groups, success rate for mature and hypermature cataracts was less than for immature cataracts. However, regardless of cataract stage, the chance of success was still higher for surgically treated eyes than for medically treated eyes. Conclusion: Surgery has a superior success rate when compared to other modes of cataract management, especially when performed early in the disease process. Lack of medical or surgical therapy results in a high rate of complications that often result in loss of the eye.

ABSTRACT NO.: 065
Cataracts in 44 dogs (77 eyes): a comparison of outcomes for no treatment, topical medical management, or phacoemulsification with intraocular lens implantation
C. C. Lim,* S. Bakker,* C. L. Walder,† L. S. Sandimere* and B. H. Grahn†
*Department of Small Animal Clinical Sciences, †Department of Large Animal Clinical Sciences, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, Canada
Purpose: The primary objective was to compare outcomes for patients with cataracts that either received no therapy, topical medical therapy only, or phacoemulsification with intraocular lens implantation.

Methods: Medical records of dogs diagnosed with cataracts at the Western College of Veterinary Medicine were reviewed retrospectively. Patients were divided into three groups of patients that did not receive therapy, patients that received topical medical treatment only, and (3) patients that underwent phacoemulsification with intraocular lens implantation. Outcome of treatment was compared using the Cox proportional hazards model. Results: Median follow up time for all patients was 83 days. Failure occurred in all untreated cases (8 of 8 eyes) and was 64.5 and 255 times more likely than failure in animals treated with medical therapy or medical and surgical therapy, respectively. Failure was 8 times higher in dogs receiving medical treatment (20 of 35 eyes) only when compared to dogs undergoing phacoemulsification with intraocular lens implantation (7 of 34 eyes). For both medically and surgically-treated groups, success rate for mature and hypermature cataracts was less than for immature cataracts. However, regardless of cataract stage, the chance of success was still higher for surgically treated eyes than for medically treated eyes. Conclusion: Surgery has a superior success rate when compared to other modes of cataract management, especially when performed early in the disease process. Lack of medical or surgical therapy results in a high rate of complications that often result in loss of the eye.

ABSTRACT NO.: 066
Association between dog leukocyte antigen haplotype and golden retriever pigmentary uveitis
W. M. Townsend,* A. Mankey† and J. A. Gerlach‡
*College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA; †College of Human Medicine, Michigan State University, East Lansing, MI, USA; ‡Natural Sciences, Department of Pathology, Human Pathology, Michigan State University, East Lansing, MI, USA

Purpose: To determine if an individual’s dog leukocyte antigen (DLA) haplotype correlated with the development of Golden Retriever pigmentary uveitis. Methods: The pedigrees of and blood samples from 24 Golden Retrievers diagnosed by ACOV as being affected with pigmentary uveitis were collected. Blood samples were collected from their unaffected first and second degree relatives as well. Pedigrees from 220 animals were analyzed to determine the mode of inheritance of pigmentary uveitis. Genomic DNA from peripheral blood was isolated from peripheral blood by commercial column methodologies. The DLA'DQB locus was amplified and the product diluted and cycle sequenced using a chain termination method. Sequences from 65 animals were compared to determine allele and sequence similarity and dissimilarity.

Results: No association could be detected between the DLA’DQB locus sequence and the development of pigmentary uveitis. The mode of inheritance cannot be ascertained due to the absence of a dominant with incomplete penetrance or a recessive trait. Conclusion: Golden Retriever pigmentary uveitis does appear to be an inherited trait. The DLA'DQB locus does not appear to play a role in the development of pigmentary uveitis. Michigan State University Companion Animal Fund.

ABSTRACT NO.: 067
Immunohistochemical examination of fibrovacular and endothelial-like pre-iridal membranes in dogs
B. S. Bauer,* L. S. Sandmeyer,* R. B. Hall† and B. H. Grahn†
*Department of Small Animal Clinical Studies, Western College of Veterinary Medicine, Saskatoon, Saskatchewan, Canada; †College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
Purpose: To determine if the endothelial or pre-iridal membrane in iridocorneal endothelial (ICE) syndrome in humans arises through metaplasia of intraocular fibrovascular membranes in dogs. Methods: Of this study is to (1) evaluate immunohistochemical staining of the two types of pre-iridal membranes in dogs to determine if endothelial cell metabolism plays a role in membrane formation and (2) demonstrate the ocular membrane characteristics that allow differentiation of the membrane present. Results: H&E stained slides of 28 enucleated canine specimens with pre-iridal membranes were examined. The membranes were divided into two groups based on the appearance of the pre-iridal membrane: fibrovascular or endothelial-like, and the histopathologic diagnosis was recorded. Immunohistochemical labeling with antibodies to vimentin, cytokeratin AE1/AE3 and Factor VIII related antigen was completed on the globe. All fibrovascular membranes stained positive for Factor VIII related antigen compared to the endothelial-like membranes which stained negative. The endothelial-like membrane appeared more commonly in globes with primary glaucoma. Conclusions: Immunohistochemistry does not support the hypothesis of metaplasia of the endothelial cells into epithelial-like cells in the canine globe with endothelial-like pre-iridal membranes. The increased frequency of endothelial-like membranes in primary glaucoma may indicate a role of iridocorneal endothelialization in the pathogenesis of the condition. Supported by the University of Saskatchewan Diole Laser Fund.

ABSTRACT NO.: 069
Dacryocystitis associated with cutaneous erosion in a puppy
C. F. Campos,* and M. D. Barros†
*Veterinária Ypiranga, †Centro de Criação de Animais de Laboratório, Oswaldo Cruz Foundation, Rio de Janeiro, Brazil
Purpose: This study aims to document a case of recurrent dacryocystitis with cutaneous erosions in a puppy. Methods: A 60-day-old male Yorkshire terrier was referred for ophthalmic evaluation due to recurrent purulent ocular discharge. Complete ophthalmic examination revealed abundant purulent ocular discharge emerging from mildly dilated lacrimal puncta. The puppy did not present any other health problems and was vaccinated and worm prevented. The culture and doxycycline sensitivity test were performed. The dog received ceftiofur-oxacillin for 20 days, the signs ceased but recurred and after 2 days there was also bilateral purulent ocular discharge from the nare and the discharge from the nare was purulent and flushed. After 5 days of the beginning of the nasal discharge the dog also presented a perinasal vesicle, which ruptured, leading to a cutaneous erosion. Samples for impression cytology and microbial culture/antibiogram tests were collected from the perinasal skin and ocular discharge respectively. Oral moxifloxacin and chlorotetracycin were used, with temporary regression of the ocular and nasal discharge. 5 days later the dog was re-evaluated and the ocular and nasal discharge was still present. Failure was 4 times higher in dogs receiving medical treatment (20 of 35 eyes) only when compared to dogs undergoing phacoemulsification with intraocular lens implantation (7 of 34 eyes). For both medically and surgically-treated groups, success rate for mature and hypermature cataracts was less than for immature cataracts. However, regardless of cataract stage, the chance of success was still higher for surgically treated eyes than for medically treated eyes. Conclusion: Surgery has a superior success rate when compared to other modes of cataract management, especially when performed early in the disease process. Lack of medical or surgical therapy results in a high rate of complications that often result in loss of the eye.

ABSTRACT NO.: 070
Cartilage reversal: a technique for correction of everted nictitans
E. D. Wolf
Southern Eye Clinic for Animals, Tampa, FL, USA
Purpose: Develop a technique for surgical correction of eversion of the nictitans cartilage that restores normal contact between the cornea and the advancing margin of the nictitans while maintaining full excision of the nictitans across the cornea. Methods: Eight eyes of five canine patients with everted cartilage of the nictitans underwent surgery to reverse the everted portion of the vertical stem portion of the T-cartilage of the nictitans. Results: A total of 7/8 canines resulted in normal contact between the leading margin of the nictitans and the cornea while maintaining full excision across the cornea as demonstrated by retroptosis.

Conclusion: A new technique is developed to reverse a portion of the cartilage of the third eyelid to direct eversion of the nictitans while maintaining normal nickitating excursion across the cornea.

ABSTRACT NO.: 071
Use of a buccal mucosal island graft for surgical repair of feline eyelid agenesis
A. Welihozkiy, S. Pizziran and C. G. Pirie
Tufts Cummings School of Veterinary Medicine, Grafton, MA USA
Purpose: To describe a surgical technique combining a buccal mucosal island graft with a sliding skin graft for the repair of feline upper eyelid agenesis. Methods: Upper eyelid agenesis in three kittens with superficial keratitis and blepharospasm was diagnosed in three domestic short hair cats (two bilateral). Peters’ anomaly was noted in two patients and PPM’s were present in one patient. Repair of the defect was accomplished using a buccal mucosal island graft in

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Subchoroidal foreign body in a dog – a case report

A. Welihizky, S. Pizzirani and C. G. Pirie
Tufts Cummings School of Veterinary Medicine, Grafton, MA, USA

Purpose: To describe a case of a subchoroidal foreign body in a dog.

Methods: A 2-year-old MC Springer Spaniel was referred for a 3-week history of exophthalmos, periorbital swelling, and chemosis associated with fundus OD.

Effect of eyelid manipulation and manual jugular compression on intraocular pressure measurement in dogs

H. E. Klein,* S. G. Krohne,* J. Stiles* and A. S. Mohamed†
*Department of Veterinary Clinical Sciences, †Department of Comparative Pathobiology, School of Veterinary Medicine, Purdue University, West Lafayette, IN, USA

Purpose: To determine the effect of eyelid manipulation and manual jugular compression on intraocular pressure (IOP) measurement by applanation tonometry (Tono-Pen) in normal dogs.

Methods: Retrospective analysis of medical records of 30 dogs using six methods of eyelid manipulation and/or jugular compression. The methods used in each eye included (a) minimal eyelid manipulation, (b) maximal dorsal overflow extension of the eyelids, (c) lateral eyelid extension, (d) manual compression of the ipsilateral jugular vein (c) manual compression of both jugular veins, and (f) lateral eyelid extension and manual compression of both jugular veins. Significant difference between the means of each measurement and the reference Tono-Pen values of 21.5 mmHg was determined using student’s t-test. Results: The two manipulations that caused the greatest mean increase in IOP were lateral eyelid extension combined with compression of both jugular veins (17.6 mmHg increase) and lateral extension alone (17 mmHg increase). These results were statistically significant (95% CI = 15.7–19.6 and 15.7–19.7 respectively). Lateral or dorsal/overflow eyelid extension also significantly increased mean IOP. Compression of the ipsilateral jugular vein did not significantly alter mean IOP compared to jugular manipulation. Conclusions: Traction on the eyelids and/or pressure on both jugular veins can significantly and clinically increase IOP values as measured by the Tono-pen in normal dogs.

ABSTRACT NO.: 078

Canine optic neuritis: retrospective analysis of 20 cases

A. J. Specht, M. L. Busch and C. E. Plummer
College of Veterinary Medicine, University of Florida, Florida, USA

Purpose: To review common clinical presentations, underlying causes, treatment and prognosis of canine optic neuritis in a retrospective study of 20 cases.

Methods: Retrospective analysis of medical records of 20 dogs diagnosed with optic neuritis between December 1996 and September 2006. Information collected included age, sex, breed, presenting signs, results of diagnostic tests, treatment protocols, and outcome. Statistical analysis was performed using Fisher’s exact test and Chi-Square with Yate’s correction. Results: The mean age was 8.55 years (range 0.8–18 years). The most common breeds were Labrador Retrievers (30%), Boxers (15%), mixed (20%), and Golden Retrievers (10%). The most common signs were blindness (100%), anisocoria (75%), and nystagmus (50%). The majority of dogs (75%) presented with bilateral signs, while 25% presented with unilateral signs. The mean time from onset of signs to diagnosis was 5 months. The most common underlying condition was trauma (65%, 13/20), followed by inflammatory diseases (25%, 5/20), neoplasia (10%, 2/20), and idiopathic (10%, 2/20). There were no statistically significant differences between the groups. Conclusions: Optic neuritis can be a common, severe and vision-threatening disease in dogs, with a poor prognosis.

ABSTRACT NO.: 080

Evaluation of preclinical tear film pH in clinically healthy dogs

R. A. Armentano, A. J. Specht, C. E. Plummer, A. E. Stone and J. A. Wuerz
Veterinary Medical Center, University of Florida, Florida, USA

Purpose: To establish a range of preclinical tear film (PFT) pH measurements in a population of clinically healthy dogs as well as to determine the degree of correlation between PFT pH and pH of venous blood.

Methods: This study was designed for prospective, sequential enrollment of clinically healthy canines (determined by history and physical examination) admitted to the Veterinary Medical Center, University of Florida. Tertiate pH (pHT) was measured using an iontophoretic instrument (model IQ125) which was calibrated prior to every measurement. Results: Mean pHT was 7.5 with a reference range (mean ± 2 standard deviations) of 6.4 to 8.6. The minimum pH value was 6.16 and the maximum pH was 7.94. No statistical difference was found between preclinical pH and pH of venous blood. Conclusions: There was no substantial variation in pH between canine eyes. In addition, PHT pH does not appear to be a passive reflection of blood pH. Further study is necessary to elucidate factors that influence tear pH in normal dogs.

ABSTRACT NO.: 081

In vitro culture and reconstruction of equine corneal epithelial cells on amniotic membrane

C. E. Plummer, J. Coleman and H. Sapp
College of Veterinary Medicine, University of Florida, Gainesville, FL, USA

Purpose: To investigate the use of equine corneal epithelial cells (LEC) as in vitro and for constructing sheets of epithelium upon amniotic membrane (AM) for clinical use.

Methods: Equine corneal explants were harvested from cadavers and expanded in cell culture. The resultant LEC were placed upon AM and examined for proliferation and expansion. Results: LEC are easily obtained from limbal biopsies and are amenable to proliferation in culture. When placed upon pieces of preserved AM, these cells sheets and orient themselves parallel to the dorsal surface of the cornea. Conclusions: LEC can be used as a substrate for cultured LEC for the purpose of proliferation and healing of corneal epithelium. AM as a substrate for cultured LEC has tremendous potential for the advancement of therapies aimed at ocular surface reconstruction.
ABSTRACT NO.: 085
Protective effects of BDNF and phenytoin against NMDA induced retinal damage
S. Iwabe,* F. Gil-Carrasco,† A. A. Rodríguez-Reyes† and M. Lamas-Gregori‡
*Department of Pharmacobiology, Centro de Investigación y de Estudios Avanzados del IPN (Cinvestav), Mexico City, Mexico, †Glaucoma Service and Pathology Anatomía Para Escitar la Ceguera en México, Hospital Dr. Luis Sanchez Bulnes, IAP, Mexico City, Mexico.
Purpose: To evaluate the neuroprotective effects of brain-derived neurotrophic factor (BDNF) and the anticonvulsant phenytoin against N-methyl-D-Aspartate (NMDA) induced retinal damage. Methods: Forty rats were injected intravitreally with NMDA (20 mM) to induce retinal excitotoxicity. Different groups of 10 animals each were injected with BDNF (0.5 μg) intravitreally and/or with phenytoin (100 mg/kg) intraperitoneally, respectively. In order to study the role of different treatments alone and in combination, one group of animals was treated with saline instead of the treatments. Results: TUNEL assay was used to evaluate the apoptosis. In an acute environment of excitotoxicity induced with NMDA, the treatment using BDNF and phenytoin together provides better neuroprotection to retinal ganglion cells, when compared to control eyes. Conclusion: The combination of BDNF and phenytoin may be a potential retinal protective agent in cases where retinal injury occurs.

ABSTRACT NO.: 086
Diabetic retinopathy and cataracts in an aged raccoon with pancreatic islet amyloidosis
C. M. Reilly,* B. C. Barr† and N. L. Anderson‡
*University of California, Davis Veterinary Medical Teaching Hospital, CA, USA, †California Animal Health and Food Safety Laboratory, Davis, CA, ‡Lindsay Wildlife Museum, Walnut Creek, CA, USA
Purpose: To report the clinical and pathologic findings in a raccoon with islet amyloidosis, diabetes mellitus (DM), and associated ocular lesions. Methods: This is a retrospective case report of a 6-year-old female raccoon presented to the California Animal Health and Food Safety Laboratory, Davis, CA, USA, for evaluation of a 1-year history of cataracts and diarrhea. Results: The raccoon was hypothyroid and had an increased serum insulin concentration. Cytology of the pancreas revealed the presence of islet amyloidosis. Bacterial culture of the blood was negative. Funduscopic examination revealed severe retinopathy and cataracts. Histologically, the pancreas was markedly widened by fibrillar eosinophilic material, which was confirmed to be amyloid with Congo red staining. Both eyes had hypermature cortical cataracts with liquefaction, and varying degrees of preiridal fibrovascular membrane formation. Conclusions: This is the first report of ocular manifestations of DM in raccoons to our knowledge. Diabetic retinopathy and cataracts in an aged raccoon were observed in this case.

ABSTRACT NO.: 087
Goblet cell MUC5AC mRNA in canine nictitating membrane Y. Umeda,* S. Nakamura,† K. Fujiuki,* H. Toshida,‡ A. Saito,‡ and A. Murakami*†
*Department of Ophthalmology, Juntendo University School of Medicine, Tokyo, Japan, †Division of Biomedical Imaging Research, Biomedical Research Center, Juntendo University School of Medicine, Tokyo, Japan, ‡Triangle Animal Eye Clinic, Tokyo, Japan
Purpose: To evaluate the distribution of the goblet cells and expression of MUC5AC mRNA in canine nictitating membrane. Methods: Distribution of the goblet cells in canine nictitating membrane was examined by histochemical analysis using frozen sections and stained with alcian blue and periodic acid–Schiff reagents. The detection of the MUC5AC mRNA was examined by reverse transcription polymerase chain reaction (RT-PCR). And distribution of the MUC5AC mRNA was also examined by in situ hybridization using digoxigenin (DIG)-labeled RNA probe. Results: The goblet cell in canine nictitating membrane epithelium contains numerous PAS reaction positive goblet cells, particularly at the marginal edge. RT-PCR analysis detected that MUC5AC have been expressed in the canine nictitating membrane tissues. Distribution of MUC5AC mRNA on the nictitating membrane was much in the palpebral side as same as the histochemical examination. In the present studies, we recognized numerous goblet cells in canine nictitating membrane epithelia, particularly the palpebral side, and the MUC5AC mRNAs have been expressed in canine nictitating membrane epithelia, corresponding to the goblet cells.
Substrate topography modulates TGFB-induced sSMAD7 and smad7 expression in rabbit corneal stria cells

K. E. Myrna,* P. Russell,† S. J. Lienesick,* J. V. Jester,* P. F. Nealey,* D. Brown§ and C. J. Murphy†

*School of Veterinary Medicine, University of Wisconsin, Madison, WI, USA  †School of Veterinary Medicine, University of California-Davis, Davis, CA, USA  ‡School of Veterinary Medicine, University of California-Irvine, Irvine, CA, USA  §College of Engineering, University of Wisconsin, Madison, WI, USA

Purpose: TGFB is known to be important in regulating corneal fibroblast differentiation to the myofibroblast phenotype and plays an important role in normal and dysregulated wound healing. Myofibroblasts are generally located at the normal and wound tissue interface suggesting that the tissue provides cues that may modify TGFB signaling. The purpose of this study was to determine the effect of topographic cues on TGFB-induced myofibroblast differentiation of rabbit corneal stromal cells. Methods: Rabbit corneal fibroblasts were plated on nanopatterned surfaces having topographic features of varying pitch (200 µm), width and ridge widths. Cells were cultured with TGFB at concentrations of 0.0 ng/ml, 0.1 ng/ml, 1 ng/ml or 10 ng/ml. 72s after culture was collected from the surfaces and analyzed for sSMAD7 and SMAD7 by quantitative real time PCR. Results: Cells grown on a planar surface expressed negligible levels of sSMAD7 (0.0 and 0.1 ng/ml TGFB). A fold increase was observed at 1 ng/ml and a 2.5-fold increase at 10 ng/ml. Cells grown on all topographically patterned surfaces demonstrated significantly reduced levels of sSMAD7 (P < 0.002) compared to the flat surface when exposed to at least 1 ng/ml of TGFB. Cells on the 1400 nm pitch surface expressed the lowest levels of sSMAD7, expressing 30% less than those on planar surfaces at 1 ng/ml TGFB and 98% less than sSMAD7 at 10 mg/ml TGFB. Cells grown on planar surfaces at all concentrations of TGFB showed equal and low levels of SMAD7. SMAD7 expression was significantly greater on all planar surfaces compared to the control surface (Disopur P14 1400 nm pitch concentration of 0.0002). There was a seven fold increase in expression at 400 nm and a four fold increase at 1400 nm at a TGFB concentration of 10 ng/ml. Conclusions: These data suggest that nanoplate topographic features modulate the expression of myofibroblasts through the expression of sSMAD7, perhaps by a mechanism of SMAD7 inhibition. We propose that in the wound environment the native corneal topography is likely to affect the myofibroblasts/fibroblast phenotype with pathologic alterations of the topographical environment may be permissive for myofibroblast differentiation and the development of fibrosis and corneal haze. Funded by NIH Grant R01EY022331-07

Visual examination with visual evoked potential using flash stimulus in dogs

Y. Itoh, S. Maehara and Y. Izumisawa

Rakuno Gakuen University, School of Veterinary Medicine, Department of Small Animal Clinical Sciences, Hokkaido, Japan

Purpose: To evaluate visual examination with flash VEP (VEP) in dogs. Materials and Methods: Seven normal beagles (normal group) and four cases with visual impairment (disease group) were assessed. Dogs in disease group were diagnosed with cataract, optic nerve atrophy, chronic glaucoma and brain tumor adjacent in optic chiasm, respectively. VEP was recorded with plate-type electrodes positioned on inion, nasion and temporal region. The flash intensity was 700 cd/m²/sec and 128 repetitions were averaged. In normal group VEP was recorded before and after mydriasis. To evaluate the reproducible, VEP was recorded from same dogs 7 days later again. In disease group, VEP was recorded before and after mydriasis. To evaluate the reproducible, VEP was recorded from same dogs 7 days later again. In disease group, VEP was recorded only with mydriasis. Results: In normal group, implicit time of N2 and P2 and amplitude of N2-P2 after mydriasis were significantly shortened and increased compared with those before mydriasis, respectively. And there was significant difference in amplitude compared with first recording result. In disease group, VEP was recorded only with mydriasis. Conclusions: The laser VEP is a useful objective assessment tool of blood aqueous barrier breakdown with surgical damage and/or in uveitis. Flare values increased rapidly one day post-surgery but decreased markedly 3 days post-surgery and remained low thereafter. As for the influence of the intraocular lens on flare value, there was no significant difference between DV-20 and PFI 16 SE. Thus, it was suggested that the type of IOL implanted have little influence on flare value for a short term following cataract surgery.

Effects of tafaluprost 0.0015% compared with latanoprost 0.005% on the IOP and pupil size of normotensive dogs

N. Takiyama, M. Sakai, H. Koie and M. Uechi

Laboratory of Veterinary Internal Medicine, Department of Veterinary Medicine, College of Biowaesce Sciences, Nibot University, Kameins, Fajjaru-shi, Kanagawa, Japan

Purpose: To compare the effects of tafaluprost 0.0015% and latanoprost at all time intervals.

Results: The IOP of latanoprost was significantly higher than that of tafaluprost. Conclusions: Tafaluprost 0.0015% significantly reduces the IOP in normotensive Beagle dogs. The effects on IOP and PS obtained with tafaluprost 0.0015% is equally to that obtained with latanoprost 0.005%.

Commercial interests:

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ABSTRACT NO.: 097
Outcome of gene therapy is enhanced by CNTF-induced photoreceptor deconstruction in dogs with advanced stages of primary cone function loss
*Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA, USA; †Department Molecular Genetics and Microbiology, University of Florida, Gainesville, FL, USA; §Baker Institute, Cornell University, Ithaca, NY, USA
Purpose: To study the effect of intravitreal CNTF administration on the therapeutic efficiency of rAAV-mediated gene replacement therapy in adult dogs with CNGB3 achromatopsia. Methods: Intraocular injections of CNTF were delivered concomitantly with injection of rAAV-CNGB3 into the vitreous cavity of 7.96 ± 0.02 mL CNTF (kindly provided by Dr. Rong Wen, Bascom Palmer Eye Institute), while the fellow eyes were injected with 30 μL of PBS. After 7 days, 7 dogs (age range: 14–39 months) were treated bilaterally with subretinal injections of rAAV1-SP2.ICNGB3. The injected volumes varied between 140 and 200 μL containing 7.96 × 10^3–A.62 × 10^5 particles per mL. Full-field ERGs were recorded before, as well as 1 and 3 weeks after the CNTF injections. Retinas were collected from 3 dogs for measurement of transgene expression and cone-specific gene expression by qRT-PCR. Results: Baseline ERGs confirmed normal red-mediated function, but lack of cone-mediated responses. One week following intravitreal CNTF application, conventional full-field ERG responses were almost completely extinguished, but remained normal in the PBS injected eyes. Red ERG responses recovered at 5 weeks post CNTF injection. Cone function was restored only when gene therapy was combined with intravitreal CNTF administration. High levels of CNGB3 transgene expression were found in all rAAV injected eyes, regardless of concomitant CNTF/vehicle treatment. Conclusions: Intravitreal injection of CNTF led to a fully reversible depression of outer retinal function (Parton-Cott et al., 2009), and dedifferentiation of photoreceptors (Beltran et al., 2007) in dogs, a process we term photoreceptor deconstruction. We posit that this process which reduces the delivery and efficacy of gene therapy in older mutant animals may result from treatment of cones that have dedifferentiated, and are able to reform the molecular components of the outer segment following redifferentiation. Supported by EY13112, 19204, 06851, 07132, 08571, 11123, 17549, FFB, MVRF, The ONCE Int’l Prize. Commercial Relationship: P (WW Hauwirth, AGTC).

ABSTRACT NO.: 098
Multiple congenital ocular anomalies (MCOA) syndrome in two silver coat colored ponies
A. M. Komáromy and J. S. Rowlan
Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA, USA
Purpose: Equine Multiple Congenital Ocular Anomalies (MCOA) or Anterior Segment Dysgenesis (ASD) syndrome consists of various numbers of ocular abnormalities predominantly affecting the anterior segment of the eye. It has been well described in the Rocky Mountain and Kentucky Mountain horses. While the disease-causing gene mutation has not yet been identified, the chromosome interval for the MCOA locus has been mapped to a 4.9-megabase interval on EC04q (Anderson et al., 2008). This interval also contains the PMEL17 gene, which when mutated is responsible for color coat color (also called Silver dapple). While the Silver coat color shows an autosomal dominant inheritance, the alleles at the PMEL17 locus are codominant.

Methods: Blood was collected and genomic DNA extracted for genotyping. Retinas were collected from two silver coat colored ponies referred for treatment of cones that have dedifferentiated, and are able to reform the molecular components of the outer segment following redifferentiation. Supported by EY13112, 19204, 06851, 07132, 08571, 11123, 17549, FFB, MVRF, The ONCE Int’l Prize. Commercial Relationship: P (WW Hauwirth, AGTC).

ABSTRACT NO.: 099
Changes of aqueous flare values in four breeds of dog after phacoemulsification with IOL implantation
Y. Fujii and S. Kudo
Kudo Animal Hospital, Tokyo, Japan
Purpose: Breed differences, especially American Cooker Spaniel (Cooker) and Toy Poodle (Poodle), were reported in post-operative inflammatory reactions on the surgical site. To examine the exact correlation between the breeds and inflammatory responses, we compared the aqueous flare values of Cocker and Poodle, after phacoemulsification with IOL implantation. Methods: Four breeds of the dog, 37 eyes of 10 American Cooker spaniel (age: 3.7 ± 1.7), 41 eyes of 32 Toy Poodle (age: 4.9 ± 1.3), 17 eyes of 7 Chihuahua Spaniel (Cavalier, age: 4.8 ± 2.0), and 12 eyes of 10 Shiba-Inu (Shiba, age: 5.4 ± 2.9) were used in this study. Aqueous flare values were measured using the LASER FLARE TTER FM-500 (Kowa, Tokyo, Japan) from the day 1 to the day 4 after phacoemulsification with IOL implantation between January 2007 and March 2009 at our practice. Statistical analysis was done using one-way analysis of variance. Results: Aqueous flare values linearly increase from the day 1 to the day 4. The highest个体日差 in the day 4 were 149.9 ± 106.1, 119.7 ± 106.7, 92.6 ± 107.9 in Cooker, Poodle, Cavalier, and Shiba, respectively.

ABSTRACT NO.: 100
Feline conjunctival surface adenocarcinoma: ten cases
C. Naranjo, C. S. Schobert and R. R. Dubielzig
School of Veterinary Medicine, University of Wisconsin-Madison, WI, USA
Purpose: To describe a novel tumor, conjunctival surface adenocarcinoma, in 10 cats.
Methods: The Comparative Ocular Pathology Laboratory of Wisconsin (COPLOW) database was searched for cases diagnosed with feline conjunctival surface adenocarcinoma. Information regarding the breed, age, gender, affected eye and location of the tumor within the conjunctiva was recorded. The referring ophthalmologist was contacted for follow up information. Results: Ten cats were diagnosed with conjunctival surface adenocarcinoma, including five Domestic Long Haired, two Persian, two Siamese or Siamese cross and one Domestic Short Haired. Mean age was 10.7 years (range 3 to 18 years). Gender distribution was homogenous. The most common location included conjunctiva overlying the third eyelid, although multifocal distributions were common. The tumor was frequently contiguous with the surface epithelium of the conjunctiva, forming slender papilliferous projections. Tumors frequently infiltrated adjacent structures, including the lamina propria of the conjunctiva, cornea at the limbus, and the gland of the third eyelid. Neoplastic cells were organized in packets with occasional acini noted. PAS-positive extracellular matrix within the laminae of acinar structures was found in 4 of 5 cases. Local recurrence was frequent, so aggressive surgery, including enucleation and extirpation, was necessary in some cases. Conclusions: Conjunctival surface adenocarcinomas should be considered as a differential diagnosis for masses involving the conjunctiva and third eyelid of the cat and may affect the palpebral or palpebral nasal planum. Radical surgery may be required as this tumor has potential for recurrence if incompletely excised.

ABSTRACT NO.: 101
A retrospective evaluation of the diamond burr superficial keratectomy in the treatment of spontaneous chronic corneal epithelial defects in dogs from 2006 to 2008
Department of Ophthalmology, Michigan Veterinary Specialist, Southfield, MI, USA
Purpose: To determine approximate healing times and complications in dogs with spontaneous chronic corneal epithelial defects (SCCEDs) treated with a diamond burr superficial keratectomy (DBSK), grid keratotomy with a #64 beaver blade under anesthesia (GKT), or a grid keratotomy with a 25G needle under topical anesthesia (GKT) at a private referral hospital.

Methods: Eyes with a diagnosis of SCCED from 2006 to 2008 were eligible for inclusion in the study. Dogs treated with GKT or GKT were reviewed and the results compared. Healing time and mean post-operative inflammatory responses were recorded. Statistical analysis was performed using Chi square contingency tables. Results: A total of 195 eyes were eligible for inclusion in the study (100 DBSK, 52 GKT, and 43 GKT). All of the dogs had lesions that had failed to heal within 2 to 3 weeks after other treatments. Conclusions: DBSK was rare and the most significant complication was developing of varying degrees of keratolacia early in the post-operative period. In all cases, the eyes improved with medical management. Conclusions: DBSK is a promising new method for the treatment of SCCEDs and may allow for more optimal healing times than more traditional methods. Further evaluation of the DBSK as a treatment for SCCEDs is indicated.

ABSTRACT NO.: 102
Effects of fixed combination timolol 0.5%/travoprost 0.004% compared with travoprost 0.004% on the intraocular pressure in normal dogs
P. Jitasonbuti, S. Asawapureekorn, T. PloIgnym, N. Petchoo, K. Boonloh, T. Somphabutr and P. Wipoosak
Faculty of Veterinary Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen District, Khon Kaen Province, Thailand
Purpose: To compare the effects of fixed combination timolol 0.5%/travoprost 0.004% and travoprost 0.004% on the intraocular pressure (IOP) in normal dogs. Methods: Ten mixed breed dogs were divided randomly into two groups of 5 each. Each group received instillation of fixed combination timolol 0.5%/travoprost 0.004% or travoprost 0.004% on the right eyes at 8 AM. The left eyes in both groups served as control, which were instilled with normal saline solution. One eye of each dog was measured at 1 PM and 8 PM during 3 days of treatment. Results: Mean IOP was significantly reduced by day 1 and 2 in the eyes treated with timolol 0.5%/travoprost 0.004% and travoprost 0.004%, respectively (P < 0.05). By the end of the third day, mean IOP of the 0.5%/travoprost group and 0.3 mmHg in the timolol 0.5%/travoprost 0.004% group. However, no significant difference between the mean IOP of the eyes treated with timolol 0.5%/travoprost 0.004% and travoprost 0.004% was observed (P > 0.05). Conclusions: Travoprost 0.004% and fixed combination timolol 0.5%/travoprost 0.004% significantly reduce the IOP in normal dogs. The ocular hypotensive effect of timolol 0.5%/travoprost 0.004% and travoprost 0.004% is comparable.
ABSTRACT NO.: 103
Incidence of juvenile cataract in 213 Labrador retrievers for guide dog in Japan
A. Kubo,* T. Yogo,† K. Terakado,‡ J. Yaw‡ and T. Furukawa* †Veterinary Medical Eye Center, Takahashi Animal Hospital, Japan
‡Department of Veterinary Surgery, Nippon Veterinary and Life Science University, Japan
§Hokkaido Guide Dogs for the Blind Association
$Department of Comparative Animal Science, Kurashiki University of Science and the Arts, Japan

Purpose: To determine the incidence of juvenile cataracts in Labrador retrievers training for guide dog services and to compare the stage of cataract development with a control group. Methods: A total of 213 Labrador retrievers (114 males and 99 females) were subjected to a slit lamp biomicroscope to detect cataract. Age, gender, familial relation and the position of cataracts in the lens were determined. Results: This study showed that cataracts were observed in 17 eyes of 12 dogs (six males and six females), the incidence rate was 5.63% and the average age of the detection was 2.24 ± 0.24 year old. Cataracts were detected at the posterior part of lens including posterior cortex, suture and capsule in 11 of 12 dogs with cataract. There were two groups of two dogs from each same litter, a group of four dogs from same father and the other group of two dogs from same mother, and a group of two dogs from same mother in the dogs with cataract. Conclusions: In this study, the incidence rate of cataracts was lower than the spontaneous incidence rate reported previously. No gender predisposition was observed. Most of cataracts were detected at the posterior part of lens as previous report in Labrador retrievers. The familial relation with cataract formation was observed significantly and we considered the genetic factor was strongly related to the cataracts observed in this study.

ABSTRACT NO.: 104
Evaluation of the photopic negative response and oscillatory potentials in New Zealand white rabbits with elevated intraocular pressure following intra-cameral injection of 1% methyl cellulose and vortex vein ligation
P. D. Chevis,§ L. Croft,§ E. Hoffman,†† S. Osborn,** S. W. Jack,‡‡ M. Renner,§§ D. T. Rickard,†††
*Department of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA,
†††College of Veterinary Medicine, University of California, Davis, CA, USA,
‡‡Department of Veterinary Ophthalmology and Strabismus, University of Pennsylvania, Philadelphia, PA, USA,
**VetPath, Inc., Redwood City, CA, USA,
.§§Section of Ophthalmology, Department of Ophthalmology, Mayo Clinic, Rochester, MN, USA

Purpose: We have established a reliable model for intraocular pressure (IOP) elevation in rabbits. Intraocular pressures (IOP) were induced in New Zealand white rabbits by intracameral injection of 1% methyl cellulose and vortex vein ligation. Photopic negative responses (PhNR) and oscillatory potentials (OP) were recorded to assess retinal function. Methods: Rabbits were anesthetized and placed posterior to an oval-shaped pupil. Nictitating membranes were retracted and stapedius muscles were exposed. A partial temporal axial pattern flap to restore tension-free cutaneous palpebral tissue, and secondly, a Roux eyelid rotation was performed on the third eyelid to provide inner conjunctival lining to the third eyelid. The nictitans flap was transected. The pigmented, cartilaginous leading edge of the nictitans was reflected over and sutured to the distal margin of the neo-palpebra, creating a well-defined inner lining of the neo-palpebra. Results: Prolapsed third eyelid gland can occur normally with keratoconjunctivitis sicca. This was treated using a partial functional blink emanating from the lower eyelid. The animal was sedated with 0.2% ointment. Fifteen dogs (19 eyes) with prolapse of the third eyelid gland were evaluated, and submitted to STT-1. They underwent the Morgan pocket technique, and were post-operatively examined. In the eyes after intraocular pressure elevation, six measurements were taken and averaged resulting with the mean value. A complete ophthalmic examination had been performed on all CSL by a veterinary ophthalmologist. Results: Currently, there are twenty healthy eyes with intraocular pressure elevation of 32.8 mmHg with a SD± = 3.2 at a 95% CI of 26.4 to 39.1. Conclusion: We have established a reliable model for IOP elevation in rabbits. This model is useful for the study of IOP elevation as compared with the previous studies. Further studies are needed to investigate the percent decrease of PhNR amplitudes of ERG PhNR and OP had both declined progressively over time compared with the baseline. By 9 day, the mean PhNR amplitudes at +1dB decreased by an average of 30% (+0.21dB, SD± = 0.625) after vortex veins ligation. In the eyes after intracameral injection, the mean PhNR amplitudes at +1dB decreased by an average of 18% (+0.04dB, SD± = 0.625) after vortex veins ligation. The difference of the PhNR amplitudes and prolonged implicit times of OP are more sensitive and specific than the declining PhNR amplitudes. Conclusion: The decreased amplitudes of PhNR and OP indicate the damage at the ganglion cell layer or outer nuclear layer respectively as caused by the slow increased IOP. The amplitudes and implicit times of OP are sensitive and specific to monitor the possible early damage of IOP changes.

ABSTRACT NO.: 105
Complete reconstruction of the superior eyelid in a dog utilizing a superficial temporal axial pattern flap and nictitans-based conjunctival pedicle graft
B. J. Stanley, J. T. Bartoc and K. E. Pierce
College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA

Purpose: Reconstruction of large, full-thickness defects of the superior eyelid can be challenging, as maintenance of lid function is critical for ocular health. This case report describes a novel, multi-layer reconstruction of the skin, margin, and conjunctiva of the superior eyelid.
Methods: An 11-year-old dog presented with a grade II mast cell tumor involving the left upper eyelid, with no evidence of metastatic disease. The eyelid was excised and reconstruction was performed. The first stage reconstruction involved the development of two flaps, firstly, a superficial temporal axial pattern flap to restore tension-free cutaneous palpebral tissue, and secondly, a conjunctival flap from the nictitans apron of the third eyelid to provide an inner conjunctival lining to the neo-palpebra. A temporary tarsorrhaphy showed good results.

ABSTRACT NO.: 106
Use of rebound tonometry as a diagnostic tool to diagnose glaucoma in the captive California sea lion (Zalophus californianus). CSL is ocular disease. Glaucous is a disease that has not been evaluated extensively in the CSL. Observing clinical signs and measuring intraocular pressures (IOP) is critical for early diagnosis. The objective of this project is to measure IOP in clinically normal captive CSLs without ocular pathology to establish a normal range. Methods: The Tono-Vet® (Wed- ster Veterinary) was selected to be used in the study. The Tono-Vet uses non-invasive, rebound methods to estimate IOP and to record an accurate IOP. Results: Six measurements were taken and averaged resulting with the mean value. A complete ophthalmic examination had been performed on all CSLs by a veterinary ophthalmologist. Results: Currently, there are twenty healthy eyes with intraocular pressure elevation of 32.8 mmHg with a SD± = 3.2 at a 95% CI of 26.4 to 39.1. Conclusion: We have established a reliable model for IOP elevation in rabbits. This model is useful for the study of IOP elevation as compared with the previous studies. Further studies are needed to investigate the percent decrease of PhNR amplitudes of ERG PhNR and OP had both declined progressively over time compared with the baseline. By 9 day, the mean PhNR amplitudes at +1dB decreased by an average of 30% (+0.21dB, SD± = 0.625) after vortex veins ligation. In the eyes after intracameral injection, the mean PhNR amplitudes at +1dB decreased by an average of 18% (+0.04dB, SD± = 0.625) after vortex veins ligation. The difference of the PhNR amplitudes and prolonged implicit times of OP are more sensitive and specific than the declining PhNR amplitudes. Conclusion: The decreased amplitudes of PhNR and OP indicate the damage at the ganglion cell layer or outer nuclear layer respectively as caused by the slow increased IOP. The amplitudes and implicit times of OP are sensitive and specific to monitor the possible early damage of IOP changes.

ABSTRACT NO.: 107
Morgan pocket technic plus ciclopamide 0.2% ointment in dogs with prolapsed third eyelid gland
P. D. Galera, R. V. R. Peixoto and M. S. A. Falcão
College of Veterinary Medicine, University of Brasilia, Brazil

Purpose: Prolapsed third eyelid gland can occur normally with keratoconjunctivitis sicca. This was treated using a partial functional blink emanating from the lower eyelid. The animal was sedated with 0.2% ointment. Fifteen dogs (19 eyes) with prolapse of the third eyelid gland were evaluated, and submitted to STT-1. They underwent the Morgan pocket surgery, and were post-operatively examined. In the eyes after prolapse of the third eyelid gland, the use of the medication before surgery reduced the inflammation. In the post operatory period, 70% of the eyes had normal clinical aspect and normal STT values. The mean of STT was 214.68 and 20.84 mmH and before and after the surgery, respectively. In 89.5% of the cases the association of the two drugs ciclopamide 0.2%, twice, a day for 21 days. Result- s: In the first examination before the surgery, 67% of the eyes had other ophthalmic alterations aside from the prolapse of the third eyelid gland. The use of the medication before surgery reduced the inflammation. In the post operatory period, 70% of the eyes had normal clinical aspect and normal STT values. The mean of STT was 214.68 and 20.84 mmH and before and after the surgery, respectively. In 89.5% of the cases the association of the two drugs ciclopamide 0.2%, twice, a day for 21 days.

ABSTRACT NO.: 108
Protein measurement of aqueous humor of clinically healthy dogs through multidimensional electromorphosis gel (SDS-PAGE) with color in silver
M. A. S. Falcão,* P. D. Galera,* R. V. R. Peixoto,* T. C. Ferreira† and E. G. Campos†
*College of Veterinary Medicine, University of Brasilia, Brazil, †Cellular Biology Laboratory, University of Brasilia, Brazil

Purpose: To describe the standardization of the technique for measuring the protein profile of the aqueous humor of clinically healthy dogs, through the determination of proteins by molecular weight by gel-dimensional electromorphosis (SDS-PAGE) with Color in Silver and densitometry. Methods: A total of 23 clinically healthy adult mixed breed dogs were selected without ophthalmic problem, eight females and 15 males. The animals were anesthetized and subjected to paracentesis of anterior chamber and a sample of 0.1 mL of aqueous humor of each eye was obtained. The material was centrifuged and put in electrophoresis gel and stained with silver nitrate. The molecular weight of proteins in the aqueous humor averaged between 120 and 25 kDa, according to the molecular mass marker (190–15 kDa). One of the samples was 40 kDa, and the other one 25 kDa. The proteins were analyzed and subjected to densitometry. The results showed a good correlation between the profiles of proteins. Conclusions: The Morgan pocket technique plus ciclopamide 0.2% increased the STT values and restored the clinical aspects of the eyes. Supported by FINATEC, FAPDF.
ABSTRACT NO.: 110
Quantitative analysis of aqueous humor protein of dogs with cancer
P. D. Galera,* C. M. Nasser,* M. A. S. Falcão,* M. S. T. Rocha,* T. C. Ferreira† and E. G. Campos†
*College of Veterinary Medicine, University of Brasilia, Brazil, †Cellular & Molecular Biology Laboratory, University of Brasilia, Brazil

Purpose: The aim was to quantify the aqueous humor proteins in dogs affected by cancer using the Bradford's colorimetric test and to compare it to the quantity found in healthy dogs. Methods: Six dogs with cancer (one sarcoma histiocytoma, two osteosarcoma, one squamous cells carcinoma, a melanoma, one mast cell tumor and three healthy dogs (control group) had their aqueous humor collected (0.3 mL) by anterior chamber paracentesis. The amount of aqueous humor protein was measured by the Bradford method. Blood was also drawn for total protein blood quantification. Results: A reduction of the protein levels was found in the left eye of sick dogs (8.45 mg/dl) compared statistically to the amount of the protein levels found in the left eye (20.47 mg/dl) of the control group, while in the right eye (17.46 mg/dl) and the left eye (8.45 mg/dl) of the sick dogs, showing a reduction of the left eye's protein levels, which was not observed in healthy animals. The values of aqueous humor protein of dogs with cancer did not correspond to the 8.5% of plasma protein values found in healthy dogs. Conclusion: The hemato-aqueous barrier was intact to systemic alterations in animals with cancer. Further research should be done to elucidate this initial correlation. Supported by FINATEC, FAPDF.

ABSTRACT NO.: 111
Neovascular proliferative vitreoretinopathy reminiscent of retinopathy of prematurity: a morphologic and immunohistochemical study in cats
A. Hoffman,* K. Tawansy,* E. J. Ehrlhart,‡ J. Charles,‡ M. Zarfoss,§ C. Schobert* and R. R. Dubielzig*†
*Eye Care for Animals, CA, USA, ‡Children's Retina Institute, Los Angeles, CA, USA, ‡Colorado State University, Fort Collins, CO, USA, §University of Illinois, Urbana-Champaign, IL, USA, †University of Wisconsin-Madison, WI, USA

Purpose: This study aims to report clinical features, histopathologic and immunohistochemical results in a population of young cats with neovascular proliferative vitreoretinopathy. Methods: Cases diagnosed as neovascular vitreoretinopathy were selected from a total of 619 feline subluxation from COPLOW. Histopathology subsumed to obtain information on age, gender, medical and clinical features. Routine H & E slides were reviewed to describe morphologic characteristics. Immunohistochemistry included GFAP, Caplan IV, laminin, SMA, CD68 and FVIIIRb and was performed on globes available for further sectioning. Results: Most cats presented at <1 year of age, with 6/14, 6 months old. Representative breeds were Persian (2), domestic medium hair (2) and domestic shorthair (10). Among these breeds, eight were female and six were male. The most common clinical presentation was glaucoma. Histopathology: Retinal detachments were noted in 11/14 eyes. The retina was entirely avascular in an eye, and 80–90% avascular in the remaining 13 cases. The course of retinal vessels traveled axially within the vitreous towards the lens in all cases. The nature of the vitreous tended to be very liquid. Fibrovascular membranes were found in all 14 cases. Anterior uveal inflammation was noted in 12/14 cases. Fibrovascular membranes were found in all 14 cases. GFAP: showed excessive staining in the retina, which would be expected from retinal detachment. Collagen IV and laminin: showed staining for basement membrane on the inner border of the retina and prominent basement membrane of the iris. Caplan IV showed myofibroblastic cells in connective tissue and supported that the retinal detachment resulted from traction. CD68: the presence of histiocytic cells were variable within vessels and membrane. A-antitau: showed staining to correlate with the proliferative reaction. FVIIIRb: confirmed that vascular endothelial cells are responsible for the vasoproliferative reaction. Conclusions: Neovascular proliferative retinopathy is a vascular and cellular disorder with retinal detachment, avascular retina, and excessive retinal gliosis that should be considered a cause of feline pediatric uveitis or glaucoma.

ABSTRACT NO.: 112
Equine amniotic membrane transplantation for canine and feline corneal diseases
K. Kim,* J. S. Sapienza* and D. E. Brooks†
*Long Island Veterinary Specialists, Plainview, NY, USA, †College of Veterinary Medicine University of Florida, Gainesville, FL, USA

Purpose: To report the use of equine amniotic membrane transplantation in clinical cases of canine and feline ulcerative keratitis. Methods: Six dogs and one cat (n = 7 eyes) with ulcerative corneal diseases were treated with equine amniotic membrane transplantation (AMT, University of Florida) following poor response to medical therapy. Medical records were retrospectively reviewed to evaluate pre-operative clinical course, surgical methods, and post-operative outcomes. Results: Three breeds of dogs (four Shih tzu, one Miniature pincher, one Bichon frise) and one domestic longhair cat were treated with AMT for ulterior progressive keratitis. Two equine AMTs were placed on two treated eyes, which were treated with keratotomy. One dog received single layer AMT, and four dogs received double layer AMT. The cat had a corneal perforation and received an underlying Biosist± graft in addition to a single layer AMT. Post-operative scars were minimal. Follow-up ranged from four to nine months. All seven eyes showed full graft dehiscence of the second overlying AMT was always observed. One dog developed bullous keratopathy when the retinal detachment became severe. Conclusions: AMT may provide an alternative surgical therapy in order to optimize corneal healing and to minimize corneal scarring.

ABSTRACT NO.: 114
Determination of progenitor cells during canine retinogenesis
M. C. Avila,* G. A. Garcia† and N. A. Moreno*
*Instituto de Investigaciones Biomedicas, Universidad Nacional Autonoma de Mexico, †Facultad de Medicina Veterinaria y Zootecnia, UNAM, Mexico

Purpose: To determine the expression of specific markers for stem, ganglion and proliferation cells into canine felines retinas. Future cell-replacement therapy with progenitor cells represents an alternative treatment for canine glaucomatous neurodegeneration. Methods: Eyes from young dogs were excised and processed for immunohistochemical analysis. Expression of specific markers of neural stem cells (Pax6, c-kit and nestin), ganglion cells (BDNF, CNTF, TRPV1) and cell proliferation (H3) was performed. Results: Expression of BDNF and CNTF was not detected in the ONL while cells in the outer neuroblastic layer (ONL), adjacent to the pigmented epithelium, expressed H3. Expression of Pax6/c-kit and nestin/H3 were observed in the INL while nestin/H3 was found in the ONL. Colocalization of c-kit/Pax6/BDNF and nestin/Pax6/c-kit was found in the INL. Conclusions: During retinogenesis (55 days) the cells in the INL have morphological characteristics of stem cells while those in the ONL show characteristics of cell proliferation, which subsequently initiate their differentiation into photoreceptors. Supported by DGAPA-IN2118 (UNAM).

ABSTRACT NO.: 115
Exclusion analysis reduces the list of candidate genes for the ocular melanosis causative mutation in cairn terriers
J. T. Bartos,* P. A. Winkler,* C. Quinones,* P. J. Venta† and S. M. Petersen-Jones‡
*Department Small, Animal Clinical Science © Department Microbiology and Molecular Genetics, College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA

Purpose: To use genetic markers to screen for linkage of candidate genes to the Ocular Melanosis (OM) locus in Cairn terriers. Methods: Eleven genes: ASIP, COMT, DCT, GPNMB, GSK3B, LYST, MC1R, MITF, SILV, TYR, and TRPV1 were identified as candidate genes potentially encoding OM causative mutations. Conserved polymorphic genetic markers consisting of single nucleotide polymorphisms (SNP), insertion/deletion (In/Del) or microsatellite copy variation were selected that would be informative in or within 0.5 megabases of these 11 genes. PCR primer pairs were designed to amplify two unique markers per gene. SNP allelic variation was evaluated by evaluating the digestion pattern of PCR amplicons containing naturally occurring or primer-engineered restriction endonuclease sites. In/Del and MS alleles were generally easily discriminated on agarose gels. MSs and indeterminate gel separation were sent for high-resolution genotyping. Previous pedigree analysis has demonstrated a dominant inheritance pattern for OM. Therefore, 5–10 unaffected Cairn terrier DNA samples were screened for marker allele variation within OM. Once polymorphism markers were found, samples were evaluated for a single shared marker allele, allowing linkage between the marker and the OM locus. Results: No group of OM affected dogs was found to have a single shared marker allele. Conclusion: Exclusion analysis suggests ASIP, COMT, DCT, GPNMB, GSK3B, LYST, MC1R, MITF, SILV, TYR, and TRPV1 are unlikely to contain mutations resulting in OM in Cairn terriers. Supported by AKC-Canine Health Foundation, Cairn Terrier Club of America, MSU-CVM Pure-bred Dog Endowment Fund, Glassen Foundation.

ABSTRACT NO.: 116
Dichistis causing recurrent corneal ulceration in two Friesian horses
K. L. Wotring and M. E. Utter
New Bolton Center, School of Veterinary Medicine, University of Pennsylvania, PA, USA

Purpose: Two cases of dichitis with subsequent recurrent corneal ulceration are described in Friesian horses. Methods: Retrospective case review. Results: Case 1 was a 9-year-old Friesian stallion with dichitis on the superior and inferior aspects of both eyes causing recurrent ulceration of the cornea. Case 2 was a 5-year-old Friesian gelding with a single dichis in the inferior lid associated with recurrent superficial corneal ulceration in the right eye. Case 1 underwent cytoreduction and epilation twice under standing sedation without resolution of dichitis. A split lid procedure was then performed on the inferior left lid, which was the most severely affected. Cytoreduction was repeated 6 months post-operatively due to recurrence. Cytoreduction was associated with skin depigmentation and repigmentation several months following the procedure. No recurrence has been reported up to 18 months following the third cytoreduction procedure. Case 2 was treated with epilation. Familial relationship between the two horses has not been established. Conclusions: Dichitis should be included as a differential diagnosis when presented with a horse experiencing recurrent superficial corneal ulceration. There has been no established breed association for Friesian horses and dichitis but both horses in this report were Friesians imported from Friesland, the Netherlands.

ABSTRACT NO.: 117
Localization of interleukin 11 in the canine eye
T. R. Richards, N. C. Whelan, C. Pinard, J. Mortlock and J. LaMarre
Ontario Veterinary College, University of Guelph, Guelph, ON, Canada

Purpose: Interleukin 11 (IL-11) is a pleiotropic cytokine with anti-inflammatory, cytopyretic, antitumorogenic, and immunoregulatory properties. IL-11 directly regulates the expression pattern of IL-11 in normal canine eyes. Methods: Normal canine eyes were collected from eight dogs. The distribution of IL-11 expression in the different ocular layers was determined by immunohistochemistry. Frozen sections were stained with IL-11 antibody (clone 2009 American College of Veterinary Ophthalmologists, Veterinary Ophthalmology 12, 390–409

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and cells treated with TGF-β, a known inducer of IL-11 expression. Results: Cytoplasmic expression of IL-11 was observed in the cornea and iridoconal angle. Variable levels of IL-11 expression were noted in the iris and retina, and no expression was consistently present in the ciliary body or sclera. A low level of IL-11 mRNA was constitutively expressed in corneal epithelial cells. A moderate level of IL-11 expression was observed in the cornea and iridoconal angle, and expression in the cornea is increased in the presence of TGF-β, a cytokine important in ocular inflammation and disease. Funded by the OVC Pet Trust.

ABSTRACT NO.: 118
Expression of matrix metalloproteinases in feline eyes with uveitis and lens luxation
J. J. Broadwater,* C. M. H. Colitz,†§ R. R. Dubielzig,‡ S. C. Marastany* and H. L. Chandler,§
*Animal Eye Specialty Clinics of South Florida, Miami, FL, USA
†University of Minnesota, School of Veterinary Medicine, Madison, WI, USA
‡The Ohio State University, College of Veterinary Medicine, Columbus, OH, USA
Purpose: To determine the expression of matrix metalloproteinases-2 and -9 (MMP-2 and MMP-9) in normal feline eyes (N), feline eyes with uveitis (U), and feline eyes with uveitis and lens luxation (UX). Methods: Zymography was performed on aqueous humor samples from 4 N, 3 U, and 3 UX to determine expression of MMP-2 and MMP-9. Immunohistochemistry was performed on 10 N, 10 U, and 10 UX to evaluate the presence of MMP-2 and MMP-9 in the cornea and iridoconal angle. Results: MMP-2 and MMP-9 were present in aqueous humor from both normal and diseased eyes. U samples had an average 1.60 fold increase in MMP-2 expression compared to N. UX samples had an average 1.60 fold increase in MMP-2 expression and an average 1.42 fold increase in MMP-9 expression compared to N. Immunohistochemistry showed MMP-2 and MMP-9 expression in both normal and diseased eyes. Conclusions: MMP-2 and MMP-9 are found in aqueous humor from both normal and diseased eyes. MMP-2 and MMP-9 expression are significantly increased in eyes with uveitis and lens luxation.

ABSTRACT NO.: 119
A retrospective review of the histological and clinical characteristics of canine ocular glauvioscoric syndrome (cogs): a syndrome of intravitreal glial aggregates, neovascular membrane proliferation, intraocular hemorrhage, and neovascular glaucoma in the dog
A. N. Treadwell,* C. Naranjo,† M. K. Zarfoss,‡ T. Blocker* and R. R. Dubielzig
*Eye Care for Animals, †University of Wisconsin College of Veterinary Medicine, Madison, WI, USA, ‡University of Illinois College of Veterinary Medicine, Urbana-Champaign, IL, USA
Purpose: This study aims to characterize the histopathologic findings, clinical behavior, diagnostic findings, and treatment outcomes in canine eyes affected by a syndrome associated with neovascular glaucoma of which we have proposed the name Canine Ocular Glauvioscoric Syndrome (COGS). Methods: The archives at COVPD were used to identify 16 eyes with Cogs. A complete ophthalmic examination was performed on each animal to confirm the diagnosis of COGS. Immunohistochemistry for GFAP and VEGF was performed on paraffin sections. Results: Of all the cases, 5/16 had primary congenital glaucoma. 4/16 had cataracts, 6/16 had anterior lens luxation, 1/16 had a previous iridectomy, and 1/16 had secondary glaucoma. 8/16 had intraocular hemorrhage, and 7/16 had neovascularization. Conclusions: Primary congenital glaucoma is the most common cause of Cogs, followed by cataracts, anterior lens luxation, and previous iridectomy. A complete ophthalmic examination is necessary to confirm the diagnosis of Cogs. Immunohistochemistry for GFAP and VEGF was used to confirm the diagnosis of Cogs.

ABSTRACT NO.: 121
Histopathology and immunohistochemistry evaluation of ocular tissues from horses (Equus caballus, Linnaeus, 1758) seropositive or seronegative for leptospirosis
A. L. G. Souza,* F. Montani-Ferreira,* B. C. Martins,* M. A. G. Silva,† R. J. S. Girio,* J. L. Laus† and L. Noronha‡
*Univestidade Estadual Paulista (UNESP), Brazil, †Universidade Federal de Paraíba (UFPB), Brazil, ‡Pontificia Universidad Católica do Parana (PUCPR), Brazil
Purpose: Evaluate morphological and immune changes in ocular tissues (cornea, iris process, choroid and retina) from horses seropositive and seronegative for leptospirosis. Methods: Fifty eight globes of 29 horses from an abattoir, randomly selected, were studied using histopathology (H&E) and immunohistochemistry (IHC) techniques. For all eye tissues anti-Leptospira antibodies IHC was performed. Specific antibodies were used for cornea (anti-MMP anti-MiPA and anti-MMP anti-MiPA), ciliary body (CD45), choroid and retina (GFAP and calcitonin). 29 serum samples (26 from horses from 26 studies and 3 from normal horses) were assayed for leptospirosis. Results: Fourteen animals were con- sidered positive (MAT titer higher than 80) and 15 negative. Five serum samples from 26 studied were positive for Leptospira interrogans were found: 1) xanthommatogranulosis (14,5%), ataxia, paraesthesia, cerebellar ataxia, ventromedale hemodame. One seronegative animal was MAT-positive for vitreous body. Analysis of HE-stained sections revealed a characteristic pattern of leptospirosis for leptospirosis had corneal thickness significantly higher than the seronegative (P = 0.0347). The immunohistochemistry of corneal samples for Leptospira sp. showed higher positivity in eyes from seropositive animals but also revealed Lepto- spira body antigen. 12/16 samples from normal horses and 3/15 samples from seronegative horses were considered positive (MAT titer higher than 80). No statistically significant differences between eye samples from seropositive or seronegative for leptospirosis. Conclusions: Infection with Leptospira sp. may be organ-specific, since there were seropositive horses with clinical signs of leptospirosis and seronegative horses that were MAT-positive for vitreous body. Early stages of uveitis may cause clinically imperceptible ocular signs. Leptospira sp. can cause early changes in the corneal tissues. IHC changes confirm that seropositive animals may have ocular problems caused by infection by Leptospira sp. and possibly equine recurrent uveitis. Supported by FAPESP – 06/54189-2.

ABSTRACT NO.: 124
Diode endoscopic cyclophotocoagulation in feline glaucoma
I. D. Bras and T. E. Webb
Medcut Medical and Cancer Center for Pets, Worthington, OH, USA
Purpose: To evaluate endoscopic diode laser system for glaucoma therapy in feline patients. Methods: Patients were selected for endoscopic cyclophotocoagulation (ECP) when intraocul- lar pressure (IOP) was >30 mmHg, or when glaucoma was considered uncontrolled (>25 mmHg) on medical therapy. Limbal approach was used; 6/12 combined with cataract sur- gery. Of 12 eyes studied, 11 had postoperative complications. Two weeks post-operatively, IOP was <25 mmHg in 100% of the patients. The average IOP at 6 months, 1 and 2 years was 12.38 mmHg (±2.21), 10.43 mmHg (±1.99), and 14.44 mmHg (±3.05). All patients had a reduction of IOP greater than 50%. Conclusions: Diode ECP appears to be an effective tool in the management of glaucoma in feline patients, IOP can be controlled long term if light can be protected. Intraocular pressure fluctuations decreased when IOPs were monitored with a rebound tonometry rather than applanation tonometry.

ABSTRACT NO.: 125
GNB3 is involved in cone-on-bipolar cell function
S. M. Petersen-Jones,* G. C. Shaw,* E. R. Ritchey,* F. Montani-Ferreira* and A. J. Fisher†
*Department of Small Animal Clinical Sciences, Michigan State University, East Lansing, MI, USA, †Department of Neuroscience, The Ohio State University, Columbus, OH, USA
Purpose: The RGE chE has a functional null mutation in GNB3, the gene known to encode Gβ3, cone beta transducin. RGE chEs have characteristic ERG changes with elevated response thresholds and a supernormal b-wave which lacks oscillatory potentials. These abnormalities suggest that Gβ3 can play a role in inner retinal function in addition to cone function. This study was undertaken to further characterize the relationship between Gβ3 and cone function. Methods: Eyes were harvested from animals of both sexes and ages. Gβ3 antibodies were used in an immunohistochemical study to identify GNB3 expressing retinal neurons. The ERG of RGE chEs was dissected from that of normal chEs. Gβ3 knockout retinas were treated with ATP, DA, PDA and NMDA. Dark and light adapted flash ERG and long flash ERGs were recorded and post injection. Results: GNB3 was found to be expressed in cones and a subset of bipa- rolar neurons in the RGE chE. The Gβ3 knockout retina is similar to the RGE chE, except the Gβ3 antibody block the bulk of the b-wave leaving an a-wave. The deletion of Gβ3 results in the inability of the a-wave to generate an a-wave with a shallower slope and increased implicit time. It also suppressed the supernormal b-wave but enhanced the d-wave. NMDA (blocks transmission from bipolar to third order neurons) had a similar effect on the RGE.chE as did ERG and FTOH cells. Conclusions: GNB3 is involved in cones and ON-bipolar cells. It appears that despite the lack of Gβ3, RGE chEs still have some cone-driven responses. The function of Gβ3 in cone bipolar cells is unknown but the ERG changes that result from a lack of Gβ3 suggests that it may act to enhance and lengthen the duration of signal transduction in the ON-bipolar cell. Additionally, cone and ON-bipolar cell function does not fully explain all the differences in the ERG waveform of RGE chEs. The ERG contributions from other retinal neurons are also abnormal and further studies are required to explain these changes. Supported by MSU Genetic Research Fund.

ABSTRACT NO.: 126
Diagnosing Blastomycosis dermatitidis using a commercial urinary antigen test
Jo-Ann McKinnon, David Whitley and Dan Betts
Department of Veterinary Clinical Sciences, Iowa State University, Ames, Iowa
Purpose: To evaluate the clinical effectiveness of a commercial urinary antigen test as a diagnostic test for suspected blastomycosis. Methods: Fifty one dogs with a history of urinary antigen test for blastomycosis were reviewed retrospectively, including the results of the urine antigen test, cytology, urinalysis and histopathology. Results: Thirty patients were positive for blastomycosis from 113 cases. The urine antigen tests were positive in 3/3 of those cases. Two patients were negative on urinary antigen test. Four cases had negative results; three cases were positive either by cytology or histology but had a negative urine antigen test. One case originally reported as negative, was considered positive on a second urine anti-
Sildenafil reversibly suppresses rod-mediated ERG responses in dogs

K. E. Pierce, J. T. Bartoc, J. G. Hauptman and S. M. Petersen-Jones

Department of Small Animal Clinical Sciences, Michigan State University, East Lansing, MI, USA

Purpose: To investigate if the suppressive effect of sildenafil on PDE6 activity causes permanent alterations of retinal function in carriers of the PRA causing PDE6A4 mutation (PDE6A4+/+) in dogs. Methods: Thirty PDE6A4+/+ - dogs were administered sildenafil citrate (Viagra® USA) at 14.1 μg/kg b.w. once daily for four months. Three wild-type dogs were administered an equivalent sildenafil dose for one week. Two wild-type dogs were administered placebo. Fundus photography, electrophysiology, and vision testing were performed regularly on all dogs during the treatment, and washout phases. Dark-adapted ERG intensity:response series and rod-mediated flicker responses were recorded following light adaptation and light-adapted intensity:response series and cone flicker responses. Nakao-Roshston fitting was performed on b-wave dark-adapted intensity:response curves. Intensity required to elicit a dark-adapted b-wave criterion threshold of 20 μV was calculated. Vision testing was conducted at light intensities ranging from 0.002 to 20 cd/m² using a device consisting of a junction box with four function tunnels. The first-choice tunnel and exit time were recorded during repeated box exit attempts. Results: No ophthalmoscopic abnormalities were identified at any time point. Significantly decreased dark-adapted b-wave amplitudes (P = 0.017) and prolonged implicit times (P = 0.018) were noted during the four months of sildenafil treatment as compared to dogs receiving placebo. The b-wave criterion threshold response was significantly elevated during the placebo phase in PDE6A4+/+ dogs, but the differences resulting in an "unnaking" of the scotopic threshold response (STR). Following washout all recorded ERG responses were comparable to pre-study values. No significant differences in initial tunnel choice and exit times were observed between groups in the vision-testing device. Conclusions: Sildenafil unmasked the STR and elevated the b-wave threshold in both PDE6A4+/- and wild-type dogs during the treatment phase. Study limitations: A cross-sectional study that can be performed in a clinical setting by use of an appropriate corrective equation. Supported in part by CDC grant R49/CLR811509.

ABSTRACT NO.: 130

Lamin A Minus predicts decreases in glutamate, glutathione and glutamine synthetase in the retinas of glaucomatous DBA/2J mice

K. S. Freeman,* J. R. Gionfriddo,* A. Groth,* V. L. Scofield,* K. A. Tahayavi,* and J. E. Madl,**

*Veterinary Medical Teaching Hospital, School of Veterinary Medicine, University of California, Davis, CA 95616, USA; **Department of Clinical Sciences, Colorado State University, 300 West Drake, Fort Collins, CO 80523, USA; †MD Anderson Cancer Research Center, Smithville, TX 78957, USA; ‡Biomedical Sciences, Colorado State University, 300 West Drake, Fort Collins, CO 80523, USA

Purpose: To determine the accuracy and reproducibility of intraocular pressure (IOP) measurements obtained with the TonoVet® and Tono-Pen XL® tonometers in normal and glaucomatous cat, and mouse retinas. Methods: The anterior chambers of both eyes of three anesthesia-adapted adult cats (two glaucomatous, one normal) were cannulated with branched, 21-gauge needles. One branch of each needle was attached to a vertically adjustable reservoir, while the other branch allowed measurement of manometrically-derived IOP. IOP was increased by 5 mmHg increments from 5 to 70 mmHg, then decreased back to 10 mmHg, by raising and lowering the reservoir. At each increment/decrement, three TonoVet and three Tono-Pen XL readings were obtained for each eye by two independent observers. Triplicate IOP readings were also obtained with each tonometer, from both eyes of five normal and seven glaucomatous, unilaterally intervened cats, weekly for 8 weeks. Results: In both normal and glaucomatous cats, TonoVet readings were accurate, with acceptable precision (mean ± 1.02 ± 0.016, r² = 0.931 ± 0.005), but not Tono-Pen XL readings (mean ± 1.04 ± 0.019, r² = 0.931 ± 0.036, y-intercept = 1.41 ± 0.65). Application of a mathematically-derived corrected equation dramatically improved the performance of the Tono-Pen XL relative to the TonoVet. Conclusions: The TonoVet tonometer allows accurate measurement of IOP in both glaucomatous and normal cats. Readings obtained with the Tono-Pen XL are inaccurate but an estimate of actual IOP can be obtained in a clinical setting by use of an appropriate correction equation. Supported: NIH Grants K08 EY018609 and P10 EY016665.
Gene therapy in the second eye of RPE65 deficient dogs also improves retinal function


*Department of Small Animal Clinical Sciences, †Center for Statistical Consulting, Michigan State University, East Lansing, MI, USA ‡Division of Molecular Therapy, UCI, Institute of Ophthalmobiology, London

Purpose: To evaluate whether prior subretinal gene therapy in the RPE65
* dog using an AAV2:2 construct containing the human RPE65 gene results in immune responses that interfere with rescue when the contralateral eye is similarly treated. Methods: Nine RPE65
* dogs underwent subretinal injection of an AAV2:2 vector containing the human RPE65 gene coding region driven by the human RPE65 promoter. Subretinal injection of the same vector construct was performed in the contralateral eye 96–180 days after the first injection. Rescue of retinal function was assessed by electroretinography and vision testing. A dark-adapted intensity-response series and rod flicker responses were recorded. Following light-adaptation single flash and flicker responses were recorded. To assess rescue and rescue effects an ERG was performed at 1 cd/°s (below threshold for a untreated RPE65
* dog) and 3 Hz flicker responses respectively were measured. A vision testing apparatus that assessed a subject’s ability to see an open exit tunnel was used to quantitatively measure visual function under differing light levels. Serum was collected to assess immune response to AAV2 (serum neutralizing antibodies) and RPE65 protein levels (IFN and IgG levels by ELISA). Statistical analysis was performed with significance set at P ≤ 0.05. Results: RPE65
* mice provide further support for this hypothesis. Supported by Colorado State University College Research Council Grant R49/CLR 815109. GVT supplied by Bach Pharma, North Andover, MA.

ABSTRACT NO.: 133

Prevalence of Leptospira infections and positive PCR tests in horses with chronic or recurrent uveitis in Louisiana

A. M. Kubai, R. T. Carter and E. S. Storey

School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA, USA

Purpose: To investigate the prevalence of Leptospira infections within the eyes of horses presented to Louisiana State University for chronic or recurrent uveitis. Methods: Horses were sedated to allow the aqueous humor to be sampled aseptically for diagnostic purposes at presentation, or vitreous was harvested for Leptospira PCR during a transcleral vitrectomy for the treatment of conjunctival equine sarcocystosis. In addition to Leptospira PCR, samples of the same intraocular fluids were submitted to a diagnostic laboratory for Leptospira cultures, and titers as samples of serum were determined. Leptospira cultures and transport media were obtained in advance from the laboratories. Results: Six out of eleven (55%) horses diagnosed with uveitis had positive PCR results for Leptospira. Two of the horses with positive Leptospira PCR tests (18%) also had positive cultures for Leptospira. Serology was submitted for 10 of the 11 horses and all horses tested had positive serum, vitreous and/or aqueous titers for Leptospira. Conclusions: The population of horses that presented to LSU with uveitis had a high prevalence of Leptospira based on PCR results obtained from intraocular fluids (aqueous and vitreous). Infectious causes of equine uveitis including Leptospira should be considered in the etiologic differentials for equine uveitis, but the diagnosis of these intraocular infections was not aided by serology and required specific, invasive sampling of the ocular fluids.

ABSTRACT NO.: 135

Keratonylosis caused by Curvularia sp. in an Asian elephant (Elephas maximus): diagnosis and treatment

A. B. Marlar, S. T. Ferrell and N. P. Lung

Fort Worth Zoological Association, Fort Worth, TX, USA

A 35-year-old, female Asian elephant (Elephas maximus) presented acutely with uveal pain and a focal, periorbital corneal opacity. Initial examination findings included epiphora, marked conjunctival hyperemia, keratoconjunctivitis, conjunctival edema and corneal ulceration with pigmentary inflammatory infiltrates were present in the central portion of the lesion. At presentation, the corneal lesion stained negative with fluorescein dye. Initial corneal bacterial culture yielded 5. buccus and C. striatum. Corneal scrapings were achieved with the animal in lateral recumbency. Corneal cytology was suggestive of keratocyclitis. Fungal culture from the lesion was positive for Curvularia sp. Medical management included: topical EDTA plasma, antibiotics, antifungal agents, immunosuppression and oral anti-inflammatory therapy. Treatment continued for eight weeks at decreasing frequencies (from q 12 h to q 12 h) until the lesion appeared completely resolved. This case illustrates that while there are challenges associated with performing ophthalmic exams and diagnostics in megavertebrate species, efforts to do so are important to help obtain accurate diagnosis and aid in directing therapy. The challenges and techniques facilitating successful medical management in this case will be discussed. The authors would like to acknowledge the generous support of Alcon Laboratories in assisting with the management of this case and the help and dedication of the elephant staff at the Fort Worth Zoo.

ABSTRACT NO.: 136

The dark adaptation curve of the horse

G. Ben-Shlomo, C. Plummer, K. Barrie and D. Brooks

College of Veterinary Medicine, Department of Small and Large Animal Clinical Sciences, University of Florida, FL, USA

Purpose: There is a lack of information in the literature regarding the electroretinogram (ERG) of the horse. Despite a clinical need, the dark adaptation curve of the horse has not been investigated to date. The goal of this work is to study the dark adaptation curve of the normal horse. Methods: The ERG of seven horses was recorded at 10 intensities across a range of intensities from 4 log cd/s/° (T = 1, 5, 10, 15, 20, 25, 30, 30, 50, 60 minutes of dark adaptation, and off-time analysis was then performed. Results: A significant increase (26.3%) of b-wave amplitude was noted between T = 15 and T = 20 (P < 0.05). Conclusions: Evaluation of horse rod and cone function or combined rod/cone function by means of full-field ERG should be performed after a minimum 20 minutes of dark adaptation.

ABSTRACT NO.: 137

Topical KinostatTM ameliorates the development and progression of cataracts in dogs with diabetes mellitus

J. D. Bras,† T. R. Webb,‡ K. Kerting,* M. Wyman,*§‡,§‡ P. F. Kardash,*‡

*MedVet Medical Center for Pets, Walthington, OH, USA, †All Animal Eye Clinic, Cincinnati, OH, USA, ‡Therapeutic Vision Inc., Omaha, NE, USA, §College of Veterinary Medicine The Ohio State University, Columbus, OH, USA, ††College of Pharmacy University of Nebraska Medical Center, Omaha, NE, USA

Purpose: Cataract formation is a hallmark of diabetes mellitus (DM) in dogs. Approximately 75% of diabetic dogs develop cataracts within 1 year of the time of diagnosis. Since the aldose reductase inhibitor KinostatTM was demonstrated to inhibit the development of cataracts in diabetes mellitus, the purpose of this study was to investigate whether the topical administration of the aldose reductase inhibitor KinostatTM on one eye blocked the development or progression of cataracts in naturally occurring diabetic dogs. Methods: Forty dogs, newly diagnosed with DM and with minimal lens changes were enrolled in a prospective, masked pilot study. Dogs were randomly assigned a coded eye containing either KinostatTM or vehicle (placebo). The topographic evaluation of normal retinal function or combined rod/cone function by means of full-field ERG should be performed after a minimum 20 minutes of dark adaptation.