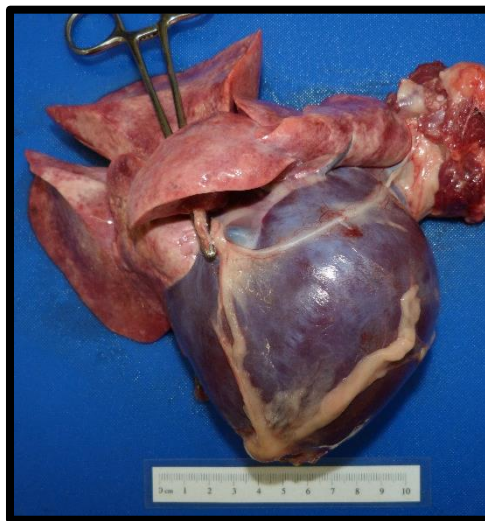


Certificate in Advanced Veterinary Practice
**C-VC.1 Cardiovascular Anatomy, Physiology and
Pathology**

Module Syllabus



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American Specialist in Veterinary Cardiology

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Learning outcomes

You will be expected to demonstrate an understanding of the relevance and application of this basic science in anatomy, physiology and pathology in relation to cardiovascular medicine and surgery in veterinary practice.

This module is intended to cover the anatomy, physiology and general pathology of the cardiovascular and respiratory systems, with application to all major species of veterinary concern. The majority of the assessment will be focused on the anatomy, physiology and pathology of the cardiovascular system. The practical application of theoretical knowledge to clinical practice, pharmacology and comparative medicine will be emphasised.

For a designated Certificate in Advanced Veterinary Practice (Veterinary Cardiology) you must complete this module, module C-VC.2 (Cardiovascular Diagnostics), module C-VC.3 (Cardiovascular Therapeutics), a fourth 10 credit module of your choice and an RCVS synoptic assessment.

Learning topics

On successfully completing this module, you would be expected to have knowledge of, and understand the clinical relevance of:

Anatomy:

- The gross anatomy of the mammalian heart, pericardium and great vessels
- The microscopic anatomy of the myocardium and the myocyte
- The cardiac pacemaker, conduction system and autonomic nerves supplying the heart.
- The gross anatomy of the upper and lower respiratory tract including the nasal chambers, nasopharynx, larynx, trachea, bronchi, alveoli, thoracic cavity, pulmonary parenchyma and pulmonary vessels.
- The organisation of the circulation in before birth and the changes that occur after birth.
- Characteristic congenital abnormalities of the heart and circulation such as patent ductus arteriosus, pulmonic stenosis, ventricular septal defect, aortic stenosis, vascular 'ring' abnormalities and Tetralogy of Fallot.

- Familiarity with congenital abnormalities which are common in certain species and certain breeds.
- Comparative anatomy covering species of major veterinary interest, including cats, dogs, horses and ruminants.

Physiology:

- The cardiac cycle
- Myocardial function
- Impulse conduction
- Vascular microanatomy and physiology
- Central/neural control of the heart and circulation
- Blood pressure control
- Cardiovascular response to exercise
- Cardiovascular effects of trauma
- The anatomy and physiology of the pericardium
- Anaesthesia and the cardiovascular system
- Fluid balance
- Pregnancy
- Age and the cardiovascular system
- The physiology of the airways
- Gas exchange in the lungs
- Blood gases and acid-base balance
- Electrolyte physiology and the circulation
- Integrative physiology: CNS, CVS, respiratory and renal function

Pathology:

- Shock and circulatory failure
- Blood clotting and clotting defects
- Hypertension and hypotension
- Heart failure
- Arteriosclerosis and atherosclerosis
- Tachycardia and bradycardia
- Pre-load and afterload
- Valvular incompetence
- Dilated cardiomyopathy

- Hypertrophic cardiomyopathy
- Neoplasia and the heart
- Pericardial disease
- Comparative aspects of cardiovascular disease
- Rhinitis, nasal and nasopharyngeal disease
- Laryngeal, tracheal and bronchial diseases
- Asthma, COPD and small airway diseases
- Pulmonary parasitology
- Pneumonia
- Respiratory failure
- Disorders of the pleural space / thorax
- Systemic disease and the CVS / respiratory system
- Comparative pathology of the CVS and respiratory systems

Enrolment advice

Before embarking on this module, you should fulfil the following criteria:

- a) You should have completed module B-SAP.1.
- b) If you are only enrolling for the cardiology C modules with RVC, it is **highly recommended** that you write one report from module B-SAP.1. This will be reviewed by the assessors prior to assessment of any C module work in order to assist with transition to the CertAVP. If you have completed the B-SAP.1 module at another institution, a B-SAP.1 report may be submitted for feedback.
- c) It is your responsibility to ensure that you have access to sufficient cases to produce adequate material for the module.

Coverage of this module may be integrated with others, particularly other B and C modules. You will normally have completed A-FAVP.1 Foundations of Advanced Veterinary Practice module, and at least one of the practice B modules, before undertaking a C module, although you can choose to work through modules in a different order if you wish. In whichever order modules are tackled, compliance with best practice for all the topics covered by module A-FAVP.1 will be expected whenever these are appropriate in C modules. For example, awareness of, and compliance with, all relevant legislation, welfare and ethical principles will be required throughout.

Before embarking on any module, you are advised to plan a structured programme of continuing professional development to help you achieve your objectives. Involvement in 'learning sets' and networks of other candidates working towards the same or similar modules is encouraged; this should be initiated by the candidates themselves via RVC Learn. The RCVS considers that you will need advisers/mentors to support you through the programme; you are free to choose your own advisers/mentors.

Assessment

- One case report can be submitted for review prior to being marked. This is only permitted once per candidate per discipline.
- Six case reports (1,200 words per report) and you are recommended to keep your case description short (<400 words) and focus on the case discussion.
- A 1,000 word synopsis of what you have learned about cardiovascular anatomy / physiology / pathology during your course of study and how this impacts on your veterinary practice.
- A 90 minute examination to consist of short answer questions and/or spot tests. This will include theoretical knowledge as well as interpretation of gross pathology images.

Assessment weighting

- | | |
|------------------------|-----|
| • 6 x Case Reports | 40% |
| • 1 x Reflective Essay | 20% |
| • 1 x Exam | 40% |

Annual assessment timetable

Early October	'Student check in' – online Teams call with the CertAVP team and other students
11th December	You are given the opportunity to have one case report per discipline reviewed prior to marking (therefore only one for all C-VC modules). Please submit your report by this date if you haven't already had a review.
19th January	Case report feedback returned to you
Late January	'Student check in' – online Teams call with the CertAVP team and other students
1st March	Case reports and synopsis to be submitted
1st May	You will be notified of your results
Late May	'Student check in' – online Teams call with the CertAVP team and other students
Mid July	Formal examination to be held in July - date to be confirmed
Early September	You will be notified of your results

You are strongly advised to have a supervisor with which you can discuss cases. Ideal supervisors would have post-graduate qualifications in your area of interest. The module leader will not be discussing case management with any candidate.

Learning support

Learning support is provided to aid self-directed learning and to provide easy access to published articles. You will be given a username and password which will allow you to log on to 4 different systems:

- **RVC Learn (<http://learn.rvc.ac.uk/>)**

- Articles on cognitive learning behaviours
- Articles on cardiovascular disease in veterinary species
- Access to discussion forums that are used by all CertAVP candidates as well as RVC tutors. The forums can be used to discuss any topic relevant to the CertAVP cardiology C modules or simply to find out who else is out there!
- Access to a webinar which contains guidance on preparing written work for the cardiology C modules
- Access to the RVC online library. This is invaluable when researching literature for writing up case reports. This means that (with rare exception) all journal articles that you want to view can be downloaded to your PC with a few mouse clicks. This includes original research articles as well as review articles and case reports. IT and Library support is available for this facility (email library@rvc.ac.uk or helpdesk@rvc.ac.uk).
- There are also several CPD courses run each year at the RVC that support some of the learning outcomes for C-VC modules. CertAVP candidates receive a 20% discount on RVC CPD courses – please contact the CertAVP office for further details.

- **RVC Intranet (<https://intranet.rvc.ac.uk>)**

Access to all information available to all RVC students and employees, for example, news, events, policies, committees, services, Library, IT helpdesk, etc.

- **Athens (<http://www.openathens.net/>)**

A huge amount of any library's information is now available online, e.g. electronic journals, e-books and databases. 'Athens' is a system used by UK universities for controlling access to these type of online services and with your username and password, you can access many of a library's online databases, electronic journals and e-books seamlessly.

- **Webmail (<https://webmail.rvc.ac.uk>)**

You are given an RVC email address, which is **compulsory** to use for CertAVP communication and submission of work.

Case report guidelines

The following framework should be used as a guide to the structure of a case report:

- Identification of patient
- Case summary (recommended length 400 words), including:
 - Summary of case presentation
 - Summary of diagnostic findings
 - Final diagnosis
 - Management
- Discussion (recommended length 800 words) exclusively about anatomy / physiology / pathology
- References; please use the style of the Journal of Small Animal Practice

The discussion should focus on features of the case that stimulated learning about cardiovascular anatomy / physiology / pathology. For example, a candidate may wish to describe a congenital cardiac lesion in terms of its embryological anatomy. You may benefit from the use of diagrams (original, can be hand drawn) as required to illustrate answers. Marks are not awarded for discussion relating to diagnosis or treatment *except* where it is directly related to cardiovascular anatomy, physiology or pathology. A range of congenital and acquired diseases should be included among the six cases and two (or more) species should be included among the six cases.

Case reports are intended to be written at Master's degree level. It can be challenging to include the level of detail required to reach this level within the word limit provided. However, concise scientific writing is one of the skills necessary to work to this level.

A few tips:

- Avoid repeating information; however relevant it is, marks can only be awarded for a particular piece of information once
- Avoid including information in the discussion that is not relevant to the learning objectives of the module
- Avoid the temptation to select cases that are too complicated to adequately discuss in 1,200 words

Note that cases selected do not need to represent ideal or perfect management, and frequently well-written reports highlight where things went wrong or how they could have

been done differently. It should be borne in mind that patient safety, however, is paramount. Discussion of how management could be improved if alternative equipment, etc, was available, or if costs allowed additional testing often provides a valuable component of the case report. This should be explained in the context of how it would be helpful, rather than listing all the additional equipment/drugs etc that would be used in a different setting. Case reports should be written in the third person in a style suitable for publication in a Journal (for example Journal of Small Animal Practice). You are expected to demonstrate a high standard of literacy and please ensure that any spelling and grammatical errors have been corrected – not doing so will result in a negative effect on your final mark.

The word limit is 1,200 words per report. Tables, figure legends, appendices and reference list are NOT included in the word count. The report title and titles within the report ARE included. You should not put important information, such as the physical examination, into a table to avoid the word count; only numerical data should appear within a table (such as laboratory results). In the interests of fairness to all candidates the word count is adhered to strictly and reports that exceed it will be returned unmarked.

Reflective synopsis guidelines

The synopsis might include what has changed in your understanding of a specific case or a specific condition that they have seen, how this may have influenced your management of a case and any additional reading that was helpful. You are encouraged to discuss how your new understanding will influence decision making in the future. You may also wish to make comparisons of how your self-directed understanding of cardiovascular anatomy / physiology / pathology may help the management of a case or condition compared to other methods of learning that direct practice, including but not limited to experiential learning, peer-to-peer learning, taught courses, or evidence-based medicine.

You will probably find it easier to write your reflective synopsis after you have finished your case reports. You must stay within the word limit given or the work will be returned unmarked.

Examination

The exam paper for C-VC.1 is short answer questions and/or spot tests, to include theoretical knowledge as well as interpretation of gross pathology images.

It is a 90 minute exam and each question will show the mark assigned. Sample exam questions are available on Learn and you are encouraged to work through the samples as part of your exam preparation.

The RVC Study Skills team is available to assist with any revision techniques.

Instructions for submitting work

Each piece of work you submit must be anonymous and please ensure that your work includes this table on the front page:

Student number:	
Module:	C-VC.1
Piece of work:	<i>case report 1, case report 2 etc</i>
Word count:	

Contact the CertAVP office if you need a reminder of your student number (found on your Rover email when you first enrolled). All work is submitted online via Learn; you will be given further instructions when you enrol.

The content of case reports must also be anonymous, e.g., removing practice details from discharge notes or laboratory reports.

References should be properly cited in the text, in accordance with the style in the Journal of Small Animal Practice (JSAP). Do not list references that were not cited in the text or vice versa. We recommend using Harvard referencing and you will find it very helpful to use a program such as Endnote® or Reference manager® to organise your references.

You may include appendices but please note that the examiners are not obliged to read them (so please do not include essential case information; omitting this from the body of the case report will affect your mark). Laboratory reports may be included here but all abnormalities need to be written in the text and reference ranges must be included. It is acceptable to scan printed reports rather than re-type them if you prefer, but any case details or details of your name or practice must be blanked out.

All written work submitted to the Royal Veterinary College is passed through plagiarism detection software. Work submitted for this module should not have been submitted for any other courses at RVC or other institutions.

Suggested reading

The following list is given as a guide as to where to start and for this reason cannot be considered 'complete'. We also don't expect candidates to read texts from cover to cover or to use all of the texts listed, however we do recommend you make use of the most recent edition of textbooks where available. We apologise if candidates feel a particular favourite is missing - feel free to use the Learn discussion board to pass on additional suggestions to other candidates.

Essential reading:

- Manual of Canine and Feline Cardiology. *Eds:* LP Tilley, FWK Smith Jr, M Oyama, MM Sleeper. 2015, Elsevier Ltd, London.
- Stephenson RB. (2013) Section III: Cardiovascular Physiology. In: Cunningham's Textbook of Veterinary Physiology. *Ed:* BG Klein. Saunders Elsevier, St Louis.

General cardiology:

- Feline Cardiology. *Eds:* E Côté, KA MacDonald, KM Meurs KM, MM Sleeper. 2011, Wiley Blackwell, Chichester.
- Topics in Cardiology. An Issue of Veterinary Clinics: Small Animal Practice (The Clinics: Veterinary Medicine). Volume 47, Issue 5, pp 955-1122 September 2017. *Ed:* João S. Orvalho. TheClinics.com
- Robinson R and Borgeat K (2016). Cardiovascular Disease, Ch21 in Duke-Novaskovski T, de Vries M, Seymour C (Eds), BSAVA Manual of Canine and Feline Analgesia and Anaesthesia, BSAVA Publishing, Gloucestershire, UK.
- BSAVA Manual of Canine and Feline Cardiorespiratory Medicine. *Eds:* V Luis Fuentes, LR Johnson, S Dennis. 2010, BSAVA, Gloucester.
- Cardiovascular Disease in Small Animal Medicine. *Ed:* WA Ware. 2007, Manson Publishing Ltd, London.
- Cardiology of the Horse. *Eds:* C Marr, M Bowen. 2010, Elsevier Ltd, London.
- Cardiology. An Issue of Veterinary Clinics: Exotic Animal Practice (The Clinics: Veterinary Medicine). Volume 12, Number 1, Feb 2009. *Ed:* JJ Heatley. TheClinics.com

Cardiovascular physiology:

- Hall, J. E. (2020). Unit I: Introduction to Physiology: The Cell and General Physiology. In: *Guyton and hall textbook of medical physiology* (14th ed.). W B Saunders.

- Hall, J. E. (2020). Unit II: Membrane Physiology, Nerve, and Muscle. In: *Guyton and hall textbook of medical physiology* (14th ed.). W B Saunders.
- Hall, J. E. (2020). Unit III: The Heart. In: *Guyton and hall textbook of medical physiology* (14th ed.). W B Saunders.
- Hall, J. E. (2020). Unit IV: The Circulation. In: *Guyton and hall textbook of medical physiology* (14th ed.). W B Saunders.
- Hall, J. E. (2020). Unit V: The Body Fluids and Kidneys. In: *Guyton and hall textbook of medical physiology* (14th ed.). W B Saunders.
- Cardiovascular Physiology. Eds: AJ Pappano, WG Wier. 2013, Elsevier Mosby, Philadelphia.
- An Introduction to Cardiovascular Physiology. Ed: JR Levick. 2009, Hodder Arnold, London.

Cardiovascular electrophysiology:

- Santilli, R., Moïse, S., Pariaut, R. and Perego, M., 2019, June. Electrocardiography of the dog and cat.: Diagnosis of arrhythmias. Edra.
- Willis, R., Oliveira, P. and Mavropoulou, A. eds., 2018. *Guide to canine and feline electrocardiography*. John Wiley & Sons.