



# Australian and New Zealand College of Veterinary Scientists

## Fellowship Examination

June 2017

## 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 mark .....total 30 marks

Section B: **FOUR** short-answer questions each worth 15 marks .....total 60 marks

Section C: **THREE** long-answer questions each worth 30 marks .....total 90 marks

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# Paper 1: Veterinary Dermatology

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## Section A: Answer all thirty (30) very short answer questions

1. List **two (2)** molecular components of desmosomes. *(1 mark)*
2. Name the cytoskeletal filament type present in adherens junctions. *(1 mark)*
3. Name the common precursor of eumelanin and pheomelanin, produced by the action of tyrosinase on tyrosine. *(1 mark)*
4. Name the main collagen type present in the dermis. *(1 mark)*
5. Name **one (1)** major proteoglycan present in the basement membrane. *(1 mark)*
6. Name **one (1)** surface molecule that distinguishes canine dermal dendritic cells from Langerhans cells. *(1 mark)*
7. Name the site of origin of mast cells. *(1 mark)*
8. Name the location within hair follicles of normal Beagle dogs where fibroblast growth factor 18 is most commonly found. *(1 mark)*
9. Name a constituent characteristically found in human sebum that is a marker to distinguish sebaceous-derived lipids from keratinocyte-derived lipids. *(1 mark)*

Section A continued over page

10. Name the **two (2)** cellular layers in the secretory coils of atrichial sweat glands. *(1 mark)*
  
11. Name the cytokine produced by keratinocytes that is the major chemoattractant for canine neutrophils. *(1 mark)*
  
12. State the key structural difference between antigens recognised by antibodies on the surface of B lymphocytes versus T-cell receptors. *(1 mark)*
  
13. Name the key difference in the process of presentation of a peptide to T-cells that results in anergy rather than activation. *(1 mark)*
  
14. Name **two (2)** endothelial derived mediators responsible for histamine induced urticaria. *(1 mark)*
  
15. Name **three (3)** phenotypic markers which collectively identify T regulatory cells. *(1 mark)*
  
16. Name **two (2)** tight junction proteins known to have decreased expression in atopic dermatitis in Beagle dogs. *(1 mark)*
  
17. Name **two (2)** cell types proposed to be antigen-presenting cells in the elicitation phase of allergic contact dermatitis. *(1 mark)*
  
18. List **one (1)** major and **one (1)** minor antibody isotypes involved in the pathogenesis of canine pemphigus foliaceus. *(1 mark)*
  
19. Name the antibody type which is not involved in the pathogenesis of canine pemphigus foliaceus. *(1 mark)*
  
20. Name the primary cell type including **two (2)** surface markers currently considered to play a role in the pathogenesis of alopecia areata in horses. *(1 mark)*

**Section A continued over page**

21. List **three (3)** of the saprophytic fungal species most commonly isolated from normal skin and/or haircoats in both cats and dogs. (1 mark)
22. Name the fungal pathogen associated molecular pattern (PAMP) that is recognised by Dectin-1. (1 mark)
23. List **two (2)** pro-inflammatory cytokines produced by feline neutrophils following exposure to *Microsporum canis*. (1 mark)
24. List **two (2)** pattern recognition receptors (PRRs) which have increased expression in feline neutrophils following exposure to *Microsporum canis*. (1 mark)
25. List **two (2)** virulence factors that have been linked with *Malassezia pachydermatis*. (1 mark)
26. Name the form of thyroid hormone that is the major metabolically active form in dogs. (1 mark)
27. Name the region of the adrenal gland that is responsible for secretion of glucocorticoids. (1 mark)
28. Name the cellular location of the glucocorticoid receptor responsible for the genomic effects of glucocorticoids. (1 mark)
29. Name the enzyme responsible for the conversion of testosterone into dihydrotestosterone. (1 mark)
30. Name **two (2)** amino acids documented to be reduced by more than 50% in the plasma of Shih Tsu dogs with hepatocutaneous syndrome. (1 mark)

**Section B starts on the next page**

**Section B: Answer all four (4) short-answer questions**

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

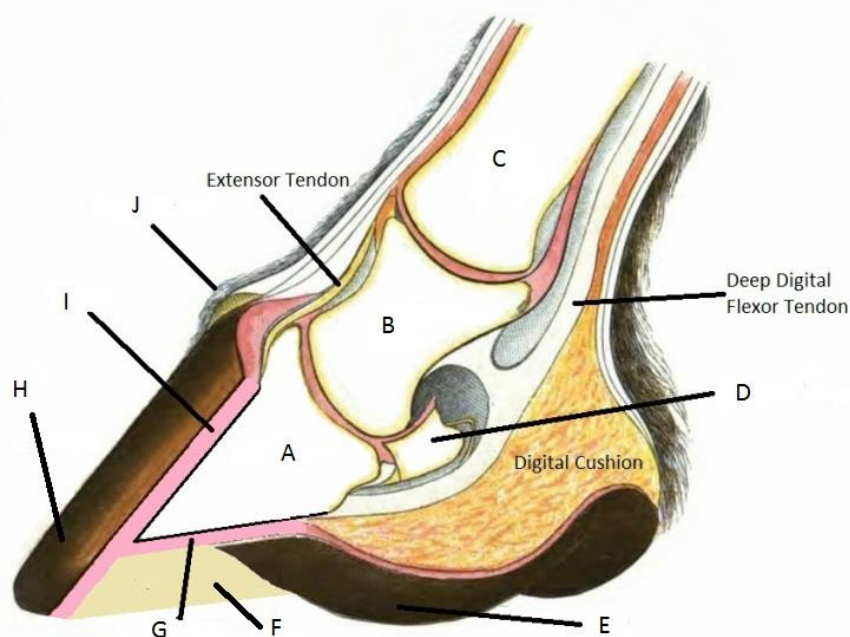
a) Draw a diagram of the canine claw. Identify and label the following structures:  
(total 2.5 marks)

- i. phalanx 3 (P3)
- ii. ungual fold
- iii. keratinized claw plate
- iv. haired skin
- v. coronary band/germinative centre/‘nail bed’.

b) Name the **three (3)** regions of the keratinized claw plate that can be identified on macroscopic and microscopic appearance. (1.5 marks)

c) Name **two (2)** keratins that are present in the canine claw and sole. (1 mark)

d) On the image of the equine hoof below the digital cushion, extensor tendon and deep digital flexor tendon are labelled. In your answer booklet name the remaining **ten (10)** structures. (5 marks)



(credit to Okanagan School of Natural Hoof Care)

Section B: Question 1 continued over page

e) Briefly define the following terms:

- i. onychodystrophy (1 mark)
- ii. onychomadesis (1 mark)
- iii. onychomalacia (1 mark)
- iv. onychorrhhexis (1 mark)
- v. paronychia. (1 mark)

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

- a) With regards to the induction of cutaneous pruritus list **five (5)** endogenous pruritogens (mediators of pruritus) **and** their receptors. (A table is acceptable.) (5 marks)
- b) Describe the peripheral (4 marks), spinal (4 marks) and central (2 marks) neural pathways associated with itch perception of a cutaneous induced pruritus. (Diagrams are acceptable.) (total 10 marks)

3. For **each** of the following components of the innate immune system, describe briefly how they would help to provide protection against cutaneous staphylococcal infection. Your answer should include the molecular mechanisms that provide the protective or antimicrobial effect. Each component listed is of equal value. (total 15 marks)

- i. antimicrobial peptides
- ii. toll-like receptors
- iii. keratinocyte derived interleukin-1
- iv. complement
- v. iron binding proteins
- vi. mast cells
- vii. neutrophil extracellular traps

**Section B continued over page**

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

- a) Briefly describe how B cells and T cells are differentiated based on cell surface markers. (2 marks)
  
- b) Name the different types of T lymphocytes. For **each** subtype name the cell surface markers, cytokine production profile and its major function. (13 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) Describe the post translational synthesis, structure and function of keratin. *(20 marks)*
- b) Describe the assembly of the cornified cell envelope, its structure and function. *(10 marks)*

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

- a) Describe the structure of the basement membrane zone (a diagram is acceptable), include the main structural components and their attachments. *(10 marks)*
- b) Briefly describe the structure and function of focal contacts. *(2 marks)*
- c) Briefly describe how the basement membrane zone is involved in wound healing and name **two (2)** other functions of the basement membrane zone. *(4 marks)*
- d) Name a genetic disease affecting the basement membrane zone in cattle and name the structural component affected. *(2 marks)*
- e) Name an auto-immune disease affecting the basement membrane zone in cats and name the structural component affected. *(2 marks)*
- f) Describe the pathomechanism of vesicle formation in canine epidermolysis bullosa acquisita and contrast this mechanism with epidermolysis bullosa simplex in dogs and other species. Include in your answer the ultrastructural component affected in **each** species. *(10 marks)*

**Section C continued over page**



3. Microbiome

Answer **both** parts of this question:

- a) Describe and discuss the cutaneous bacterial microbiome that has been identified on the dog and cat using culture dependent and independent techniques. Your answer should include how the cutaneous microbiome varies in normal and atopic individuals. *(25 marks)*
  
- b) Briefly compare and contrast this animal cutaneous microbiome to the human equivalent. *(5 marks)*

**End of paper**



# Australian and New Zealand College of Veterinary Scientists

## **Fellowship Examination**

June 2017

## **Veterinary Dermatology Paper 2**

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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

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# Paper 2: Veterinary Dermatology

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## Section A: Answer all thirty (30) very short answer questions

1. Name the most commonly reported lesion site for canine leproid granuloma and name **one (1)** at-risk breed. *(1 mark)*
2. Identify the causal agent of caseous lymphadenitis in sheep (provide genus and species). *(1 mark)*
3. Sporothrix is a temperature dependent dimorphic fungus. Name the form that exists at environmental temperatures (25–30°C) and the form that exists at body temperature (37–39°C). *(1 mark)*
4. Apart from malassezia, dermatophytes, candida and Cryptococcus, name (to genus level) a fungus that has recently been reported to cause otitis externa in dogs. *(1 mark)*
5. Name the virus that causes contagious ecthyma (orf/scabby mouth). *(1 mark)*
6. Name a test that is able to differentiate Neospora caninum infection from toxoplasma gondii infection in dogs. *(1 mark)*
7. Name the **two (2)** major shock organs in anaphylaxis in the dog. *(1 mark)*
8. The canine atopic dermatitis extent and severity index 4 (CADESI – 4) is used to assess the severity of canine atopic dermatitis in dogs. Name the **three (3)** lesion criteria that are assessed in this index. *(1 mark)*

Section A continued over page

9. Name **two (2)** feline skin diseases characterized histopathologically by hyperkeratosis, apoptosis, cell poor interface dermatitis with involvement of CD 3+ CD 8+ lymphocytes. *(1 mark)*
10. Name the homozygous mutation in the Golden retriever dog that causes autosomal recessive congenital ichthyosis. *(1 mark)*
11. In hereditary nasal parakeratosis of the Labrador retriever name the characteristic epidermal histopathological feature present (in addition to diffuse parakeratotic hyperkeratosis and inflammation). *(1 mark)*
12. Name the laboratory technique which has been reported to most accurately confirm the diagnosis of hereditary equine regional dermal aesthenia (HERDA). *(1 mark)*
13. Name **one (1)** canine and **one (1)** feline disease associated with the histopathological finding of excessive cutaneous mucin. *(1 mark)*
14. Name **three (3)** breeds of cat reported to be affected with urticaria pigmentosa. *(1 mark)*
15. Name **one (1)** breed of dog and **one (1)** breed of cat reported to be affected by vitiligo. *(1 mark)*
16. Briefly outline the process whereby firocoxib reduces epidermal proliferation in the treatment of solar dermatosis in the dog. *(1 mark)*
17. List **two (2)** diagnostic procedures which have been reported to aid in the diagnosis of primary secretory otitis media (PSOM) in humans but have been shown to be less useful than otoscopy, myringotomy, CT and MRI in dogs. *(1 mark)*
18. Name **three (3)** aetiological causes of sterile nodular panniculitis in the dog. *(1 mark)*

**Section A continued over page**

19. Name **two (2)** infectious diseases that have been identified by PCR in dogs previously diagnosed with sterile granuloma/pyogranuloma syndrome. *(1 mark)*
20. List **two (2)** dermatological lesions seen in feline hyperadrenocorticism which are not typically seen in canine hyperadrenocorticism. *(1 mark)*
21. Name an endocrinopathy reported to be associated with hepatocutaneous syndrome. *(1 mark)*
22. Name the papillomavirus most frequently detected in feline Bowenoid *in situ* carcinoma. *(1 mark)*
23. Name **two (2)** proliferation markers that have been reported as prognostic indicators in canine mast cell tumours. *(1 mark)*
24. State the mode of action of toceranib (Palladia®) in the treatment of mast cell tumours. *(1 mark)*
25. Name the most common immunophenotype of T lymphocytes in canine epitheliotropic lymphoma. *(1 mark)*
26. Name a cell surface marker that is positive in histiocytoma and negative in reactive cutaneous histiocytosis. *(1 mark)*
27. Name **one (1)** immunohistochemical marker that could assist in the diagnosis of a melanoma. *(1 mark)*
28. Name the key feature differentiating Sezary syndrome from other forms of cutaneous epitheliotropic T cell lymphoma. *(1 mark)*

**Section A continued over page**

29. Name the enzyme encoded for in the DNA vaccine Oncept® which has been used to treat canine melanoma. *(1 mark)*
30. Name **one (1)** of the **two (2)** techniques reported in a recent scientific paper that was used to assess transepidermal water loss in cats. *(1 mark)*

**Section B starts on the next page**

**Section B: Answer all four (4) short-answer questions**

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

a) Name two Demodex species recognised in each of the following animals:  
(total 3 marks)

i. dog

ii. cat

iii. horse

iv. sheep

v. cow

vi. human.

b) Describe the mechanism of action of isoxazolines and ivermectin that result in their administration being toxic to demodex mites whilst being comparatively safe in mammals. (4 marks)

c) Briefly describe why ivermectin may be severely toxic in some dogs. Include in your answer any potential interactions of ivermectin with other medications.  
(8 marks)

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

a) Outline the aetiopathogenesis of leishmaniasis in the dog. (7 marks)

b) List **eight (8)** recognised cutaneous clinical presentations of leishmaniasis.  
(4 marks)

c) List **four (4)** recognised non cutaneous clinical signs of leishmaniasis.  
(2 marks)

d) In a suspected case of leishmaniasis name **two (2)** samples that you would obtain from the dog and the test that you would request on each of those samples to help confirm this diagnosis. (2 marks)

**Section B continued over page**

3. Write brief notes on signalment, clinical presentation, pathogenesis and diagnostic criteria for the following **two (2)** diseases:
- i. mucous membrane pemphigoid (*7.5 marks*)
  - ii. mucocutaneous lupus erythematosus. (*7.5 marks*)
4. Describe the mechanism of action of **each** of the following:
- i. cyclosporine (*5 marks*)
  - ii. prednisolone (*5 marks*)
  - iii. oclacitinib. (*5 marks*)

**Section C starts on the next page**



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

1. Answer **all** parts of this question:
  - a) List **ten (10)** reaction patterns seen in cutaneous adverse drug reactions in the dog. *(10 marks)*
  - b) For **each** reaction pattern list **one (1)** drug that has been reported to cause this type of adverse reaction in the dog. You should not nominate the same drug more than once. *(5 marks)*
  - c) List **ten (10)** findings derived from the signalment, history, clinical findings and/or diagnostic tests that would support a diagnosis of a suspected cutaneous adverse drug reaction. *(10 marks)*
  - d) Describe the pathophysiology of immunologically mediated cutaneous drug reactions to beta lactam antibiotics. *(5 marks)*
  
2. Briefly describe the proposed pathogenesis, breed predispositions, clinical signs, histopathological appearance and treatment options for the following conditions:
  - a) Alopecia X. *(10 marks)*
  - b) Colour dilution alopecia. *(5 marks)*
  - c) Pattern alopecia. *(5 marks)*
  - d) Follicular dysplasia of Irish Water Spaniels. *(5 marks)*
  - e) Canine flank alopecia. *(5 marks)*

**Section C continued over page**

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

- a) Describe the clinical presentations of sarcoids reported in equids (*9 marks*) and felids (*1 mark*).
- b) List differential diagnoses for **each** of the recognised presentations of sarcoid in the horse. (*5 marks*)
- c) Discuss the most appropriate approach to diagnosis of potential sarcoid lesions in the horse. (*5 marks*)
- d) Discuss the approach to treatment for confirmed sarcoid lesions in the horse. (*10 marks*)

**End of paper**