



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2012

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: Multiple choice: **THIRTY** questions each worth 0.5 marks.....total 15 marks

Section B: Short answer: **FOUR** questionstotal 25 marks

Section C: Long answer: **THREE** questions each worth 20 markstotal 60 marks

Paper 1: Veterinary Dermatology

SECTION A: Multiple choice

Answer ALL thirty (30) questions:

There is no penalty for an incorrect answer

1. Which of the following statements concerning transferrin is correct? (*1/2 mark*)
 - a) It is a member of the defensin family of antimicrobial peptides that are known to be important in protection against *Staphylococcus pseudintermedius*
 - b) It is an iron binding protein that has been shown to inhibit the growth of *Malassezia pachydermatis* in vitro
 - c) It is secreted by epidermal cells and is involved in uptake of antigens from cutaneous microorganisms into Langerhans cells
 - d) It provides protection against some cutaneous viral pathogens by inhibiting RNA synthesis

2. What is the major autoantigen targeted in canine pemphigus vulgaris? (*1/2 mark*)
 - a) Desmoglein 3
 - b) Desmocollin 1
 - c) Desmoglein 1
 - d) Plakoglobin

Section A continued over

3. What mechanism has been shown to contribute to the increased adherence of *Staphylococcus aureus* to the skin of humans with atopic dermatitis? (1/2 mark)
- a) Upregulation of receptors on Langerhans cells
 - b) Decreased release of epidermal lipids from lamellar granules
 - c) Exposure of binding sites in the stratum granulosum
 - d) Increased quantities of fibronectin on the skin surface
4. Which of the following statements concerning defensins is correct? (1/2 mark)
- a) They are anti-viral cytokines that inhibit intracellular replication
 - b) They are found within dermal fibroblasts and have an anti-inflammatory effect
 - c) They are cysteine rich proteins secreted by epithelial cells and neutrophils which have an antibacterial effect
 - d) They are macrophage derived molecules that predominantly target protozoal organisms
5. Which is the most abundant type of intercellular lipid in the stratum corneum of humans? (1/2 mark)
- a) Cholesterol sulphate
 - b) Cholesterol
 - c) Ceramides
 - d) Phospholipid

Section A continued over

6. Which of the following statements concerning IgG responses to antigens from *Dermatophagoides farinae* in dogs is correct? (½ mark)
- a) Both healthy and atopic dogs mount an IgG response to proteins derived from the mite
 - b) IgG responses are seen in healthy dogs but not in atopic dogs due to IgE class switching
 - c) IgG responses to *Dermatophagoides farinae* are not seen in dogs
 - d) IgG responses are not seen in healthy dogs, but occur alongside IgE responses in atopic dogs
7. Which cytokine has been demonstrated in canine mast cells? (½ mark)
- a) IL-2
 - b) TNF- α
 - c) IL-16
 - d) GM-CSF
8. In the mouse model of pyoderma, which of the following is the major effector of resolution? (½ mark)
- a) Anti staphylococcal IgG
 - b) Neutrophils
 - c) Cytotoxic T lymphocytes
 - d) Plasma cells

Section A continued over

9. Which of the following deficiencies is associated with sterile panniculitis in humans?
(*1/2 mark*)
- a) Alpha-1 antitrypsin
 - b) Fibronectin
 - c) Elastase
 - d) Chymotrypsin
10. The epithelial protruberance of the hair follicle known as the “bulge” is the site of:
(*1/2 mark*)
- a) Insertion of the apocrine duct
 - b) Insertion of the sebaceous duct
 - c) Keratinisation of the inner root sheath
 - d) Attachment of the arrector pili muscle
11. A toxin produced by several fungal organisms that is recognised by Toll-like receptor 2 is known as: (*1/2 mark*)
- a) Zymogen
 - b) Zymosan
 - c) Zenodyme
 - d) Blastozyme

Section A continued over

12. The TH2 subset of T-cells is defined by which of the following cytokine patterns? *(1/2 mark)*
- a) IFN- γ , IL-2 and TNF- β
 - b) IL-4, IL-5, IL-10 and IL-13
 - c) IL-3, GM-CSF, TNF- α
 - d) IL-4, IL-5, IL-10, IL-13, IFN- γ , IL-2 and TNF- β
13. Moving from the basal layer to the cornified layer in the epidermis, which of the following statements is correct concerning lipid concentrations? *(1/2 mark)*
- a) Phospholipids increase as sphingolipids and neutral lipids decrease
 - b) Phospholipids increase as cholesterol sulphate decreases
 - c) Cholesterol sulphate increases as phospholipids increase
 - d) Neutral lipids and sphingolipids increase as phospholipids decrease
14. What receptor pathway has been shown to be involved in some canine mast cell tumours? *(1/2 mark)*
- a) G protein
 - b) Inositol triphosphate
 - c) c-kit
 - d) Fc ϵ R1

Section A continued over

15. Which of the following hair follicle structures would be stained by vimentin? *(½ mark)*
- a) The outer root sheath
 - b) The inner root sheath
 - c) The sebaceous gland
 - d) The dermal papilla
16. What is pro-opiomelanocortin? *(½ mark)*
- a) It is produced in the melanocyte and regulates eumelanin synthesis
 - b) It is produced in the pituitary and is a precursor of ACTH and MSH
 - c) It is produced in the epidermis and stimulates melanocyte division
 - d) It is produced in the hair follicle and causes colour dilution alopecia
17. Thyroid hormones exert their effects in the body by activating: *(½ mark)*
- a) Cell surface adenylyl cyclase receptors
 - b) G protein receptors
 - c) Tyrosine kinase receptors
 - d) Intra-nuclear chromatin receptors

Section A continued over

18. What is the major precursor of steroid hormones? (*1/2 mark*)
- a) Cholesterol
 - b) Tyrosine
 - c) Dopamine
 - d) Pro-opiomelanocortin
19. During which stage of the canine hair follicle cycle does the inner root sheath cone emerge from the dermal papilla? (*1/2 mark*)
- a) Anagen 1
 - b) Anagen 3
 - c) Anagen 4
 - d) Anagen 6
20. Increased deposition of hyaluronan in Chinese Shar-pei dogs is associated with increased expression of which enzyme? (*1/2 mark*)
- a) Hyaluronon synthase 1
 - b) Hyaluronon synthase 2
 - c) Hyaluronon synthase 3
 - d) Hyaluronon synthase 4

Section A continued over

21. Which toxin derived from *Staphylococcus pseudintermedius* has been reported to digest canine desmoglein 1? (½ mark)
- a) *Staphylococcus intermedius* exfoliative toxin (SIET)
 - b) Exfoliative toxin (EXI)
 - c) Exfoliative toxin A (EXA)
 - d) Exfoliative toxin B (EXB)
22. Which of the following is **not** classed as a cutaneous itch-associated receptor? (½ mark)
- a) Transient receptor potential, vanilloid type 1
 - b) Transient receptor potential, vanilloid type 4
 - c) Cannabinoid receptor 2
 - d) Protease activated receptor 2
23. What best describes the distribution of the armadillo protein Plakophilin-1 in the epidermis of canine haired skin? (½ mark)
- a) Highest expression in the superficial layers
 - b) Highest expression in the basal layer
 - c) Equal expression throughout all layers
 - d) Not detected in canine epidermis

Section A continued over

24. What gene is considered a causal candidate for Hereditary Equine Regional Dermal Asthenia (HERDA)? (*1/2 mark*)
- a) ATP-binding cassette B1 (ABCB1)
 - b) Cyclophilin B
 - c) Multiple drug resistance 1 (MDR-1)
 - d) Homeobox C (*Hoxc*)
25. What is the essence of the “Danger theory” of immunology? (*1/2 mark*)
- a) The body is most concerned about situations that lead to tissue damage, rather than recognition of foreign proteins
 - b) The body regards “non-self” proteins as very dangerous
 - c) Immune reactions can be dangerous to the body as well as helpful
 - d) The presence of potent and hazardous mediators within inflammatory cells is an evolutionary accident
26. What best describes the structure of integrins? (*1/2 mark*)
- a) Single pass transmembrane glycoproteins
 - b) Transmembrane molecules with a lectin domain
 - c) Heterodimers with α and β subunits
 - d) Members of the immunoglobulin superfamily

Section A continued over

27. What molecule(s) is/are abnormal in epidermolysis bullosa simplex? (*1/2 mark*)
- a) Keratin 1 or 10
 - b) Keratin 5 or 14
 - c) Filaggrin
 - d) Transglutaminase 1
28. What is the major composition of sebum in humans? (*1/2 mark*)
- a) Cholesterol
 - b) Wax esters
 - c) Squalene
 - d) Free fatty acids/glycerides
29. Which Toll-like receptor expressed by keratinocytes recognizes lipopolysaccharide? (*1/2 mark*)
- a) TLR1
 - b) TLR2
 - c) TLR3
 - d) TLR4

Section A continued over

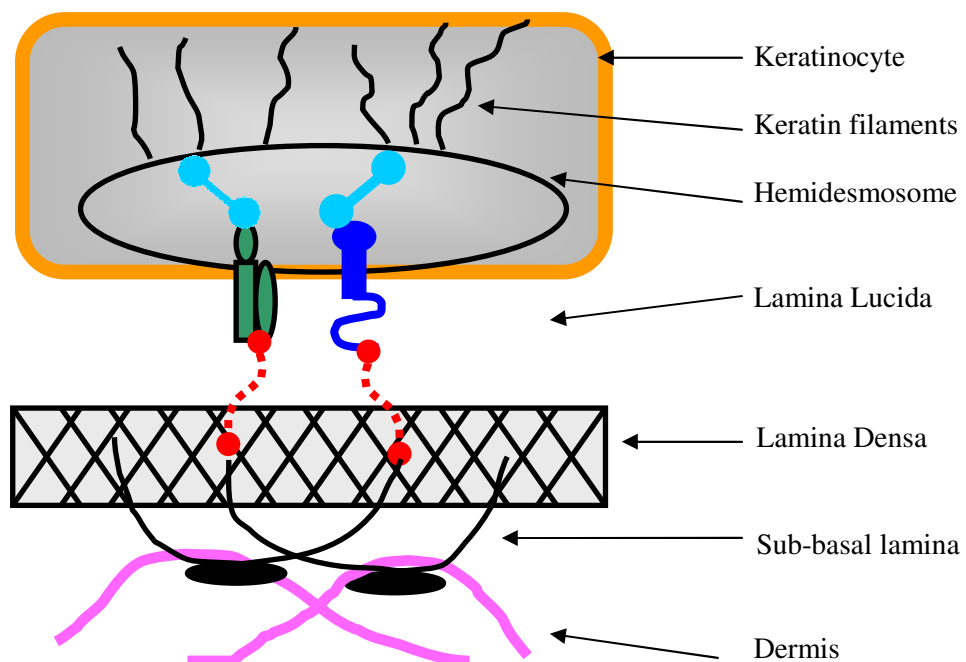
30. What best describes the molecule CD4? (*1/2 mark*)
- a) It is the receptor for MHC Class II molecules
 - b) It is a marker for dendritic cells and Langerhans cells
 - c) It is part of the T cell receptor complex
 - d) It is the receptor for MHC Class I molecules

End of Section A

SECTION B: Short Answer Questions

Answer ALL four (4) questions:

1. On the diagram of the basement membrane zone shown below, indicate where the following molecules are located. (3 marks)
 - a) Type IV collagen
 - b) Laminin 5 (Laminin 332)
 - c) $\alpha 6\beta 4$ Integrin
 - d) Type XVII collagen (Bullous pemphigoid antigen 2)
 - e) Type VII collagen
 - f) Plakins (Plectin/Bullous pemphigoid antigen 1)



Section B continued over

2. Answer **all** subparts of this question.
- a) Draw a diagram to illustrate the molecular structure of desmosomes. (2 marks)
- b) List the **three (3)** major categories of disease that can affect desmosomes. (3marks)
- c) From these **three (3)** categories, list two acantholytic diseases that have been described in animals. (3 marks)
3. Briefly outline the potential mechanisms for the development and spread of antibacterial resistance, including specific details for *Staphylococcus pseudintermedius*. (9 marks)
4. For **each** of the diseases listed below, name the major antigen(s) or allergen(s) that has been reported to be involved. (For the allergic diseases, name the allergens using internationally recognised abbreviations in the form of e.g. Cry j 1): (½ mark each)
- Pemphigus foliaceus in humans
 - Pemphigus foliaceus in dogs
 - Hypersensitivity to *Dermatophagoides farinae* in dogs
 - *Malassezia* hypersensitivity in humans
 - Alopecia areata in dogs
 - Purpura haemorrhagica vasculitis in horses
 - Canine epidermolysis bullosa acquisita
 - Flea allergy dermatitis in dogs
 - Bullous pemphigoid in dogs
 - Vesicular cutaneous lupus erythematosus in Collies and Shetland sheepdogs.

End of Section B

SECTION C: Long Answer Questions

Answer ALL three (3) questions:

1. The “superficial perivascular dermatitis pattern” is commonly reported in pathology reports from various inflammatory skin diseases. Describe the **cellular and molecular interactions** that would take place between a neutrophil, a blood vessel wall and the extracellular matrix that would result in the development of this histopathological pattern from previously normal skin. (20 marks)
2. Describe the structure and cutaneous location of Type I collagen, Type IV collagen, Type VII collagen and Type XVII collagen (diagrams can be used to illustrate your answer). Indicate how the structure of each molecule is related to its function. For **one (1)** of the collagen molecules you describe, name a disease found in dogs that involves this molecule, and describe the molecular mechanism that leads to the clinical signs. (20 marks)
3. Describe the cellular and molecular interactions that would take place after contact between a house dust mite allergen and a Langerhans cell that eventually result in the production of allergen-specific IgE. (20 marks)

End of paper



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2012

Veterinary Dermatology **Paper 2**

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: Multiple choice: **THIRTY** questions each worth 0.5 marks.....total 15 marks
Section B: Short answer: **FOUR** questionstotal 25 marks
Section C: Long answer: **THREE** questions each worth 20 markstotal 60 marks

Paper 2: Veterinary Dermatology

SECTION A: Multiple Choice

Answer ALL thirty (30) questions

There is no penalty for an incorrect answer

1. What breed of dog has been most commonly reported to be affected by a post-shampooing syndrome characterised by sterile pustular erythroderma? (*1/2 mark*)
 - a) Collies
 - b) Boxers
 - c) Miniature Schnauzers
 - d) German Shepherd dogs

2. What best describes the gross appearance of pemphigus foliaceus primary lesions? (*1/2 mark*)
 - a) Tiny pinpoint papules which coalesce into erythematous macules
 - b) Large yellow pustules with a broad erythematous rim
 - c) A papulo-pustular eruption with epidermal collarettes
 - d) Thick crusts which overly deep ulcers

Section A continued over

3. The “exclamation hair” is a trichographic finding typically associated with which disease? (*1/2 mark*)
- a) Dermatophytosis
 - b) Alopecia X
 - c) Trichorrhexis nodosa
 - d) Alopecia areata
4. Which of the following contains the highest oil content? (*1/2 mark*)
- a) Ointment
 - b) Lotion
 - c) Gel
 - d) Cream
5. *Demodex merioni* is found on which of the following hosts? (*1/2 mark*)
- a) Guinea pig
 - b) Gerbil
 - c) Hamster
 - d) Mouse

Section A continued over

6. Which of the following is **not** considered to be a humectant? (*1/2 mark*)
- a) Propylene glycol
 - b) Lanolin
 - c) Urea
 - d) Carboxylic acid
7. What concentration of chlorhexidine is thought to be safe and effective in the canine ear when the patency of the tympanic membrane is uncertain? (*1/2 mark*)
- a) 0.015%
 - b) 0.15%
 - c) 1.50%
 - d) 4.00%
8. Which of the following conditions of freshwater aquarium fish is caused by *Ichthyophthirius multifiliis*? (*1/2 mark*)
- a) Hole in the Head
 - b) White spot
 - c) Mouth rot
 - d) Fin rot

Section A continued over

9. Alopecia mucinosa (follicular mucinosis) in cats is sometimes associated with which of the following diseases? (*1/2 mark*)
- a) Mucopolysaccharidosis type VI
 - b) Cutaneous lymphosarcoma
 - c) Hypothyroidism
 - d) Panhypopituitarism
10. Which breed of dog has been reported to suffer from a congenital immunodeficiency characterised by reduced granulocyte adherence? (*1/2 mark*)
- a) German Shepherd dog
 - b) Weimeraner
 - c) Cocker Spaniel
 - d) Irish Setter
11. Staphylococcal resistance to gentamicin is most likely to be attained through: (*1/2 mark*)
- a) Transposons
 - b) Gene cassettes
 - c) Plasmids
 - d) Chromosomal mutation

Section A continued over

12. Verhoeff's stain is used for the identification of what substance? (*1/2 mark*)
- a) Elastin
 - b) Collagen
 - c) Mucopolysaccharides
 - d) Melanin
13. Which drug most commonly causes alopecia in dogs? (*1/2 mark*)
- a) Vincristine
 - b) Cyclophosphamide
 - c) Doxorubicin
 - d) Lomustine
14. Which pox virus is **not** zoonotic? (*1/2 mark*)
- a) Swinepox
 - b) Pseudocowpox
 - c) Vaccinia
 - d) Cowpox

Section A continued over

15. Which of the following is a biting louse of Guinea pigs? (*1/2 mark*)
- a) *Polyplax spinulosa*
 - b) *Chirodiscoides caviae*
 - c) *Gliricola porcelli*
 - d) *Polyplax serrata*
16. Which breed of dog is most commonly affected by leproid granuloma? (*1/2 mark*)
- a) Boxers
 - b) English Springer Spaniels
 - c) West Highland White Terriers
 - d) Golden Retrievers
17. What organism is characterised as a gram positive, partially acid fast, branching, filamentous aerobe? (*1/2 mark*)
- a) *Actinobacillus lignieresii*
 - b) *Nocardia asteroides*
 - c) *Actinomyces odontolyticus*
 - d) *Yersinia pestis*

Section A continued over

18. What stain can be used to highlight the capsule of *Cryptococcus neoformans*? (1/2 mark)
- a) Mucicarmine
 - b) PAS
 - c) Eosin
 - d) Oil red O
19. *Staphylococcus pseudintermedius* organisms found on the lateral chest of a dog in the absence of inflammation are thought to be: (1/2 mark)
- a) Nomads
 - b) Transients
 - c) Infecting organisms
 - d) Residents
20. The following terms are used to describe a disease with similar clinico-pathological features. Which term is primarily used to describe the human disease? (1/2 mark)
- a) Hepatocutaneous syndrome
 - b) Necrolytic migratory erythema
 - c) Superficial necrolytic dermatitis
 - d) Metabolic epidermal necrosis

Section A continued over

21. A four-month-old Rottweiler presents with non-inflammatory alopecia affecting only the mahogany coloured points of the face and feet. What would be the most likely diagnosis? (*1/2 mark*)
- a) Follicular lipidosis
 - b) Medullary trichomalacia
 - c) Trichorrhexis nodosa
 - d) Piedra
22. What features best characterise Waardenburg-Klein syndrome? (*1/2 mark*)
- a) Silver grey hair coat and haematological abnormalities
 - b) Blue eyes, deafness and amelanotic skin
 - c) Yellow eyes, blue smoke hair coat and large granules in leucocytes
 - d) Hyperpigmented macules on the lips
23. Which of the following is **not** a typical sign of hyperadrenocorticism in ferrets? (*1/2 mark*)
- a) Bilaterally symmetrical alopecia
 - b) Pruritus
 - c) Polydipsia
 - d) Swollen vulva

Section A continued over

24. A horse presents with a highly pruritic ulcerative, granulomatous, rapidly expanding lesion on the ventral thorax after prolonged immersion in water. What would be the most likely differential diagnosis? (*1/2 mark*)
- a) Eumycotic mycetoma
 - b) *Rhocococcus equi* cellulitis
 - c) Actinobacillosis
 - d) Pythiosis
25. Which of the following demodex mites can be found on horses? (*1/2 mark*)
- a) *Demodex ghanensis*
 - b) *Demodex phylloides*
 - c) *Demodex caballi*
 - d) *Demodex aureti*
26. Which parasite is **unlikely** to cause pruritus of the tail base in horses? (*1/2 mark*)
- a) *Culicoides*
 - b) *Chorioptes*
 - c) *Oxyuris*
 - d) *Habronema*

Section A continued over

27. What topical agent(s) has been reported to induce a pemphigus foliaceus-like skin disease in dogs? (*1/2 mark*)
- a) Neomycin
 - b) Metaflumizone/amitraz
 - c) Fipronil
 - d) Imidacloprid/permethrin
28. Hyperesthetic leukotrichia of horses has been associated with which of the following? (*1/2 mark*)
- a) Culicoides hypersensitivity
 - b) Rhinopneumonitis vaccination
 - c) Pemphigus foliaceus
 - d) Cholinergic urticaria
29. Septicaemic cutaneous ulcerative disease (SCUD) is a disease syndrome described in: (*1/2 mark*)
- a) Turtles
 - b) Lizards
 - c) Snakes
 - d) Fish

Section A continued over

30. Which **two (2)** tumours comprise the entity previously referred to as “basal cell tumour” in the cat? (*1/2 mark*)
- a) Basal cell carcinoma and well differentiated squamous cell carcinoma
 - b) Trichofolliculoma and trichoepithelioma
 - c) Apocrine ductular adenoma and trichoblastoma
 - d) Tricholemmoma and sebaceous carcinoma

End of Section A

SECTION B: Short Answer Questions

Answer ALL four (4) questions

1. Name the causative organisms, including the genus and species when this is relevant, for the following diseases. (*1/2 marks each*)
 - 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)
 - h) Caseous lymphadenitis of sheep
 - i) Molluscum contagiosum
 - j) Melioidosis

Section B continued over

2. For **each** of the diseases below, name the internal **gross** pathology that results in the condition. Then **briefly summarise (in one or two sentences)** the **proposed pathogenetic mechanism(s)** that have been described to account for the skin lesions. If a potential mechanism has not been discovered, write “**Not known**”. (6 marks)
- a) Feline paraneoplastic alopecia
 - b) Nodular dermatofibrosis
 - c) Superficial necrolytic dermatitis in dogs
 - d) Exfoliative dermatosis of cats
 - e) Canine pituitary dwarfism
 - f) Feline acromegaly
3. List **eight (8)** types/clinical presentations of vasculitis/ischaemic dermatopathy that have been described in dogs, including breed associated syndromes (4 marks). For each of these clinical presentations, briefly describe (in a sentence or two) the salient clinical features (4 marks). (**Your answer should list specific conditions, not aetiological or pathological categories**).
4. Briefly describe the mode of action of the following drugs. (6 marks)
- a) Pentoxifylline
 - b) Ciclosporin
 - c) Isotretinoin
 - d) Trilostane

End of Section B

SECTION C: Long Answer Questions

Answer ALL three (3) questions

1. List the diseases (specific diagnoses) of dogs in which an absence or loss of cutaneous pigment occurs. For **each** disease, describe the cutaneous clinical signs and the mechanism that leads to the lack of pigment. *(20 marks)*
2. Describe the aetiology and pathogenesis of the diseases that may lead to self-induced and spontaneous alopecia of the tail and/or tail base in horses. For **each** condition mentioned, list the appropriate treatment options. *(20 marks)*
3. Describe the histological and clinical features of the diseases that may lead to mural folliculitis in the cat. *(20 marks)*

End of paper