



**AUSTRALIAN AND NEW ZEALAND
COLLEGE OF VETERINARY SCIENTISTS**

FELLOWSHIP GUIDELINES

Veterinary Applied Pharmacology (Clinical Pharmacology option)

ELIGIBILITY

1. The candidate shall 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 may be in any discipline.

OBJECTIVES

To demonstrate that the candidate has sufficient training, experience, knowledge and accomplishment in Veterinary Clinical Pharmacology and that may lead to registration as a specialist in this field.

LEARNING OUTCOMES

The candidate is expected to have:

1. Extensive practical experience and accomplishment relevant to Australia or New Zealand and an understanding of Veterinary Clinical Pharmacology on a global basis.
2. Recognition as an authority in the field by veterinary colleagues and by other professional people working in the field.
3. Critically evaluated the current literature and concepts in the field of Veterinary Clinical Pharmacology.

At the completion of training, the candidate should have **detailed**¹ knowledge of:

1. The veterinary clinical pharmacology in each of the following areas:
 - (a) drugs affecting central and peripheral nervous systems with particular reference to pain management and restraint
 - (b) drugs used in the control and management of inflammation
 - (c) hormone agonists and antagonists
 - (d) antimicrobial drugs, antiparasitic drugs, antifungal drugs and antiviral drugs
 - (e) drugs used in the treatment of diseases of each of the following systems -
 - (i) cardiovascular system
 - (ii) gastrointestinal system
 - (iii) urogenital system
 - (iv) respiratory system
 - (v) nervous system
 - (f) drugs used in the treatment of neoplastic disease
 - (g) drugs used to modify behaviour
 - (h) adverse drug reactions and drug interactions in domestic animal species in health and disease
 - (i) modes of drug presentation including novel presentation and delivery systems
 - (j) chemical residue implications and avoidance

A **detailed** knowledge includes, but is not restricted to, an understanding of the mechanism of action of each drug and its modes of presentation as well as its application in the pathophysiological state. The physicochemical characteristics of the drugs, the drug-related effects in various species, the pharmacokinetics and disposition in various species, the therapeutic indications and potential adverse drug effects.

At the completion of training, the candidate should have **sound** knowledge of:

1. The pathophysiology and mechanisms of disease in domestic animal species at a standard sufficient to rationalize drug action and effect.
2. The general pharmacology involved in each of the following areas:
 - (a) drug application in ophthalmology
 - (b) general and local anaesthetics, skeletal muscle relaxants and fluid and electrolyte therapy
 - (c) drugs used topically for the treatment of skin disorders
 - (d) vitamin and mineral supplements
 - (e) drugs used in the treatment of reproductive disorders
 - (f) vaccines

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 core literature.

- (g) toxins
- (h) disinfectants and antiseptics

The candidate should be able to:

1. Predict drug interactions, drug adverse reactions and their treatment
2. Design, implement, analyse and interpret clinical trials
3. Evaluate pharmacotherapeutic protocols in individual animals utilising therapeutic drug monitoring and pharmacokinetics
4. Formulate dose regimens according to the manner of drug presentation based on pharmacokinetic principles and modify such regimes
5. Predict drug withholding times for drugs in food-producing animal species and racing canines and equines
6. Develop strategies for pain avoidance and the use of chemical restraints

Candidates should be able to apply their knowledge from within the context of a case scenario. Candidates should be familiar with current developments and advances in chemotherapy and pharmacotherapeutics through regular reading and previews of the appropriate publications. Candidates are expected to have detailed knowledge of the legal and regulatory aspects of drugs in either Australia or New Zealand (i.e. their own country).

EXAMINATIONS

Refer to the *Fellowship Candidate Handbook*, Section 7.

TRAINING PROGRAMS

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

Candidates for Fellowship in Veterinary Applied Pharmacology (Clinical Pharmacology option) must complete at least two years of supervised training as stipulated by the Blue Book. The supervised training may be in veterinary clinical pharmacology, veterinary pharmacotherapeutics or veterinary chemotherapy.

EXTERNSHIPS

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

TRAINING IN RELATED DISCIPLINES

Refer to the *Fellowship Candidate Handbook*, Section 3.4.2.

Candidates for Fellowship in Veterinary Applied Pharmacology (Clinical Pharmacology option) must spend time as stipulated by the *Fellowship Candidate Handbook* in one or more of the following related disciplines: veterinary industrial pharmacology, veterinary ophthalmology, veterinary anaesthesia and intensive care, veterinary dermatology, animal

nutrition, animal breeding and genetics, veterinary immunology, veterinary vaccinology, veterinary toxicology, veterinary public health and food hygiene.

ACTIVITY LOG AND ACTIVITY LOG SUMMARY

The Activity Log (AL) should be recorded using the format of the example in Appendix 1

The Activity Log Summary (ALS) should be kept using the format of the *Fellowship Candidate Handbook*, Section 8.9 with the exception that the cells of the table show 'Number of Weeks' and not 'Number of Cases'.

Categories for Section 8.6 and 8.9 are as follows:

- Veterinary clinical pharmacology
- Veterinary pharmacotherapeutics
- Veterinary chemotherapy
- Trial design, conduct and data analysis
- Government regulation of veterinary drugs

PUBLICATIONS

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

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 (indicated by an *) and source material. The list is not comprehensive and is not intended as an indicator of the content of the examination.

Veterinary Clinical Pharmacology and Pharmacotherapeutics

* Giguere, S., Prescott, J.F., Baggot, J.D., Walker, R.D. and Dowling, P.M. (eds.) Antimicrobial Therapy in Veterinary Medicine, 4th Edition, Blackwell Publishing, Ames, 2006.

Plumb, D.C. Plumb's Veterinary Drug Handbook, 5th Edition, Blackwell Publishing, Ames, Iowa, 2005.

Maddison, J., Page, S. and Church, D. (eds.) Small Animal Clinical Pharmacology. W.B. Saunders, London, 2002.

Boothe, D.M. Small Animal Clinical Pharmacology and Therapeutics, 1st Edition, W.B. Saunders, Philadelphia, 2001.

* Adams, H.R. Veterinary Pharmacology and Therapeutics, 8th Edition, Iowa State University Press, 2001.

Baggot, J.D. The Physiological Basis of Veterinary Clinical Pharmacology, 1st Edition, Blackwell Publishing, Ames, 2001.

Barragry, T.B. and Powers, T.E. Veterinary Drug Therapy, Lea & Febiger, Philadelphia, 1994.

Brander, G.C., Pugh, D.M., Bywater, R.J. and Jenkins, W.L. Veterinary Applied Pharmacology and Therapeutics, 5th Edition, Bailliere Tindall, London, 1991.

General Pharmacology

Brunton, L., Lazo, J. and Parker, K. (eds.) Goodman and Gilman's The Pharmacological Basis of Therapeutics, 11th ed, McGraw-Hill, New York, 2006.

Katzung, B.G. (ed.) Basic and Clinical Pharmacology, 10th Edition, McGraw-Hill, New York, 2006.

Minneman, K.P. and Wecker, L. (eds.) Brody's Human Pharmacology: Molecular to Clinical, 4th Edition, Mosby, St Louis, 2005.

Carruthers, S.G., Hoffman, B.B., Melmon, K.L. and Nierenberg, D.F. Melmon and Morelli's Clinical Pharmacology: Basic Principles in Therapeutics, 4th Edition, New York, McGraw-Hill, 2000.

Pharmacokinetics

Gabrielsson, J. and Weiner, D. Pharmacokinetic-Pharmacodynamic Data Analysis: Concepts and Applications, 4th Edition, Swedish Pharmaceutical Press, Stockholm, 2006.

Birkett, D.J. Pharmacokinetics Made Easy, Revised, 2nd Edition, McGraw-Hill, Sydney, 2002.

Riviere, J.E. Comparative Pharmacokinetics: Principles, Techniques and Applications, Iowa State University Press, Ames, 1999.

Rowland, M. and Tozer, T.N. Clinical Pharmacokinetics: Concepts and Applications, 3rd Edition, Lippincott Williams and Wilkins, Philadelphia, 1995.

Gibaldi, M. Biopharmaceutics and Clinical Pharmacokinetics, 4th Edition, Lea & Febiger, Philadelphia, 1991.

* Gibaldi, M. and Perrier, D. Pharmacokinetics, 2nd Edition, Marcel Dekker, Inc., New York, 1982.

Veterinary Industrial Pharmacology

* Hardee, G.E. and Baggot, J.D. (eds.) Development and Formulation of Veterinary Dosage Forms, 2nd Edition, Marcel Dekker, Inc., New York, 1998.

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Drug Delivery

* Rathbone, M.J. and Gurney, R. (eds.) Controlled Release Veterinary Drug Delivery: Biological and Pharmaceutical Considerations, Elsevier, Amsterdam, 2000.

Veterinary Parasitology

* Holdsworth, P.A. (ed.) Ectoparasiticide use in contemporary Australian livestock production, Avcare Limited, Canberra, 2005.

Boray, J., Martin, P. & Rousch (eds.) Resistance of parasites to antiparasitic drugs, VIIth International Congress of Parasitology, Paris (MSD Agvet), 1990.

Charleston, W.A.G. (ed.) Ectoparasiticides of sheep in New Zealand and their control, N.Z.V.A. Sheep and Beef Cattle Society, 1985.

Clinical Trials

Spilker, B. Guide to Clinical Trials, 1st Edition, Lippincott Williams & Wilkins, Philadelphia, 1991.

Friedman, L.M., Furberg, C.D., DeMets, D.L. Fundamentals of Clinical Trials, 3rd Edition, Springer-Verlag, New York, 1998.

Biostatistics

Bolton, S. and Bon, C. Pharmaceutical Statistics. Practical and Clinical Applications, 4th Edition, Marcel Dekker, Inc., New York, 2004.

Redmond, C.K. and Colton, T. (eds.) Biostatistics in Clinical Trials, John Wiley & Sons, Inc., Chichester, 2001.

Pharmacoepidemiology

Strom, B.L. (ed.) Pharmacoepidemiology, 4th Edition, Wiley, Hoeoken, New Jersey, 2005.

Pathophysiology

Slauson, D.O. and Cooper, B.J. Mechanisms of Disease: A Textbook of Comparative General Pathology, 3rd Edition, Mosby, St Louis, 2002.

Veterinary Medicine

Ettinger, S.J. and Feldman, E.C. (eds.) Textbook of Veterinary Internal Medicine: Diseases of the Dog and Cat, Volumes I and II, 6th Edition. W.B. Saunders, Philadelphia, 2005.

Smith, B.P. Large Animal Internal Medicine, 3rd Edition, Mosby, St. Louis, 2002.

Current Veterinary Therapy

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Kirk – Small Animal Practice
Robinson – Equine Practice
Howard – Food Animal Practice
Morrow - Theriogenology

Government Regulation

Documents and guidelines accessible from <http://www.apvma.gov.au>

Other Sources

Proceedings No. 103, Post-Graduate Committee in Veterinary Science, University of Sydney, “Veterinary Clinical Toxicology”, August 1987.

Proceedings No. 198, Post-Graduate Committee in Veterinary Science, University of Sydney, “Pharmacological Bases of Veterinary Therapeutics”, June/July 1992.

Publication No. 7/92 Murdoch University Foundation for Continuing Veterinary Education, “Pharmacology”, October 1992.

Journals

Journal of Veterinary Pharmacology and Therapeutics
Veterinary Record
Australian Veterinary Journal
New Zealand Veterinary Journal
Journal of the American Veterinary Medical Association
American Journal of Veterinary Research
Journal of Parasitology

FURTHER INFORMATION

For further information contact the College Office

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Appendix 1: Subject-specific Activity Log Template.

(Provide key for all abbreviations used eg PS = Principal Supervisor; BUS = Back-up Supervisor; PSE = Primary Supervisor for Externship; ASE = Adjunct Supervisor for Externship; PS TRD = Primary Supervisor for Training in a Related Discipline etc).

Category	Training facility	Training period	Supervisor	Activity Outcome*	Initials of Supervisor
Veterinary clinical pharmacology	University 1	Start / finish dates	PS	Trained in drug interactions, drug adverse reactions and their treatment	
Veterinary pharmacotherapeutics	University 1	Start / finish dates	BUS	Trained in evaluating therapeutic protocols in individual animals utilizing therapeutic drug monitoring and pharmacokinetics	
Trial design, conduct & data analysis	Institution 1	Start / finish dates	ASE	Trained in trialing a generic veterinary drug	
Government regulation of veterinary drugs	APVMA	Start / finish dates	PSE	Trained in pre-market approval assessments of veterinary drugs and pharmacovigilance	

*A comprehensive report has been prepared on each of the training outcomes listed and is available for assessment on request.