



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2013

Veterinary Ophthalmology Paper 1

Perusal time: **Twenty (20)** minutes

Time allowed: **Three (3)** hours after perusal

Section A: Answer **ALL TWENTY (20)** Questions

Section B: Answer **ALL FOUR (4)** Questions

Section A: Answer **TWENTY** short answer questions each worth 4 marks..... total 80 marks

Section B: Answer **FOUR** essay style questions each worth 25 marks.....total 100 marks

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Paper 1: Veterinary Ophthalmology

Answer all twenty (20) questions

1. Answer **all** parts of this question:
 - a) The distribution of goblet cells is heterogeneous in the dog. Name the anatomic locations with the highest densities of goblet cells in the dog's eye. (1 mark)
 - b) Name the **two (2)** layers of the substantia propria of the conjunctiva in the dog. Briefly describe the structures that are located within each layer. (2 marks)
 - c) Name the vessel from which the arteries of the conjunctiva arise. (1 mark)

2. List **all** the branch divisions of the trigeminal nerve and for **each** branch, list its innervative functions in the adnexa and eye. (4 marks)

3. Answer **all** parts of this question:
 - a) Briefly outline the configuration of the choriocapillaris and Bruch's membrane. (2 marks)
 - b) Briefly describe how Bruch's membrane differs between the diurnal species without a tapetum and those animals that possess a tapetal fundus. (2 marks)

4. Answer **all** parts of this question:
 - a) List the **four (4)** mechanisms that have been postulated as the cause of defective neuroectodermal differentiation. (2 marks)
 - b) State the most common aetiology of retinal dysplasia (1 mark)
 - c) Name **two (2)** nutritional deficiencies that have been reported to cause retinal dysplasia. (1 mark)

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5. Answer **all** parts of this question:
- a) State the age range within which the electroretinograph (ERG) is completely formed in the dog. *(1 mark)*
 - b) In the dog, state which of the photoreceptors develops more rapidly. *(1 mark)*
 - c) State the age range within which the juvenile ERG approximates the adult ERG. *(1 mark)*
 - d) The greatest changes in ERG amplitude are expected to occur between the 3rd and 4th weeks of age. Name the layers of the retina that this maturation corresponds to. *(1 mark)*
6. A recent study investigated the tear production in normal juvenile dogs.
- a) State the age at which juvenile dog Schirmer tear test 1 (STT1) values increase to normal adult dog levels. *(1 mark)*
 - b) List **three (3)** factors that affect STT1 values in normal juvenile dogs. *(3 marks)*
7. Answer **all** parts of this question:
- a) Name the class of drugs to which famciclovir belongs. *(1 mark)*
 - b) Famciclovir is converted into which drug to exert its antiviral effect? *(1 mark)*
 - c) State the dose of famciclovir recently advocated for the treatment of feline herpesvirus ulcerative keratitis. *(1 mark)*
 - d) Briefly contrast the bioavailability of famciclovir in humans and cats after the administration of a single dose of 7 mg oral famciclovir. *(1 mark)*

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8. Answer **all** parts of this question:
- a) Briefly outline the effect on intraocular pressure (IOP) of administering topical 0.03% flurbiprofen. *(1 mark)*
 - b) Briefly discuss the mechanism of action of this drug. *(1 mark)*
 - c) List the attributes of flurbiprofen that make it a useful topical ophthalmic preparation. *(1 mark)*
 - d) Briefly compare the effect of topical 0.03% flurbiprofen combined with 0.005% latanoprost compared with 0.005% latanoprost alone in the normal canine eye. *(1 mark)*
9. Answer **all** parts of this question:
- a) Name **two (2)** functions of vascular endothelial growth factor (VEGF). *(1 mark)*
 - b) Name **four (4)** trigger factors that induce VEGF. *(2 marks)*
 - c) Name the **two (2)** membrane bound receptors that interact with VEGF. *(1 mark)*
10. Toll like receptors – TLR:
- a) Due to the presence of TLRs, it has been postulated that the equine cornea could be a model for human fungal keratitis. List the TLRs common to the equine cornea, limbus, and conjunctiva. *(1 mark)*
 - b) Name the TLRs postulated to be major corneal receptors recognising many of the pathogen associated molecular patterns (PAMPS) associated with fungal invasion. *(1 mark)*
 - c) Name the TLR that is a key component in responding to viral infection. *(1 mark)*
 - d) Briefly outline the reason that PAMPS found on bacteria, viruses and fungi, are ideal targets for the immune system. *(1 mark)*

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11. Draw and label the components of the anterior uveoscleral outflow of an equine eye. (4 marks)
12. Answer **all** parts of this question:
- a) Name the **two (2)** cones that are present in dogs, and name the condition in humans where only two cone types are present. (2 marks)
 - b) State how many different cones cats and horses have. (1 mark)
 - c) A normal human has a visual acuity of 20/20. This means that a test subject will be able to see at 20 feet the same things as a person with normal vision also sees at 20 feet. With a five foot leeway, give a correct estimate of the visual acuity of dogs, **and** of cats. (1 mark)
13. Answer **all** parts of this question:
- a) With respect to uveoscleral outflow, name the structure that provides the greatest resistance to aqueous outflow. (1 mark)
 - b) Outline the effects and mechanism of action of the following agents on uveoscleral outflow in dogs: latanoprost, atropine, pilocarpine. (3 marks)
14. Define physiological astigmatism. Give **two (2)** examples of this evolutionary process. (4 marks)

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15. Answer **all** parts of this question:

- a) It is well documented that the shape of crystalline lenses changes during dynamic focusing, or accommodation. Briefly describe the feature of the crystalline lens said to account for its mechanism of accommodation. *(1 mark)*
- b) Birds have been shown to accommodate over a much wider range than many animals. With respect to the structure of the lens, briefly describe what factor has been implicated to account for the difference in the accommodative power of the avian lens compared to that of mice. *(2 marks)*
- c) State the assumed accommodative range of dogs. *(1 mark)*

16. Answer **all** parts of this question:

- a) List **four (4)** tests that fluorescein can be used for in the eye other than to test for corneal ulceration. *(1 mark)*
- b) State **two (2)** potential adverse effects associated with either topical or systemic fluorescein administration. *(1 mark)*
- c) Name **two (2)** structures in the eye that may stain positive with trypan blue.
(1 mark)
- d) List **two (2)** benefits of lissamine green stain compared to rose bengal stain.
(1 mark)

17. CT dacryocystography (CT–DCG):

- a) Identify **two (2)** reasons to perform CT–DCG. *(1 mark)*
- b) What slice orientation allows better visualisation of the inferior lacrimal canaliculi, superior lacrimal canaliculi and lacrimal sac? *(1 mark)*
- c) Which orientation is better to evaluate the bony and membranous portions of the lacrimal duct? *(1 mark)*
- d) What is the recommended mAs and slice width when performing CT of the nasolacrimal duct when contrast is applied? *(1 mark)*

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18. Opioid growth factor (OGF):
- a) What is the major pathologic effect of this peptide? *(1 mark)*
 - b) Briefly describe how OGF causes this effect. *(2 marks)*
 - c) With the exception of cats and dogs, name **four (4)** species in which this peptide has been identified. *(1 mark)*
19. Briefly outline the neuronal and muscular control of third eyelid movement in a bird. *(4 marks)*
20. Answer **all** parts of this question:
- a) List the **three (3)** types of pecten. *(1 mark)*
 - b) List the postulated functions of pectens. *(3 marks)*

Section B over page

SECTION B

Answer all four (4) questions

1. Discuss pre-iridal fibrovascular membranes (PIFMs) including: their structure; the pathophysiologic mechanisms associated with their development; the specific constituents that have been consistently identified on immunohistochemical stains; PIFM membrane morphology; possible sources of the soluble vasogenic factors inducing PIFM diseases which may induce PIFMs; location of PIFMs within the eye and potential sequelae of their existence. *(25 marks)*
2. Describe in detail the use of local anaesthetics for analgesia in veterinary ophthalmology when applied topically, intracamerally, intravenously and regionally. Your answer should include: the general features of their chemical structure, details of their mechanisms of action, and an explanation for some of the differences between local anaesthetics with regard to their method of action, side effects and contraindications. Provide a brief outline of their potential uses other than for analgesia. Finally compare and contrast topical versus systemic analgesia for the management of corneal pain. *(25 marks)*
3. Discuss ganglion cell death in glaucoma: including reference to the main hypotheses brought forward to explain the nature of the damaging signal, and the role of the main gene(s) involved in the process of ganglion cell death. *(25 marks)*
4. Describe in detail the ocular blood barriers including the blood aqueous barrier, blood retinal barrier and iris blood barrier. *(25 marks)*

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