



## AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

### FELLOWSHIP GUIDELINES

#### *Veterinary Anatomical Pathology*

#### ELIGIBILITY

1. The candidate must meet the eligibility prerequisites for Fellowship outlined in the *Fellowship Candidate Handbook*.
2. Membership of the College must be achieved prior to the Fellowship examination.
3. Membership must be in Veterinary Pathology (*includes both Anatomical and Clinical Pathology*).

#### OBJECTIVES

To demonstrate that the candidate has sufficient knowledge, training, experience and accomplishment to meet the criteria for registration as a specialist in **Veterinary Anatomical Pathology**.

#### LEARNING OUTCOMES

1. The candidate will have **detailed**<sup>1</sup> 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:

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<sup>1</sup> Knowledge levels:

**Detailed knowledge** — candidates must be able to demonstrate an in-depth knowledge of the topic including differing points of view and published literature. The highest level of knowledge.

**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.

- 1.2.1. Diseases of companion and commercial animals, including poultry and commercially-farmed aquatic species in Australia and New Zealand
- 1.2.2. Major **infectious** animal diseases exotic to Australia and New Zealand.
- 1.3. Diagnostic (technical and interpretive) aspects of Veterinary Anatomical Pathology, including:
  - 1.3.1. Routine laboratory procedures.
  - 1.3.2. Immunodiagnosis, including immunohistochemistry.
2. The candidate will have **sound** knowledge of:
  - 2.1. The aetiology, pathogenesis, and pathological features of:
    - 2.1.1. Major diseases of laboratory animals, and wildlife and zoo species in Australia and New Zealand.
  - 2.2. Diagnostic (technical and interpretive) aspects of related disciplines, including Veterinary Clinical Pathology, Veterinary Microbiology, Veterinary Parasitology, Immunology and Toxicology, including: ?
  - 2.3. Principles of related disciplines, including Comparative Anatomy, Biochemistry, Physiology, Veterinary Medicine, and Veterinary Public Health,
3. The candidate will have **basic** knowledge of:
  - 3.1. Principles of related disciplines including Molecular Biology (predominantly the principles of PCR and *in situ* hybridisation), Veterinary Epidemiology and Statistics.
4. The candidate will, with **detailed**<sup>2</sup> expertise, be able to:
  - 4.1. Carry out a detailed necropsy on companion, commercial, laboratory, and selected wildlife and zoo animal species.
  - 4.2. Detect, describe and interpret macroscopic and microscopic (histopathological and ultrastructural) changes in necropsy and biopsy specimens from animal species. *Detailed microscopic expertise is required for histopathological sections. Basic interpretative competence is required in Electron Microscopy.*
  - 4.3. Collect, process and examine cytological smears (*solid tissue, body fluid*), and haematological smears (*peripheral blood, bone marrow*). Detect, describe and interpret morphological changes. *Sound microscopic expertise is required for cytological and haematological smears.*

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<sup>2</sup> Skill levels:

**Detailed expertise** — the candidate must be able to perform the technique with a high degree of skill, and have extensive experience in its application. The highest level of proficiency.

**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.

- 4.4. Interpret the results of haematological, biochemical, endocrinological and immunological examinations of specimens from companion and commercial animal species, for both single-animal and herd/flock problems. *Sound diagnostic expertise is required.*
- 4.5. Provide to veterinarians and non-veterinarians, information and advice on the pathological features of diseases in animals, using concise, clear verbal and written communication.

## EXAMINATIONS

Refer to the *Fellowship Candidate Handbook*, Section 7. The Fellowship examination has **four separate, autonomous components**:

1. **Written Paper 1** (*Component 1*)  
Principles of the Subject (three hours)
2. **Written Paper 2** (*Component 2*)  
Applied Aspects of the Subject (three hours)
3. **Practical Examination** (*Component 3*)  
Microscopy (three hours - 60%)  
Gross Pathology (Projected Images) (two hours - 40%)
4. **Oral Examination** (*Component 4*)  
Oral (two hours)

The written examination will comprise of two separate three-hour written papers taken on two consecutive days. There will be an additional 20 minutes perusal time for each paper, during which no writing on the examination paper is permitted. Each paper is worth a total of 180 marks and is divided into two sections, A and B. Section A provides four (4) essay style questions to answer, worth 30 marks each, while section B has four (4) short answer questions worth 15 marks. There is no choice of questions. Marks allocated to each question and to each sub-section will be clearly indicated on the written paper.

### Written Paper 1:

**Written Paper 1** assesses the candidate's knowledge of the principles of **Veterinary Anatomical Pathology** as described in the Learning Outcomes. Answers may cite specific examples where general principles apply, but should primarily address the theoretical basis underlying each example.

### Written Paper 2:

**Written Paper 2** assesses the candidate's ability to apply the principles of **Veterinary Anatomical Pathology**, with an emphasis on knowledge of the aetiology, pathogenesis, pathological features, and diagnosis of animal diseases, as described in the Learning Outcomes.

### Practical Examinations:

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

#### 1. Microscopy (3 hours - 60%)

**Microscopy** primarily assesses the candidate's ability to detect, describe and interpret morphological changes in histopathological sections. Cytological and haematological smears and electron micrographs are likely to be used during this examination for basic evaluation. The candidate is informed of the animal species. This practical will consist of a series of fourteen (14) questions with sub-questions, equating to a total of 280 marks.

#### 2. Gross Pathology (Projected Images) (2 hours - 40%)

**Gross Pathology** assesses the candidate's ability to detect, describe and interpret macroscopic changes illustrated in projected images of lesions in animals. 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. This practical will consist of a series of eighty (80) questions short answer questions, equating to a total of 160 marks.

No perusal time will be given for either of the practical exams. Marks allocated to each question and to each sub-section will be clearly indicated on the written paper.

### Oral Examination:

The **Oral** provides the candidate with a further opportunity to demonstrate knowledge of **Veterinary Anatomical Pathology** as described in the Learning Outcomes. Candidates may be asked to discuss detailed case material. Five (5) cases are presented with supporting questions asked verbally in a face-to-face setting. The oral examination has a total of 100 marks with each case allocated 20 marks. Projected images may be used during this examination.

### TRAINING PROGRAMS

Refer to the *Fellowship Candidate Handbook*, Section 4.3. In addition to the *Fellowship Candidate Handbook* requirements:

1. The residency-type training program should provide intensive training in **Veterinary Anatomical Pathology**. This must encompass both companion and commercial animal species.
2. The candidate should be actively involved in the diagnosis and reporting of gross pathological and histopathological results from **necropsy cases**, and from **surgical biopsy cases** involving all body systems.
3. In addition to directly-supervised case responsibilities, the candidate should be involved in formal training activities such as clinical rounds, resident seminars, and journal clubs, and should attend relevant lectures or continuing education courses. The candidate is encouraged to participate in regional, national and international meetings relevant to disease investigation and diagnosis.
4. **Case thresholds** are recommended to ensure the candidate's range of training experience. *There is an acceptance that in some candidate's circumstances not all thresholds can be achieved.*

SPECIES	CUMULATIVE CASE TOTAL (Recommended <u>minimum</u> numbers)		
	NECROPSY +/- HISTO	HISTO ONLY (NECROPSY)*	HISTO ONLY (BIOPSY)
<b>Dog</b>	50	*	100
<b>Cat</b>	30	*	100
<b>Farm Animals (excl Poultry)</b>	30	*	20
<b>Horse</b>	10	*	20
<b>Other</b>	20	*	20
<b>Total</b>	300	500*	

\*HISTO ONLY (NECROPSY) cases count towards the HISTO ONLY Total

### TRAINING IN RELATED DISCIPLINES

Refer to the *Fellowship Candidate Handbook*, 3.4.2.

Candidates for Fellowship must spend time as stipulated by the *Fellowship Candidate Handbook* in one or more related disciplines. Examples of related disciplines appropriate for Fellowship in Veterinary **Anatomical Pathology** include: Veterinary Clinical Pathology, Veterinary Public Health, Veterinary Microbiology, Veterinary Parasitology, Molecular Biology, Immunology, Toxicology, Veterinary Epidemiology, and Veterinary Clinical Medicine.

### EXTERNSHIPS

Refer to the *Fellowship Candidate Handbook*, Section 3.4.1.

### ACTIVITY LOG SUMMARY

The Activity Log Summary (ALS) should be recorded using the format of Appendix 1, identifying the laboratory procedure and further subdivided by Species.

### PUBLICATIONS

Refer to the *Fellowship Candidate Handbook*, Section 3.11.

### RECOMMENDED READING LIST

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

#### Textbooks

##### General Veterinary Pathology

\*\*Cheville NF. *Cell Pathology* Iowa State University Press, Ames.

\*\*Kumar, V, Abbas, AK, Fausto, N *Robbins and Cotran Pathologic Basis of Disease*. 7th edn. Elsevier Saunders (2005).

\*\*McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Pathology* 4th edn. Mosby, St Louis (2007).

\*\*Slauson, DO, Cooper, BJ. - *Mechanisms of Disease*, 3rd edn. Mosby (2002).

### **Anatomical Pathology**

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

Ferguson HW. *Systemic Pathology of Fish. A text atlas of comparative tissue responses in diseases of teleosts* Iowa State University Press, Ames (1989).

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

\*\*\*Maxie MG editor. *Jubb, Kennedy & Palmer's Pathology of Domestic Animals*, 5th edn. Elsevier. Volumes 1-3 (2007).

Ladds PW. *A Colour Atlas of Lymph Node Pathology in Cattle*, James Cook University, Townsville (1986).

McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Pathology* 4th edn. Mosby, St Louis (2007).

\*\*Meuten, DJ - *Tumours in Domestic Animals*, 4th edn. Iowa State Press (2002).

Percy DH, Barthold SW. *Pathology of Laboratory Rodents and Rabbits* Iowa State University Press, Ames (1993).

Randall CJ, Reece RR. *A Colour Atlas of Avian Histopathology* Mosby-Wolfe, London (1996).

\*Roberts RJ. *Fish Pathology* 3rd edn. WB Saunders London (2001).

Robinson WF, Huxtable CRR. *Clinicopathologic Principles for Veterinary Medicine* Cambridge University Press, Cambridge (1988).

\*Schmidt, RE, Reavill, DR and Phalen, DN *Pathology of Pet and Aviary Birds*. Iowa State Press (2003).

Sims LD, Glastonbury JRW. *Pathology of the Pig. A Diagnostic Guide* Pig Research and Development Corporation. (1996).

\*\*Summers BA, Cumming JP, de Lahunta A. *Veterinary Neuropathology* Mosby, London (1995).

\*\*Yager JA, Wilcock BP. *Color Atlas and Text of Surgical Pathology of the Dog and Cat. Volume 1. Dermatopathology and Skin Tumors* Mosby-Wolfe, London (1994).

### **Clinical Pathology**

\*\* Baker R, Lumsden JH, editors. *Color Atlas of Cytology of the Dog and Cat*. 1st edn, Mosby, Inc., St Louis, USA. ISBN 0-8151-0402-2 (2000).

\*Canfield P, Martin P, *Veterinary Cytology*, 1st edn, Postgraduate Foundation in Veterinary Science, University of Sydney (1998).

Clark P. *Haematology of Australian Mammals*. (CSIRO Publishing 2004)

- \*\*\* Cowell RL, Tyler RD, Meinkoth JH, editors *Diagnostic Cytology and Hematology of the Dog and Cat*. 2nd edn. Mosby Inc., St Louis, USA. ISBN 0-8151-0362-X (1999).
- \*\*\* Cowell RL, Tyler RD, editors. *Diagnostic Cytology and Hematology of the Horse*. 2nd edn, Mosby Inc., St Louis, USA. ISBN 0-323-01317-1 (2002).
- \* Davidson M, Else R, Lumsden J, editors. *Manual of Small Animal Clinical Pathology*, British Small Animal Veterinary Association, Cheltenham, UK. ISBN 0-905214-41-2 (1998)
- \*\*Day MJ *Clinical Immunology of the Dog & Cat* Iowa State Univ Press, Ames. 1999.
- Eade SC, Bounous DI. Editor PW Pratt. *Laboratory Profiles of Equine Diseases*. 1st edn, Mosby Inc, St Louis, USA. ISBN 0-8151-1731-0 (1997)
- \*\* Feldman BF, Zinkl JG, Jain NC editors *Schalm's Veterinary Hematology*. 5th edn. Lippincott Williams & Wilkins, Philadelphia, Pennsylvania, USA. ISBN 0-683-30692-8 (2000).
- Feldman EC, Nelson, RW. *Canine and Feline Endocrinology and Reproduction*, 3rd edn. Saunders (2004)
- \* Harvey J. *Atlas of Veterinary Hematology*, 1st edn, WB Saunders Co., Philadelphia, USA. ISBN 0-7216-6334-6 (2001).
- \*\*\* Kaneko JJ, Harvey JW, Bruss ML, editors. *Clinical Biochemistry of Domestic Animals*. 5th edn Academic Press Inc., San Diego, California, USA. ISBN 0-12-396305-2 (1997).
- \*\* Latimer KS, Mahaffey EH, Prasse KW. editors, *Duncan & Prasse's Veterinary Laboratory Medicine – Clinical Pathology*. 4rd Edition. Iowa State Press, Blackwell Publishing Co, Ames, Iowa, USA. ISBN 0-8138-2070-7 (2003).
- Meyers DJ, Coles EH, Rich LJ. *Veterinary Laboratory Medicine*. 1st edn 1992. WB Saunders Co., Philadelphia, Pennsylvania, USA. ISBN 0-7216-2654-8.
- \*, Raskin RE, Meyer DJ, editors. *Atlas of Canine and Feline Cytology*. 1st edn, WB Saunders Co., Philadelphia, USA. ISBN 0-7216-6335-4 (2001).
- Reagan WG, Sanders TG, DeNicola DB. *Veterinary Hematology – Atlas of common domestic species*, 1st edn, Manson Publishing, London, UK. ISBN 01-874545-88-X (1998)
- Rebar AH, MacWilliams PS, Feldman BF, et al. *A Guide to Hematology in Dogs and Cats*. 1st edn, Teton NewMedia, Jackson Wyoming, USA. ISBN 1-893441-48-2 (2002)
- Sodikoff CH. *Laboratory Profiles of Small Animal Disease*. 3rd edn. Mosby Inc., St Louis, USA. ISBN 0-323-00956-5 (2001).
- Troy DB, editor *Veterinary Hematology and Clinical Chemistry*. MA Thrall, DC Baker, D DeNicola, MJ Fettman, ED Lassen, A Rebar and G Weiser. 1<sup>st</sup> Edition, Lippincott Williams and Wilkins, Philadelphia, USA. ISBN 0-683-30415-1(2004).
- Willard MD, Tvedten H, Turnwald GH, editors. *Small Animal Clinical Diagnosis by Laboratory Methods*. 3rd edn. WB Saunders Co, Philadelphia, Pennsylvania, USA. ISBN 0-7216-7160-8 (1999).

### **General References and Associated Disciplines**

- Calnek BW *et al Diseases of Poultry* 10th edn Iowa State University Press, Iowa (1997).
- Geering WA, Forman AJ, Nunn MJ. *Exotic Diseases of Animals. A Field Guide for Australian Veterinarians*. Australian Government Publishing Service Canberra (1995).
- Noga EJ. *Fish Disease. Diagnosis and Treatment* Mosby-Year Book Inc, Missouri. (1996)

Quinn PJ, Carter ME, Markey B, Carter GR. *Clinical Veterinary Microbiology* Mosby, London (1994).  
 Scott, DW, Miller, WH. *Equine Dermatology*. Saunders (2003).

**Journals (particularly issues from the immediate past 5 years).**

*Amer J Vet Res.*

\**Aust Vet J.*

*Aust Vet Practitioner.*

*Comp. Clin. Pathol.*

*Comp. Continuing. Education for the Practising Veterinarian.*

*Equine Vet J.*

*J Amer Anim Hosp Assoc.*

*J Amer Vet Med. Assoc.*

*J Comp Pathol.*

\*\**J Vet Diagn Investig.*

*NZ Vet J.*

*Res Vet Sci.*

\*\**Vet Clin Pathol.*

\*\**Vet Pathol.*

*Vet Clinics N. Amer (Small Animal Practice, Equine Practice and Food Animal Practice).*

*Vet Rec.*

**Journals for Review Articles**

*Immunology Today.*

*New England Journal of Medicine.*

\**These books and journals are considered essential for candidates preparing for Written Paper 1 (General Pathology).*

**Websites**

Animal Health Australia (to access AUSVETPLAN through publications link):

<http://www.animalhealthaustralia.com.au/aahc/home-page.cfm>



**FURTHER INFORMATION**

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<b>APPENDIX 1: ACTIVITY LOG SUMMARY (BY ACTIVITY AND SPECIES)</b> <b>Veterinary Anatomical Pathology</b>		<b>Fellowship Candidate Name:</b>					<b>Date:</b>								
<b>LAB PROCEDURE /Species</b>	<b>NUMBER OF CASES</b>														
	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>Current TOTAL</b>	<b>Previous TOTAL</b>	<b>Cumulative TOTAL</b>
<b>NECROPSY +/- HISTO</b>															
1. Dog															
2. Cat															
3. Farm Animals ( <i>excl Poultry</i> )															
4. Horse															
5. Other ( <i>incl Poultry</i> )															
<b>HISTO ONLY (NECROPSY)</b>															
1. Dog															
2. Cat															
3. Farm Animals ( <i>excl Poultry</i> )															
4. Horse															
5. Other ( <i>incl Poultry</i> )															
<b>HISTO ONLY (BIOPSY)</b>															
1. Dog															
2. Cat															
3. Farm Animals ( <i>excl Poultry</i> )															
4. Horse															

<b>5. Other (incl Poultry)</b>																				
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**Signature of Supervisor:**