



AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

FELLOWSHIP GUIDELINES

Veterinary Oncology

ELIGIBILITY

1. The candidate must meet the eligibility prerequisites for Fellowship outlined in the *Fellowship Candidate Handbook*.
2. Membership of the College, in Small Animal Medicine, must be achieved prior to the Fellowship examination.

OBJECTIVES

To demonstrate that the candidate has attained sufficient knowledge, training, experience and accomplishment to meet the criteria for registration as a Specialist in Veterinary Oncology.

LEARNING OUTCOMES

1. The candidate will have a **detailed**¹ knowledge of:
 - 1.1. The aetiology, including but not limited to physical, chemical, inflammatory and viral carcinogenesis of oncological diseases of cats and dogs.
 - 1.2. The pathogenesis of oncological diseases of cats and dogs.
 - 1.3. The epidemiology, pathology, diagnosis, treatment and management of oncological diseases of cats and dogs.
 - 1.4. The cellular, genetic, immunological, molecular and biological mechanisms of tumour development, progression and metastasis.

¹ 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 major literature.

- 1.5. The principles of chemotherapy (including but not limited to cytotoxic agents, small molecule inhibitors and monoclonal antibodies) including indications, mechanism of action, toxicity, interactions, resistance and response.
- 1.6. The pharmacology of cancer chemotherapy including pharmacokinetics, pharmacogenomics and pharmacodynamics.
- 1.7. The fundamentals and interpretation of cytology, irrespective of collection method, of tumour types affecting domestic animals.
- 1.8. The diagnostic techniques as they relate to cancer, and their interpretation, including but not limited to flow cytometry, electrophoresis, polymerase chain reaction, immunocytochemistry and immunohistochemistry.
- 1.9. The staging and grading criteria of common veterinary cancers.
2. The candidate will have a **sound**¹ knowledge of:
 - 2.1. The principles of and practical applications for radiation therapy, including radiobiology, effects of ionizing radiation on cancer growth and on normal tissues.
 - 2.2. The fundamentals and interpretation of cytology, irrespective of collection method, of tumour types affecting non-domestic animals.
 - 2.3. The fundamentals and interpretation of histopathology, irrespective of collection method, of tumour types affecting domestic animals.
 - 2.4. Molecular diagnostic techniques as they relate to cancer, and their interpretation.
 - 2.5. The principles of surgery in general, and specifically in relation to oncologic disease.
 - 2.6. The interpretation of, and applications for, imaging modalities used in the diagnosis and staging of cancer in common domestic animals. These modalities include, but are not limited to radiology, ultrasonography, myelography, computed tomography (CT) and positron emission tomography – computed tomography (PET - CT), magnetic resonance imaging (MRI), nuclear scintigraphy and sentinel lymph node mapping.
 - 2.7. The pathophysiology of organ dysfunction and the principles of systemic disease as relevant to the discipline of oncology in common domestic animals.
 - 2.8. The comparative aspects of veterinary and human oncology.
 - 2.9. The use of laboratory animals in cancer research, including investigation of fundamental cancer biology, and drug discovery and development.
 - 2.10. The common statistical terms used in veterinary journals and be able to interpret common statistical tests used in veterinary oncology.

3. The candidate will have a **basic**¹ knowledge of:
 - 3.1. The aetiology, including but not limited to; physical, chemical, inflammatory and viral carcinogenesis of oncological diseases of production animals, horses and non-domestic vertebrates.
 - 3.2. The pathogenesis of oncological diseases of production animals, horses and non-domestic vertebrates.
 - 3.3. The epidemiology, pathology, diagnosis, treatment and management of oncological diseases of production animals, horses and non-domestic vertebrates
 - 3.4. The aetiology, including but not limited to physical, chemical, inflammatory and viral carcinogenesis of oncological diseases including but not limited to rodents, ferrets and birds.
 - 3.5. The pathogenesis of oncological diseases including but not limited to rodents, ferrets and birds.
 - 3.6. The epidemiology, pathology, diagnosis, treatment and management of oncological diseases including but not limited to rodents, ferrets and birds.
 - 3.7. .The fundamentals and interpretation of histopathology, irrespective of collection method, of tumour types affecting non-domestic animals.
4. The candidate will be able to do the following with **detailed**² expertise:
 - 4.1. Recognise, investigate and evaluate complex oncologic diseases and paraneoplastic syndromes.
 - 4.2. Formulate sound, rational approaches to the clinical management of complex oncologic diseases and paraneoplastic disease conditions.
 - 4.3. Evaluate and incorporate new scientific information relevant to the practice of veterinary oncology.
 - 4.4. Administer cytotoxic chemotherapy with due regard to the safety of the patient, medical personnel and patient caregivers.
 - 4.5. Biopsy multiple tissue types using appropriate techniques including fine needle aspiration and cutting needle core samples, with and without imaging guidance; bone marrow biopsy and aspiration; thoracic, abdominal, and pericardial centesis.
 - 4.6. Communicate effectively with clients, referring veterinarians and peers to provide high-quality care for animals with the most efficient use of resources in a manner that is responsive to the owner's needs and wishes.

² **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.

- 4.7. Advance knowledge in veterinary oncology through clinical innovation, research and publication.
5. The candidate will be able to do the following with **basic**² expertise:
 - 5.1. Endoscopy of the respiratory, alimentary and genitourinary tracts.
 - 5.2. Biopsy tissue whilst performing endoscopy.
 - 5.3. Cerebrospinal fluid collection.

EXAMINATIONS

Refer to the *Fellowship Candidate Handbook*, Section 5. The Fellowship examination has **four separate, autonomous components**:

- 1. Written Paper 1 (Component 1)**
Principles of the Subject (four hours)
- 2. Written Paper 2 (Component 2)**
Applied Aspects of the Subject (four hours)
- 3. Practical Examination (Component 3)**
Practical (two hours)
- 4. Oral Examination (Component 4)**
Oral (two hours)

The written examination will comprise of two separate four-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 answer booklet is permitted. In each paper you are provided with eight (8) questions to answer, worth 30 marks each, giving a total of 240 marks per paper. There is no choice of questions. Questions may be long essay type or a series of small sub-questions. Marks allocated to each question and to each subsection of questions will be clearly indicated on the written paper.

Written Paper 1:

This paper is designed to test the candidate's knowledge of the principles of oncology 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:

This paper is designed to a) test the candidate's ability to apply the principles of oncology to particular cases, problems or tasks and b) test the candidate's familiarity with the current practices and current issues that arise from activities within the discipline of oncology in Australia and New Zealand.

Practical Examination:

The practical examination is designed to test practical aspects of the Learning Outcomes. To pass this examination, candidates must be able to discuss complex case presentations and interpret the results of diagnostic tests. Candidates must demonstrate deep understanding and practical application of equipment used in oncology. Written answers will be required. No perusal time will be given for the practical exam. The practical examination will consist of a series of six (6) questions with sub-questions, equating to a total of 120 marks. Marks allocated to each question and to each sub-section will be clearly indicated on the examination paper. Diagnostic imaging studies (including radiographs, ultrasound images, CT images and MRI images), photographs of cytology and histopathology slides, clinical pathology test results, ECGs and photographs of gross tissue specimens or animals are likely to be used during this examination.

Oral Examination:

The oral examination is designed to test practical aspects of the Learning Outcomes. To pass this examination, the candidate must be capable of justifying their views in a professional and scientific manner, on important and controversial topics in Veterinary Oncology. Candidates may be asked to discuss detailed case material. Six (6) cases are presented with supporting questions asked verbally in a face-to-face setting. The oral examination has a total of 120 marks with each case allocated 20 marks. Diagnostic imaging studies (including radiographs, ultrasound images, CT images and MRI images), photographs of cytology and histopathology slides, clinical pathology test results, ECGs and photographs of gross tissue specimens or animals are likely to be used during this examination.

TRAINING PROGRAMS

Refer to the *Fellowship Candidate Handbook*, Section 3.3.

TRAINING IN RELATED DISCIPLINES

Refer to the *Fellowship Candidate Handbook*, Section 2.4.2.

Candidates for Fellowship in Veterinary Oncology must spend supervised time in each of the related disciplines training as per the following:

- Radiation Therapy (80 hours, two weeks) with a veterinary or human radiation oncologist to participate in and discuss clinical management of patients receiving radiation therapy, radiation planning, dosimetry, and physics related to clinical radiation therapy.
- Diagnostic Imaging - radiology, ultrasonography, CT, MRI and others as available (80 hours, two weeks)
- Small Animal Surgery (80 hours, two week), preferably with a surgical oncologist however a surgeon with a high soft tissue surgical load will be accepted; training must include the surgical management of patients being treated for cancer.
- Small Animal Medicine (80 hours, two weeks) including the medical management of patients with diseases other than cancer that might be encountered during oncology practice
- Diagnostic clinical cytology (40 hours, one week)
- Surgical histopathology (40 hours, one week)
- Elective discipline (candidate to select discipline e.g. molecular oncology, molecular genetics and diagnostics) (80 hours, two weeks)

EXTERNSHIPS

Refer to the *Fellowship Candidate Handbook*, Section 2.4.1.

ACTIVITY LOG SUMMARY

The Candidate must document, within the Activity Log Summary, a minimum of **500** cases over the training period. Cases suitable for inclusion are those where the candidate is the primary clinician performing the majority of the clinical procedures and client communication on the case. Revisit appointments on the same case for the same presenting problem are **not** to be entered separately in the Activity Log Summary. Of the 500 cases, a minimum of 100 cases must be dogs and a minimum of 100 cases must be cats. Candidates must also manage at least 100 cases in each of the following categories for any species;

Round Cell Tumours
Epithelial Tumours
Mesenchymal Tumours

The Activity Log Summary (ALS) should be recorded using the templates in Appendix A.

PUBLICATIONS AND PRESENTATION

Refer to the *Fellowship Candidate Handbook*, Section 2.10

The TRD, externship and presentation proposals and report templates can be found on the College website under [Fellowship – Fellowship Forms](#).

RECOMMENDED READING LIST

The candidate is expected to research the depth and breadth of the knowledge of the discipline. This list is intended to guide the candidate to some core references and source material. The list is not comprehensive and is not intended as an indicator of the content of the examination.

Core Textbooks:³

The following texts are essential to provide a detailed knowledge base in oncology.

1. Small Animal Clinical Oncology. Withrow and Vail, 5th edition, 2013.
2. The Basic Science of Oncology. Tannock, Hill, Bristow and Harrington, 5th edition, 2013
3. Cancer: Principles and Practices of Oncology. DeVita et al, 10th edition, 2014.
4. Cancer Chemotherapy and Biotherapy: Principles and Practice. Chabner and Longo, 5th edition, 2011.
5. The Biology of Cancer. Weinberg, 2nd edition, 2013.

³ **Textbook definitions:**

Core textbook – candidates are expected to own a copy of the textbook and have a detailed knowledge of the contents.

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.

6. Cellular and Molecular Immunology. Abbas, Lichtman and Pillai, 9th edition, 2017.
7. Tumors in Domestic Animals. Meuten (ED), 5th edition, 2016.

Recommended Textbooks:

The following texts have chapters or sections that have more detail and/or different perspectives on important topics that are also found elsewhere.

1. Radiobiology for the radiologist. Hall, 8th edition, 2018.
2. Cancer Management in Small Animal Practice. Henry and Higginbotham, 2009.
3. Feline Oncology. Ogilvie and Moore, 2001.
4. Managing the canine cancer patient. Ogilvie and Moore, 2006.
5. Skin tumours of the dog and cat, Goldschmidt and Shofer. 1992.
6. Diagnostic cytology and haematology of the dog and cat. Cowell, 4th edition, 2013.
7. Veterinary Surgical Oncology. Kudnig and Seguin, 1st edition, 2012.
8. Janeway's Immunobiology. Murphy and Weaver, 9th edition, 2017.
9. Biostatistics- the Bare Essentials. Norman and Streiner 4th edition, 2014.
10. Kirk's Current Veterinary Therapy XV (and previous editions). Bonagura and Twedt, 2013. Particularly oncology sections.
11. Small Animal Clinical Pharmacology. Maddison, Page, Church, 2nd edition, 2008.
12. Textbook of Veterinary Internal Medicine. Ettinger and Feldman, 8th edition, 2017.

Additional Textbooks:

Formulary

1. Veterinary Drug Handbook. Plumb, 7th Edition, 2011

Physiology

2. Ganong's Review of Medical Physiology, 25th edition, 2018.
3. Guyton and Hall Textbook of Medical Physiology, 13th edition, 2015.

Immunology

4. Roitt's Essential Immunology. Roitt, 13th edition, 2017.

Pathology

5. Duncan and Prasse's Veterinary Laboratory Medicine: Clinical Pathology, Latimer, 5th edition, 2011.
6. Schalm's Veterinary Hematology, Feldman, Zinkl and Jain, 6th edition, 2010.
7. In addition, the candidate should have ready access to texts detailing Dermatology, Gastroenterology, Endocrinology, Cardiology, Infectious Diseases, Clinical Pathology, Diagnostic Imaging, Nutrition, Urogenital diseases, Toxicology and Neurology. Choice of text should be discussed with your Supervisor.

Core Journals:⁴

Candidates are expected to have a good working knowledge of the veterinary cancer literature. Publications that contain material not yet available in textbooks are especially important. Each journal listed below should be reviewed for relevant articles from 2006 to the present. Both print and online journal versions should be reviewed (including early view):

1. Veterinary and Comparative Oncology
2. Journal of the American Veterinary Medical Association.
3. American Journal of Veterinary Research.
4. Journal of the American Animal Hospital Association.
5. Journal of Small Animal Practice.
6. Veterinary Pathology
7. Journal of Veterinary Internal Medicine.
8. Veterinary Radiology and Ultrasound
9. Journal of Feline Medicine and Surgery.
10. Australian Veterinary Journal.
11. New Zealand Veterinary Journal.

Recommended Journals

1. Veterinary Surgery
2. Veterinary Clinical Pathology
3. Veterinary Immunology and Immunopathology
4. Veterinary Clinics of North America
5. Research in Veterinary Science
6. The Veterinary Journal
7. Veterinary Clinical Pathology
8. Compendium on Continuing Education for the Practising Veterinarian
9. Topics in Companion animal medicine
10. BMC Veterinary Research
11. Journal of Comparative Pathology

⁴ **Journal definitions:**

Core Journal – candidates are expected to have ready access to either print or electronic versions of the journal and have a detailed knowledge of the published articles in the subject area.

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.

Additional Reading Materials - These are conference proceedings, other non-refereed publications and other journals that would offer some information in the subject area including differing points of view, but are not required reading.

Additional Journals

Candidates are responsible for seeking out articles on veterinary oncology published in the human literature and review articles discussing concepts in cancer biology and general therapeutic strategies. This list is not exhaustive.

1. Nature
2. Cell
3. Science
4. Cancer
5. New England Journal of medicine
6. Clinical Cancer Research
7. Nature reviews: Cancer
8. PLOS one
9. Cancer Research
10. Cancer Chemotherapy and Pharmacology
11. BMC (Biomed Central) Journals
12. Oncogene
13. CA-A Cancer Journal for Clinicians
14. Cancer Research
15. Journal of the National Cancer Institute
16. American Journal of Clinical Oncology
17. Nature Reviews Cancer
18. Nature Reviews Clinical Oncology
19. The Oncologist

Additional Reading Materials:

Veterinary Oncology

Proceedings of the Veterinary Cancer Society

Seminar series at major hospitals and research centres.

Oncology rounds and Morbidity and Mortality seminars at major hospitals.

FURTHER INFORMATION

For further information contact the College Office

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APPENDIX A: (1) Activity Log Summary	Minimum number of cases required	AU G	SEP T	OC T	NO V	DE C	JA N	FE B	MA R	AP R	MA Y	JU N	JU L	Sub- Tota l	Previou s Total	Total to date
Month of the Program																
CATEGORY																
ROUND CELL TUMOURS	100															
Plasma Cell Neoplasm																
Multiple myeloma																
Mast Cell Tumours																
Canine Lymphoma																
Feline Lymphoma																
Epitheliotropic lymphoma																
Leukaemias and Myeloproliferative Disorders																
Transmissible Venereal Tumour																
Histiocytic sarcoma																
Other (list type below)																
Feline																
Canine																
Other																

APPENDIX A: (2) Activity Log Summary Month of the Program	Minimum number of cases required	AU G	SEP T	OC T	NO V	DE C	JA N	FE B	MA R	AP R	MA Y	JU N	JU L	Sub- Tota l	Previou s Total	Total to date
CATEGORY																
EPITHELIAL TUMOURS	100															
Tumours of Skin and Subcutaneous tissue																
Salivary Glands																
Oesophageal																
Exocrine Pancreas																
Hepatic																
Gastric																
Intestinal Tract																
Perianal Tumours																
Nasal																
Larynx and Trachea																
Lung																
Endocrine Pancreas																
Other Endocrine System																
Female Reproductive																
Mammary Gland																
Male Reproductive																
Urinary Tract																
Nervous system																
Thymoma																
Other (list type below)																
Feline																
Canine																
Other																

APPENDIX A: (3) Activity Log Summary	Minimum number of cases required	AU G	SEP T	OCT	NO V	DEC	JAN	FEB	MA R	APR	MA Y	JUN E	JUL Y	Sub- Total	Previous Total	Total to date
Month of the Program																
CATEGORY																
Mesenchymal Tumours	100															
Osteosarcoma																
Other skeletal tumour																
Melanoma																
Haemangiosarcoma																
Soft-tissue sarcoma																
Mesothelioma																
Other (list type below)																
Feline																
Canine																
Other																