



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2014

Veterinary Dermatology

Paper 1

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

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

Section A: Answer **ALL THIRTY (30)** questions

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

Section C: Answer **ALL THREE (3)** questions

Section A: **THIRTY** very short answer questions each worth 1 marktotal 30 marks

Section B: **FOUR** short-answer questions.....total 45 marks

Section C: **THREE** long-answer questions each worth 35 markstotal 105 marks

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Paper 1: Veterinary Dermatology

Section A: Answer ALL thirty (30) very short-answer questions

1. Name **two (2)** T lymphocyte cytokines that are involved in the regulation of IgE isotype switching. *(1 mark)*
2. Identify the cytokeratin pair preferentially expressed in the epidermal basal cell layer. *(1 mark)*
3. Identify the **two (2)** amino acids in procollagen which must be hydroxylated in order for collagen synthesis to proceed. *(1 mark)*
4. Name the vitamin which is a co-factor for this hydroxylation event in collagen synthesis. *(1 mark)*
5. Name the Toll-like receptor which mediates the host response to Gram-positive bacteria. *(1 mark)*
6. Identify the receptor present on T cells that binds to MHC (major histocompatibility complex) class II molecules. *(1 mark)*
7. Name the receptor on mast cells that responds to stem cell factor. *(1 mark)*
8. Name the antibody isotype that has a pentameric structure. *(1 mark)*
9. Identify the event that activates the alternative complement pathway. *(1 mark)*

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10. Comment briefly on the molecular structure of antigens recognised by the T cell receptor. *(1 mark)*
11. Name **one (1)** function of interleukin-10. *(1 mark)*
12. Name **one (1)** function of interleukin-1. *(1 mark)*
13. Identify the Toll-like receptor most responsible for mediation of the antiviral and antitumour effects of imiquimod. *(1 mark)*
14. Name an inflammatory mediator that can cause vasodilatation. *(1 mark)*
15. Name a self-antigen targeted in vesicular cutaneous lupus erythematosus in Shetland sheepdogs. *(1 mark)*
16. Name a cytokine that can inhibit viral replication. *(1 mark)*
17. Name **one (1)** chemotactic factor that can attract neutrophils to a site of bacterial infection. *(1 mark)*
18. Identify the primary initiating cause of type 3 hypersensitivity reactions. *(1 mark)*
19. Apart from the skin, name the **two (2)** other organs in the body with the highest concentration of mast cells. *(1 mark)*
20. Name an inflammatory mediator protein found within eosinophil granules. *(1 mark)*

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21. Name the most abundant antibody in the canine intestinal tract. *(1 mark)*

22. Name the **two (2)** classes of antimicrobial peptides that are synthesised by inflammatory cells and epithelial surfaces. *(1 mark)*

23. Name a cytokine that stimulates eosinophil proliferation. *(1 mark)*

24. Identify the ceramide that plays a central role in correct organisation of extracellular lamella stacking by favouring the formation of a long periodicity phase and ordered lamellar packing. *(1 mark)*

25. Name the main molecular target of oclacitinib. *(1 mark)*

26. Name the enzyme which, when present in low concentrations, makes humans more likely to suffer adverse effects when treated with azathioprine. *(1 mark)*

27. Briefly outline the mechanism by which sulfonamides can decrease thyroid function test results. *(1 mark)*

28. Name **one (1)** enzyme (associated with bacterial metabolism) inhibited by fluoroquinolones. *(1 mark)*

29. Name the receptor on insect cells that is bound by nitenpyram. *(1 mark)*

30. Provide the term now used to describe hairless telogen. *(1 mark)*

Section B starts on the next page

Section B: Answer ALL four (4) short-answer questions.
Questions are NOT of equal value

1. Briefly explain the role of profilaggrin in the formation of the cornified envelope. *(10 marks)*

2. Describe briefly the mechanisms by which defensins, complement, transferrin, lysozyme and TNF- α can protect the skin against bacterial infection. *(15 marks)*

3. Draw a diagram that illustrates the reagents that could be used in an enzyme-linked immunosorbent assay (ELISA) to detect the presence of allergen specific IgE in canine serum. Your answer should be a labelled diagram showing the various layers of reagents (steps) that are used to detect the IgE. *(10 marks)*

4. Answer **all** parts of this question:
 - a) Draw a diagram to illustrate the molecular structure of desmosomes. *(4 marks)*

 - b) List the **three (3)** major categories of disease that can affect desmosomes. *(3 marks)*

 - c) From **each** of these **three (3)** categories in 4b), list **one (1)** acantholytic disease that has been described in animals. *(3 marks)*

Section C starts on the next page

Section C: Answer ALL three (3) long-answer questions

1. Mammalian skin and hair colour is dependent on melanin.

Describe:

- a) The synthesis of melanins from their precursors, including the intermediate stages. (7 marks)
- b) The biochemical differences between the different types of melanin. (7 marks)
- c) The synthesis, function, types and anatomical location of the enzyme tyrosinase. (7 marks)
- d) The stages of melanin production within the melanosomes, and how pigments are transferred from these bodies to keratinocytes. (8 marks)
- e) The basic mechanisms underlying the abnormality in the following pigmentary disorders: (6 marks)
 - Oculocutaneous albinism type 1
 - Piebaldism
 - Chediak Higashi syndrome

2. Describe the immunological responses that can occur in dogs with cutaneous overgrowth of *Malassezia pachydermatis*. (35 marks)

3. Describe the process of keratinocyte proliferation in epidermal renewal including the surface receptors which co-ordinate the process. (35 marks)

End of paper



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Paper 2: Veterinary Dermatology

Section A: Answer ALL thirty (30) very short-answer questions

1. Name the organism that causes fleece rot in sheep (please provide genus and species). (1 mark)
2. Name **two (2)** fungi that can cause a eumycotic mycetoma in dogs (provide genus and species). (1 mark)
3. Name a hair-clasping mite of rodents (provide genus and species). (1 mark)
4. Name the guinea pig louse (provide genus and species). (1 mark)
5. Identify the causal agent of caseous lymphadenitis in sheep (provide genus and species). (1 mark)
6. Name the organism that causes erysipelas in pigs (genus and species). (1 mark)
7. Name the most common louse from the suborder Anoplura that can be found on the dog. (1 mark)
8. Name **one (1)** characteristic that allows *Sarcoptes scabiei* var. *canis* to be differentiated from *Notoedres cati*. (1 mark)
9. Name the demodex mite that is contagious in cats. (1 mark)
10. Name the cat fur mite common in Australia, Hawaii and Brazil. (1 mark)

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11. Name **one (1)** lipid dependent *Malassezia* species and **one (1)** non-lipid dependent *Malassezia* species. (1 mark)
12. Name **one (1)** organism that can cause 'piedra' (provide genus and species). (1 mark)
13. Name **one (1)** concentration-dependent antibiotic family. (1 mark)
14. Name the autoantigen that has been identified as a target for autoantibody attack in humans with chronic autoimmune urticaria. (1 mark)
15. Name the molecule recently implicated (Bizikova *et al* 2011) as a major autoantigen in canine pemphigus foliaceus. (1 mark)
16. Name the major antigen targeted in canine alopecia areata. (1 mark)
17. Name **one (1)** drug that has been implicated in fixed drug eruption in the dog. (1 mark)
18. Describe briefly the 'Darier's sign'. (1 mark)
19. Name the protein inhibitor of apoptosis that has increased expression as malignancy increases in sebaceous lesions and canine squamous cell carcinoma. (1 mark)
20. Name the tumour of the horse that arises from the smooth muscle cells of arterioles and venules, and is associated with pain. (1 mark)
21. Name the papillomavirus most frequently detected in feline Bowenoid *in situ* carcinomas. (1 mark)

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22. Name the most common adverse effect of lomustine (1-(2-chloroethyl)-3-cyclohexyl-1-nitrosourea: CCNU) in dogs. (1 mark)
23. Name the cell where Russell bodies are found. (1 mark)
24. Describe what is meant by the term pagetoid reticulosis. (1 mark)
25. Name **one (1)** diagnostic test for equine 'Cushings disease' (pituitary pars intermedia dysfunction, PPID). (1 mark)
26. Name the most commonly used medication for the treatment of adrenal gland disease in ferrets. (1 mark)
27. Name the mode of inheritance of sebaceous adenitis in standard poodles. (1 mark)
28. Name the infectious disease associated with dermal metaplastic bone formation in dogs. (1 mark)
29. Name a diagnostic technique that can be employed to distinguish bullous pemphigoid from epidermolysis bullosa acquisita in dogs. (1 mark)
30. Name the tumour reportedly associated with *Demodex* mite infestation in cats. (1 mark)

Section B starts on the next page

Section B: Answer ALL four (4) short-answer questions
Questions are NOT of equal value

1. Name the causative organisms, including the genus and species when this is relevant, for the following diseases: (10 marks)
 - a) foot and mouth disease
 - b) pseudorabies
 - c) cat scratch disease
 - d) Rocky Mountain spotted fever
 - e) plague
 - f) rabbit syphilis
 - g) septicaemic cutaneous ulcerative disease (SCUD) of turtles
 - h) caseous lymphadenitis of sheep
 - i) molluscum contagiosum
 - j) melioidosis.

2. Answer **both** parts of this question:
 - a) List **five (5)** mechanisms by which pentoxifylline achieves its mode of action. (5 marks)

 - b) Name **five (5)** conditions of dogs that have been reported in the literature to respond beneficially to pentoxifylline. (5 marks)

Continued over page

3. For **each** of the conditions below, name the systemic pathology that is associated with the listed cutaneous presentation. Where a known or proposed pathogenesis is recognised, **briefly summarise (in one or two sentences) the proposed pathogenetic mechanism(s)**; if a potential mechanism has not been discovered or hypothesised, write '**Not known**': (10 marks)
- a) feline paraneoplastic alopecia
 - b) nodular dermatofibrosis
 - c) exfoliative dermatosis of cats
 - d) canine pituitary dwarfism
 - e) feline acromegaly.
4. Describe the aetiology, pathogenesis and clinical signs of devil facial tumour disease (DFTD) in the Tasmanian devil (*Sarcophilus harrisi*). Your answer should include discussion of the proposed cell of origin and how DFTD evades host immunity. (15 marks)

Section C starts on the next page

Section C: Answer ALL three (3) long-answer questions

1. Answer **both** parts of this question:

a) For **each** of the conditions below, describe the cause and pathogenesis, clinical signs and diagnosis in the dog. Treatment regimes and prognosis are **not** required in your answer:

i. Bullous pemphigoid (10 marks)

ii. Mucous membrane pemphigoid (10 marks)

iii. Epidermolysis bullosa aquista. (10 marks)

b) For **one (1)** of the diseases above, describe the proposed mechanism for blister formation. (5 marks)

2. Describe the aetiology and pathogenesis of the conditions reported to cause self-induced or spontaneous alopecia of the tail and/or tail base in horses. For **each** condition mentioned, list the appropriate treatment options. (35 marks)

3. Cyclosporine has been shown to be an effective treatment for atopic dermatitis in both dogs and cats.

Describe:

a) the mode of action of cyclosporine at the molecular and cellular level
(10 marks)

b) the evidence you are aware of that demonstrates cyclosporine to be an effective treatment in dogs and cats (15 marks)

c) the adverse effects that have been seen most commonly in association with cyclosporine therapy in dogs and cats, and how these adverse effects can be managed. (10 marks)

End of paper