



# Australian and New Zealand College of Veterinary Scientists

## Fellowship Examination

June 2015

## 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. Name the function of a Merkel cell. *(1 mark)*
2. Name the genetic disease in which mutations of **two (2)** separate genes (LAMC2 and LAMA3) cause an identical phenotype in the horse. *(1 mark)*
3. Name a major component of the outer plaque of the hemidesmosome. *(1 mark)*
4. Name an autoimmune disease associated with abnormalities of the outer plaque of the hemidesmosome in dogs. *(1 mark)*
5. Name the structural molecule associated with recessive dystrophic epidermolysis bullosa of Rotes Hohenvieh calves. *(1 mark)*
6. Name the gene associated with hereditary cutaneous mucinosis of the Chinese Shar pei. *(1 mark)*
7. State the mechanism by which copper deficiency leads to abnormalities in pigmentation in cattle. *(1 mark)*
8. Name the precursor of adrenocorticotropin hormone (ACTH) and melanocyte stimulating hormone (MSH). *(1 mark)*
9. Name the equine skin disease in which the cytokine thymic stromal lymphopoietin (TSLP) has been shown to be over expressed. *(1 mark)*

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10. Name a molecular target of autoantibodies in human autoimmune urticaria. (1 mark)
11. Name a primary constituent of the cell wall of *Pythium insidiosum*. (1 mark)
12. Name the protein encoded by the ABCB1 (MDR1) gene. (1 mark)
13. State the primary function of Class 2 major histocompatibility complex (MHC) molecules. (1 mark)
14. Name the major anatomical location of collagen type VII. (1 mark)
15. Name a resident cutaneous cell that contains abundant vimentin. (1 mark)
16. Name the **two (2)** resident cutaneous cells dependent on stem cell factor for their embryologic development. (1 mark)
17. Name a major function of interleukin-5. (1 mark)
18. Name the major structural component of the layer of the dermo-epidermal junction known as the lamina densa. (1 mark)
19. Name the group of calcium dependent enzymes critical for formation of the cornified envelope. (1 mark)
20. Name the disease caused by mutations in the genes coding for keratins 5 and 14. (1 mark)

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21. Name the antibody isotype that has a dimeric structure. (1 mark)
22. Name the step in the cholesterol to cortisol pathway catalysed by 3beta hydroxysteroid dehydrogenase. (1 mark)
23. Name **one (1)** commonly used proliferation marker in cutaneous veterinary oncology. (1 mark)
24. Name the Toll-like receptor that mediates the host response to gram positive bacteria. (1 mark)
25. Name **three (3)** techniques that have been reported for the demonstration of IgE responses to *Malassezia pachydermatis* in dogs. (1 mark)
26. Name the receptor on the keratinocyte surface which has been demonstrated to recognise chitin in the exoskeleton of *Demodex canis*. (1 mark)
27. Define the term 'cutaneous microbiome'. (1 mark)
28. Provide the term now used to describe hairless telogen. (1 mark)
29. Name the **two (2)** classes of antimicrobial peptides that are synthesised by inflammatory cells and epithelial surfaces. (1 mark)
30. Name the iron binding protein that has been shown to inhibit the growth of *Malassezia pachydermatis* in vitro. (1 mark)

**Section B starts on the next page**

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

1. Define the term superantigen (*5 marks*) and outline the evidence for superantigen production in isolates of *S. pseudintermedius* from cases of canine pyoderma and otitis (*10 marks*).
  
2. Briefly describe the structure and function of the **three (3)** major components of the keratinocyte cytoskeleton. (*15 marks*)
  
3. In relation to type one Janus kinase receptors, briefly describe: (*15 marks*)  
(A labelled diagram may be used to illustrate your answer.)
  - i. their structure
  
  - ii. how they are activated
  
  - iii. the intracellular molecular events that occur following activation
  
  - iv. the typical cellular responses that occur following activation
  
  - v. how they can be inhibited.

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4. Answer **both** parts of this question:
- a) List how the following virulence factors contribute to the pathogenicity of *Staphylococcus* sp.:
- i. capsule/slime layer (3 marks)
  - ii. cell wall peptoglycan (3 marks)
  - iii. protein A (3 marks)
  - iv. teichoic acid. (1 mark)
- b) For the following classes of antibiotics, list **two (2)** mechanisms by which bacterial resistance develops:
- i. fluoroquinolones (2.5 marks)
  - ii. beta-lactams. (2.5 marks)

**Section C starts on the next page**

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

1. From **each** of the following categories of adhesion molecules: cadherins, integrins, selectins and immunoglobulin superfamily members:  
(Diagrams can be used if preferred to illustrate your answer.)
  - a) Name a specific example. *(0.5 marks per adhesion molecule / 2 marks total)*
  - b) Describe its molecular structure and explain how it contributes to an aspect of skin structure, function or immune protection.  
*(7 marks per adhesion molecule / 28 marks total)*
  
2. Answer **all** parts of this question:
  - a) Describe the structure of collagen one (a labelled diagram is acceptable).  
*(3 marks)*
  - b) List the key post-translational steps in the synthesis of collagen one. Include the stages that occur in the intracellular *(10 marks)* and the extracellular space *(5 marks)*.
  - c) Briefly describe the molecular mechanisms that regulate collagen homeostasis in normal skin. *(4 marks)*
  - d) Briefly describe the abnormality in collagen synthesis in the following clinical conditions:
    - i. scurvy *(2 marks)*
    - ii. dermal atrophy following glucocorticoid administration *(2 marks)*
    - iii. dermatosporaxis in cattle *(2 marks)*
    - iv. hereditary equine regional dermal asthenia (HERDA). *(2 marks)*
  
3. Describe the abnormalities of skin barrier function that have been reported in canine atopic dermatitis. Explain how these abnormalities could contribute to the pathogenesis of this disease. *(30 marks)*

**End of paper**