

## **Academic Module Descriptions**

### **Term 1**

#### **Advanced Skeletal Pathobiology**

The purpose of the course is to introduce students to a broad range of skeletal tissues. This will touch on the anatomy, physiology and functional failure and on occasion include comparative aspects of the skeletal system across species. Throughout the course, examples of skeletal pathobiology will be used to emphasize specific aspects of skeletal function.

*(Half Module, 15 UK Credits Thursday)*

**Pre-requisites:** Basic anatomy

#### **Comparative Animal Locomotion**

The purpose of the course is to introduce students to comparative aspects of the musculo-skeletal system and modes of locomotion. Throughout the course, examples will be drawn across the animal kingdom, so students will gain an appreciation for the diversity of different movement strategies. The course also has three unifying vertical themes that run through the course which are:

1. Effect of animal size on its musculoskeletal design (scaling).
2. Optimization of the musculoskeletal system for locomotor economy.
3. Constraints on optimization because of tradeoffs and phylogenetic baggage.

*(Full Module, 30 UK Credits, Monday/Friday)*

**Pre-requisites:** none

#### **Parasitology of Human & Veterinary Tropical Diseases**

This module provides an understanding of the complex co-evolutionary relationships between parasites and their hosts. In addition it will illustrate, by experimental research examples, the ways in which the study of parasitic organisms have provided fundamental insight into molecular biology, immunology, pathology, cell biology and epidemiology.

*(Half Module, 15 UK Credits, Monday)*

**Pre-requisites:** Basic parasitology

#### **Practical Investigative Biology**

This module has been designed to deliver an intense training course in cell and molecular biology, with a view to equipping students with the practical and design skills required to undertake research in areas of molecular biology. The two week module involves the completion of a 'mini-project', whereby the student will generate a plasmid DNA construct, amplify this in bacteria, purify and analyse the resulting DNA, then transiently express this gene in a eukaryotic cell line before analyzing the effects of its expression by cell imaging techniques (confocal microscopy and FACS). The learning environment is critical to the success of this module, and students will be closely supervised, with a staff: student of approximately 1:3 throughout the module.

*(Half Module, 15 Credits, last 3 weeks in Sept.)*

**Pre-requisites:** none

#### **Endocrine & Metabolic Syndromes**

This module provides a firm basis in the components of the mammalian endocrine system, and the mechanisms of action of different types of hormones. We will seek to integrate the basic science of endocrinology into more translational topics relating to the diseases and syndromes associated with disorders of endocrinology and metabolism. Having taught the concepts of endocrine signalling, the following units of study will focus specifically on clinical abnormalities affecting blood glucose regulation and feeding, growth and metabolism, endocrine-related cancers, and reproductive disorders including those affecting sex differentiation and intersex. In every unit, we will stress the importance of endocrine research in establishing the molecular and physiological basis of these conditions.

*(Half Module, 15 Credits, Friday)*

**Pre-requisites:** Basic cell biology

### **Genetics in action**

This module is designed to show you how genetics is used by different organisations and groups to improve the health and productivity of livestock, horses and domesticated animals. The approach taken in this module is to learn about genetic methods which are used in practice by discussions with practitioners and researchers about what happens in their particular sector. In order to understand their methods it is important to have a grounding in the terminology and methodology that they use. The first part of the course will explore these methods through lectures and various readings. Reinforcement of these ideas will take place through a series of journal clubs and paper critique sessions. The emphasis will be on you actively learning about the subject by reading around the topics outlined in lectures. The relevant texts are available in the library and will be available on-line week by week.

*(Half Module, 15 UK Credits, Tuesday)*

**Pre-requisites:** Basic Genetics

### **Development and Disease**

The nervous system is by far the most complex tissue in any animal. By understanding the molecular and cellular basis of nervous system development, we aim to understand how changes in these processes result in developmental defects – both morphological and function. For example, significant change in the morphology of the brain can be seen in conditions such as holoprosencephaly whereas functional changes are seen in autism and schizophrenia. This module will give insight into the latest research in nervous system development, will give you the opportunity to develop your understanding of how researchers employ animal models in this research and inform you of the latest applications of developmental biology research, including the use of stem cells and molecular editing techniques.

*(Half Module, 15 Credits, Tuesday)*

**Pre-requisites:** none

### **Advanced Concepts in Reproduction**

This advanced module is designed to build upon the knowledge of Reproduction. It concentrates on the veterinary applications of research in these two exciting fields and highlights how they make a real impact on animal health and welfare. Students will learn cellular and molecular aspects of reproductive biology from gonadal development and function to ovulation, fertilization and embryo and germ cells development, and establishment and maintenance of pregnancy and placental immunology in animals.

*(Half Module, 15 Credits, Thursday)*

**Pre-requisites:** Basic Reproduction

## **Term 2**

### **Infection & Immunity**

The overall purpose of the course is to introduce students to key aspects that need to be considered when defining and controlling infectious diseases in individual animals and animal populations, using examples from virology, bacteriology and parasitology. Students should then be able to apply similar principles to additional pathogens of both animals and man.

*(Full Module, 30 UK Credits Monday/Tuesday)*

**Pre-requisites:** Basic microbiology, basic immunology

### **Wild Animal Biology**

The module will provide an introduction for students to important topics in conservation as well as reviewing the basic anatomy and physiology of the non-captive animals. The module introduces the principle that decision-making (in conservation) needs to be based on science and ethics, and thus prepares students for postgraduate education in the field of zoo/wild animals.

*(Half Module, 15 UK Credits, Tuesday)*

**Pre-requisites:** none

### **Comparative Models of Disease**

The role of animal models in the understanding of human and animal physiology and in the treatment of infectious diseases is controversial. Modern society is increasingly re-evaluating the value of animal life and as a consequence questioning the use of animal disease models. In this module students will be introduced into the rationale behind use of animal models and the increasing number of alternatives, including cells, zebra fish and drosophila. The students will be introduced to the key aspects that need to be considered when developing/analysing models of disease. The uses and limitations of comparative models of disease will be discussed. The module entails analysis of comparative models of infectious diseases, genetic diseases, neurodegenerative diseases and neoplasia. The course will also examine models of lifestyle diseases including obesity, cardiovascular and metabolic diseases. The use of animal models in the development of new therapies and the production of research tools will be discussed.

*(Full Module, 30 Credits, Monday and Tuesday)*

**Pre-requisites:** none

### **Epidemiology: The Bigger Picture**

If you want to discover more about how diseases affect animal (and human!) populations, and how to select the best ways to try to control diseases, then this half-module is for you!

*What is this module all about?*

- Discovering the patterns, causes, and effects of diseases in animal populations
- The key concepts of epidemiology taught in a structured way
- A broad range of examples are used to help you understand the subject
- Topics include research methods, economics, One Health, strategies for disease control, and more!
- Case studies of pets, livestock, horses and wildlife will show you how to apply what you learn in the real world
- Develops knowledge of epidemiology and statistics

*(Half Module, 15 Credits, Friday)*

**Pre-requisites:** none

### **Both Terms**

#### **Animal Behaviour & Welfare**

The Module will provide training in Animal Behaviour and Welfare Science. The student will become familiar with the principles of these subjects, and will develop an understanding of how animals respond to different situations. The Module will encompass domesticated and undomesticated animal behaviour and welfare, but a major emphasis will be on companion animals and livestock species.

*(Full Module, Tuesday Terms 1& 2)*

**Pre-requisites:** none