AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

MEMBERSHIP GUIDELINES

Veterinary Pathology (includes Anatomical and Clinical Pathology)

ELIGIBILITY REQUIREMENTS OF CANDIDATE

The candidate must meet the eligibility prerequisites for Membership outlined in the *Membership Candidate Handbook.*

OBJECTIVES

To demonstrate that the candidate has acquired a sufficient level of postgraduate knowledge and skill in the field of Veterinary Pathology, to be able to give sound advice in this field to veterinary colleagues.

LEARNING OUTCOMES

1. The candidate will have **sound[1] knowledge** of:
   - 1.1. General and systemic pathobiology, including:
     - 1.1.1. The concepts of host-pathogen-environment interactions to produce disease.
     - 1.1.2. Principles of disease related to *pathological processes* (mechanisms of cell injury, inflammation and repair, vascular disturbances, disorders of growth, and pigmentations and deposits) and their *causes* (physical, chemical, infectious, genetic and immune-mediated).
     - 1.1.3. Pathobiology of organ systems, including the *structural* and *functional* changes at the subcellular, cellular, tissue and organ levels.
   - 1.2. The aetiology, pathogenesis, and pathological features of:
     - 1.2.1. Diseases of common companion and commercial animals including dogs, cats, horses, cattle, sheep, goats, pigs and poultry.
     - 1.2.2. Major **infectious** animal diseases exotic to Australia and New Zealand.

[1] **Knowledge levels:**
Sound knowledge — candidate must know all of the principles of the topic including some of the finer detail, and be able to identify areas where opinions may diverge. A middle level of knowledge.
Basic knowledge — candidate must know the main points of the topic and the core literature

1.3. Diagnostic (technical and interpretive) aspects of Veterinary Anatomical Pathology and Veterinary Clinical Pathology.

1.3.1. Routine diagnostic laboratory procedures.

1.3.2. Immunodiagnosis, including immunohistochemistry and immunocytochemistry

2. The candidate will have **basic knowledge** of:

2.1. The aetiology, pathogenesis and pathological features of:

2.1.1. The major diseases of laboratory animals, commercially-farmed aquatic species in Australia and New Zealand, and wildlife and zoo species in Australia and New Zealand.

2.2. Diagnostic (technical and interpretive) aspects of related disciplines, including Veterinary Microbiology, Veterinary Parasitology, Immunology, Toxicology and Molecular Biology including:

2.2.1. Routine diagnostic laboratory procedures.

2.2.2. PCR testing for infectious agents and lymphocyte clonality.

2.3. Principles of related disciplines, including Comparative Anatomy, Physiology, Biochemistry, Veterinary Medicine, Molecular Biology *(predominantly the principles of PCR and in situ hybridisation)*, Veterinary Epidemiology, Veterinary Public Health, and Statistics.

3. The candidate will **be able to**:

3.1. Describe how to carry out a routine necropsy on a common companion or commercial animal species. ***Sound*** *knowledge is required*

3.2. Detect, describe and interpret macroscopic and microscopic (histopathological, cytological and haematological) changes in specimens from companion and commercial animals, including poultry and commercially farmed aquatic species. ***Sound*** [2] *microscopic expertise is required for histopathological sections, and for cytological and haematological smears*.

3.3. Interpret the results of haematological, biochemical, endocrinological, and immunological investigations for companion and commercial animals. ***Sound*** *diagnostic expertise is required.*

3.4. Provide to veterinarians and non-veterinarians information and advice on the pathological features of diseases in animals, using concise, clear verbal and written communication.

[2]**Skill levels**:
Sound expertise — the candidate must be able to perform the technique with a moderate degree of skill, and have moderate experience in its application. A middle level of proficiency.
Basic expertise — the candidate must be able to perform the technique competently in uncomplicated circumstances.

EXAMINATIONS

Refer to the *Membership Candidate Handbook*

The examination will cover both disciplines of Anatomical Pathology and Clinical Pathology, and content of the examination will approximate 50% of each. It is recognised that the range of material that is covered is broad, and thus a degree of choice will be offered in the examination, however the choice is such that a mix of both disciplines must be answered in the examination to achieve a pass.

The Membership examination has **two (2) sections**, the **Written**, and **Practical/Oral**.

The **Written** consists of **two (2) parts**:

1. **Written Paper 1** (2 hours – 50%),

   Four (4) questions, with 2 to 4 sub-parts.

   All questions must be answered; there is some choice in the sub-parts.

Written Paper 1 *assesses the candidate's knowledge of the principles of* ***Veterinary Pathology*** *as described in the Learning Outcomes. The candidate should be able give examples of the application of the principles of pathobiology to specific diseases of animals. The candidate should be aware of recent advances in pathobiology (as covered in recent review articles). There is some choice in this paper.*

2. **Written Paper 2** (2 hours – 50%)

   Four (4) questions, with 2 to 4 sub-parts.

   All questions must be answered; there is some choice in the subparts.

Written Paper 2 *assesses the candidate's ability to apply the principles of* ***Veterinary Pathology****, with an emphasis on knowledge of the aetiology, pathogenesis, pathological features, and diagnosis of animal diseases, as described in the Learning Outcomes. Questions involving analysis of clinical laboratory data (normal reference values are provided) may be included. There is considerable choice in this paper.*

The **Practical/Oral** consists of **three (3) parts**:

1. **Microscopy** (2 hours - 50%)

   Four (4) histological sections and four (4) slides of blood smears or cytology, candidate to choose six (6) slides.

Microscopy *assesses the candidate's ability to detect, describe and interpret morphological changes in histopathological sections,* ***AND*** *cytological and haematological smears. Laboratory data for interpretation may accompany haematological and cytological smears. The candidate is informed of the animal species, and in the case of smears, their origin..*

2. **Gross Pathology AND Clinical Pathology (Projected Images)** (1 hour -25 %)

   Thirty (30) images of gross pathology and clinical pathology including parasitology or microbiology. All questions to be answered

Gross Pathology *assesses the candidate's ability to detect, describe and interpret macroscopic changes illustrated in projected images of lesions in animals.*

Clinical Pathology *assesses the candidate's ability to detect, describe and interpret gross and microscopic changes illustrated in projected images of cytological smears (solid tissue, body fluid), urine components, faecal examination and haematological smears (peripheral blood, bone marrow) from animal species.*

The candidate may be required to write morphological and/or aetiological diagnoses and possibly brief comments.

The candidate is informed of the animal species and tissue.

*Each candidate is required to answer all Gross Pathology **AND** Clinical Pathology questions in this part of the Practical/Oral.*

3. Oral (1 hour - 25%)

***Oral** provides the candidate with a further opportunity to demonstrate knowledge of **Veterinary Pathology** as described in the Learning Outcomes.*

RECOMMENDED READING LIST

The candidate is expected to read widely within the discipline, paying attention to areas not part of their normal work experiences. This list of books and journals is intended to guide the candidate to some major references (*, **, and *** indicate more important references) and other source material. Candidates also should be guided by their mentors. *The list is not exhaustive and is not intended as an indicator of the content of the examination.*

Textbooks[3]

General Veterinary Pathology

*Cheville NF. *Ultrastructural Pathology: The Comparative Cellular Basis of Disease* 2nd edn. Wiley-Blackwell (2009).

*Kumar, V, Abbas, AK, Fausto, N, Aster, J. *Robbins and Cotran Pathologic Basis of Disease* 9th edn. Elsevier (2014) (Chapters 1 to 8).

***McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Disease* 6th edn. Elsevier (2016) (Chapters 1 to 6).

Anatomical Pathology

Aughey E, Frye FL. *Comparative Veterinary Histology with Clinical Correlates* Manson Publishing (2001).

Genten F, Terwinghe E, Danguy A. *Atlas of fish histology* Science Publishing (2009).

*Gross TL, Ihrke PJ, Walder EJ, Affolter, VK. *Skin Diseases of the Dog and Cat – Clinical and Histopathologic Diagnosis* 2nd edn. Blackwell (2005).

***Maxie MG editor. *Jubb, Kennedy & Palmer's Pathology of Domestic Animals* 6th edn. Elsevier. Volumes 1-3 (2015).

Ladds PW. *Pathology of Australian Native Wildlife* CSIRO Publishing (2009).

**McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Disease* 6th edn. Elsevier (2016).

[3] **Definitions of Textbooks**
Recommended textbook – candidates should own or have ready access to a copy of the book and have a sound knowledge of the contents.
Additional references – candidates should have access to the book and have a basic knowledge of the contents.

**Meuten, DJ. *Tumors in Domestic Animals* 5th edn. Wiley (2016).
Mumford et al. Fish histology and histopathology (free PDF) (2007): https://training.fws.gov/resources/course-resources/fish-histology/Fish_Histology_Manual_v4.pdf
Percy DH, Barthold SW. *Pathology of Laboratory Rodents and Rabbits* 4th edn. Wiley (2016).
Randall CJ, Reece RR. *Color Atlas of Avian Histopathology* Mosby-Wolfe (1996).
Roberts RJ. *Fish Pathology* 4th edn. WB Saunders (2012).
*Schmidt, RE, Reavill, DR, Phalen, DN. *Pathology of Pet and Aviary Birds* 2nd edn.Wiley (2015).
Sims LD, Glastonbury JRW. *Pathology of the Pig. A Diagnostic Guide* Pig Research and Development Corporation. (1996).
Young B, Woodford P, O'Dowd G. *Wheaters Functional Histology* 6th edn (2014).

Clinical Pathology

Campbell TW. *Exotic animal hematology and cytology* 4th edn. Wiley Blackwell (2015).
Clark P. *Haematology of Australian Mammals* CSIRO Publishing (2004).
*** Valenciano AC, Cowell RL, editors. *Cowell and Tyler's Diagnostic Cytology and Hematology of the Dog and Cat* 4th edn. Mosby (2014).
*** Cowell RL, Tyler RD, editors. *Diagnostic Cytology and Hematology of the Horse* 2nd edn. Mosby (2015).
*Day MJ *Clinical Immunology of the Dog & Cat* 2nd edn. CRC Press (2011).
Feldman EC, Nelson RW, Reusch C, Scott-Moncrieff JC. *Canine and Feline Endocrinology* 4th edn. Elsevier (2015).
* Harvey J. *Veterinary Hematology: A Diagnostic Guide and Color Atlas* Saunders (2012).
* Kaneko JJ, Harvey JW, Bruss ML, editors. *Clinical Biochemistry of Domestic Animals* 6th edn. Academic Press (2008).
*** Latimer KS, *Duncan & Prasse's Veterinary Laboratory Medicine – Clinical Pathology* 5th edn. Wiley-Blackwell (2011).
* Raskin RE, Meyer DJ, editors. *Canine and Feline Cytology: A Color Atlas and Interpretation Guide* 3rd edn. Saunders (2015).

General References and Associated Disciplines

Swayne DE et al. *Diseases of Poultry* 13th edn. Wiley-Blackwell (2013).
Geering WA, Forman AJ, Nunn MJ. *Exotic Diseases of Animals. A Field Guide for Australian Veterinarians* Australian Government Publishing Service (1995).
Noga EJ. *Fish Disease: Diagnosis and Treatment* Wiley-Blackwell (2010).
Quinn PJ, Carter ME, Markey B, Carter GR. *Clinical Veterinary Microbiology* 2nd edn. Mosby (2013).
Scott DW, Miller WH. *Equine Dermatology* 2nd edn. Elsevier (2010).
Zimmerman JJ et al, editors. *Diseases of Swine* 10th edn. Wiley-Blackwell (2012).

Journals[4] (particularly issues from the immediate past five years).

American Journal of Veterinary Research

**Australian Veterinary Journal*

Equine Veterinary Journal

Journal of the American Animal Hospital Association

Journal of the American Veterinary Medical Association

Journal of Comparative Pathology

***Journal of Veterinary Diagnostic Investigation*

Journal of Veterinary Internal Medicine

New Zealand Veterinary Journal

***Veterinary Clinical Pathology*

***Veterinary Pathology*

Veterinary Clinics of North America (Small Animal Practice, Equine Practice and Food Animal Practice).

Journals for Review Articles

American Journal of Pathology

New England Journal of Medicine.

Websites

Animal Health Australia (to access AUSVETPLAN through publications link):
http://www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ausvetplan/

The candidate should also be familiar with current and emerging animal diseases, both domestic and exotic. A useful resource in this regard is: http://www.promedmail.org

[4] **Definitions for journals:**
Recommended Journal – candidates should have ready access to either print or electronic versions of the journal and have a sound knowledge of the published articles in the subject area.
Additional Journal – candidates should be able to access either printed or electronic versions of the journal and have a basic knowledge of the published articles in the subject area.

FURTHER INFORMATION

For further information contact the College Office

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