



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 is an advanced veterinary practitioner in the field of veterinary pathology, representing a middle-tier of knowledge, competence and experience.

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.

¹Knowledge 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
 - 2.2.3. Flow cytometry.
 - 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 with a **sound**² level of expertise:
 - 3.1. Describe how to carry out a routine necropsy on a common companion or commercial animal species
 - 3.2. Recognise, 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.
 - 3.3. Interpret the results of haematological, biochemical, endocrinological, and immunological investigations for companion and commercial animals.
 - 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.

While there is no choice of questions (all questions must be answered), candidates may be given the ability to focus on either anatomical pathology or clinical pathology aspects within some questions. Ultimately knowledge of both disciplines is required to pass the examination.

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

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

1. Written Paper 1 (2 hours – 50% of written mark)

The exam may include a series of short answer questions and multiple-choice questions. The exam is worth a total of 120 marks and all questions must be answered.

Allocated marks to each question/sub question will be clearly indicated.

*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).*

2. Written Paper 2 (2 hours – 50% of written mark)

The exam may include a series of short answer questions, multiple-choice questions or may require an essay-type response. The exam is worth a total of 120 marks and all questions must be answered.

Allocated marks to each question/sub question will be clearly indicated.

*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 some scope to focus on either clinical pathology or anatomical pathology in answers to some questions, however both disciplines are examined in this paper.*

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

1. Digital Microscopy (2 hours - 50% of practical mark) – 6 cases

Candidate's will be required to nominate ahead of the examinations if they wish to undertake the Anatomical OR Clinical pathology focused practical examination:

Anatomical pathology: Four (4) histological sections and two (2) slides of haematologic/cytologic smears

Clinical pathology: Two (2) histological sections and four (4) slides of haematologic/cytologic smears

*Digital 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 scanned haematological and cytological smears. The candidate is informed of the animal species, and in the case of smears, their tissue origin.*

The questions are short-essay and short-answer format. The candidate will be required to write a

microscopic description and interpretation for each case and possibly brief comments addressing specific questions e.g. differential diagnoses, recommended further tests.

Students will be provided with access to a practice slide to become familiar with the digital microscopy system prior to the examination.

2. Anatomical Pathology AND Clinical Pathology (Projected Images) (2 hours - 50% of practical mark)

The exam may include a series of image-based short answer questions, multiple-choice questions or scenario-based questions. The exam is worth a total of 120 marks and all questions must be answered. Both anatomical pathology and clinical pathology images are included in roughly equal proportions, including parasitology and microbiology. Allocated marks to each question/sub question will be clearly indicated.

Anatomical Pathology assesses the candidate's ability to detect, describe and interpret macroscopic and microscopic 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 samples (peripheral blood, bone marrow) from animal species.

The questions are short-answer format. The candidate may be required to write morphological and/or aetiological diagnoses and possibly brief comments e.g. regarding differential diagnoses or recommended further tests.

The candidate is informed of the animal species and tissue, and for scenario-based questions a brief clinical history.

RECOMMENDED REFERENCES

The candidate is expected to read widely within the discipline, paying attention to areas not part of their normal work experiences. Candidates should have ready access to the following references and have a sound knowledge of the contents.

General Veterinary Pathology^{3,4}

- McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Disease* 7th edn. Elsevier (2021)(Chapters 1 to 6).

Anatomical Pathology^{3,4}

- McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Disease* 7th edn. Elsevier (2021).
- Maxie MG editor. *Jubb, Kennedy & Palmer's Pathology of Domestic Animals* 6th edn. Elsevier. Volumes 1-3 (2015).
- <https://www.outbreak.gov.au/for-vets-and-scientists/emergency-animal-diseases-guide>

Clinical Pathology^{3,4}

- Latimer KS, Duncan & Prasse's *Veterinary Laboratory Medicine – Clinical Pathology* 5th edn. Wiley-Blackwell (2011).
- Valenciano AC, Cowell RL, editors. *Cowell and Tyler's Diagnostic Cytology and Hematology of the Dog and Cat* 5th edn. Mosby (2019).

- Cowell RL, Tyler RD, editors. *Diagnostic Cytology and Hematology of the Horse* 2nd edn. Mosby (2001).

Journals (particularly issues from the immediate past three years, past five years for consensus statements). ^{3,4}

- *Veterinary Clinical Pathology*
- *Veterinary Pathology*
- *Australian Veterinary Journal (pathology related articles)*

ADDITIONAL REFERENCES

Candidates may find these references useful for evaluating cases and broadening breadth of species knowledge. Only a basic knowledge of their content is required, and candidates should seek mentor guidance regarding study of these references or others according to candidate background and pathology experience.

General Veterinary Pathology^{3,4}

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

Anatomical Pathology ^{3,4}

- Meuten, DJ. *Tumors in Domestic Animals* 5th edn. Wiley (2016).
- Ladds PW. *Pathology of Australian Native Wildlife* CSIRO Publishing (2009).
- 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).
- Noga EJ. *Fish Disease: Diagnosis and Treatment* (Chapters 4, 5, 7-15).
- *Avian Disease Manual*. 8th edn. The American Association of Avian Pathologists. (2019) Schmidt, RE, Reavill, DR, Phalen, DN. *Pathology of Pet and Aviary Birds* 2nd edn. Wiley (2015).

Clinical Pathology ^{3,4}

- Campbell TW. *Exotic animal hematology and cytology* 5th edn. Wiley Blackwell (2022).
- Raskin RE, Meyer DJ, editors. *Canine and Feline Cytology: A Color Atlas and Interpretation Guide* 3rd edn. Saunders (2015).
- *Journal of Veterinary Internal Medicine (consensus statements)*
- *New Zealand Veterinary Journal*

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.

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

Telephone: +61 (07) 3423 2016

Email: examinations@anzcvs.org.au

Web: www.anzcvs.org.au

Postal Address: Building 3, Garden City Office Park, 2404 Logan Road
EIGHT MILE PLAINS QLD 4113 Australia

© 2023 The Australian and New Zealand College of Veterinary Scientists ABN 00 50 000894 208

This publication is copyright. Other than for the purposes of and subject to the conditions prescribed under the Copyright Act, no part of it may in any form or by any means (electronic, mechanical, microcopying, photocopying, recording or otherwise) be reproduced, stored in a retrieval system or transmitted without prior written permission. Enquiries should be addressed to the Australian and New Zealand College of Veterinary Scientists