

VETERINARY & BIOMEDICAL SCIENCE (VBMS)

VBMS 6020 Histological Basis of Pathology

This course covers microscopic anatomy of tissues and organ systems of mammals important in veterinary medicine, e.g. dog, cat, mouse, rat, horse and cow. The central thread in the course is light microscopic structure as observed in standard stains, but this picture is amplified by electron microscopy, special stains and histochemistry. The material is presented, through lecture and laboratory, from the point of view of experimental biology, cell function, and disease. The course reveals that the structure or histology of the tissues of an animal's body is not an arbitrary assemblage of cells but rather the structural expression of the diverse cell types that interact to carry out the functions of the body. Thus, through the microscopic study of the structure of tissues (histology) the functions of the tissues of the body may be inferred.

5 Credit Hours

VBMS 6030 Developmental Biology

The course examines classic and modern concepts in embryonic development as they relate to veterinary medicine. The lectures are designed to cover recent advances in the field with special emphasis on stem cells, specification of cell fate, manipulation of the genome and organogenesis. Examples of pathologies associated with aberrant development of major organ systems will be presented and discussed in the context of veterinary medicine.

3 Credit Hours

VBMS 6040 Introduction to the Neurosciences

This is an introductory course to the neurosciences and assumes a basic background in anatomy, cell biology, histology and biochemistry. At the cell/molecular level the course covers neurocytology, membrane bioelectrical events and their channel protein basis, neurotransmitters and their actions at the synapse. It also covers aspects of neurochemistry, neuropharmacology and focuses on neuroanatomy and function of neural systems. The latter include the somatic and autonomic components of the peripheral nervous system, the spinal cord and reflexes, primary sensory systems, motor pathways and limbic-visceral systems of the brain.

5 Credit Hours

VBMS 6050 Cellular and Biochemical Foundation of Disease

This course teaches the principles of biological chemistry as applied to metabolic relationships underlying cellular and physiological processes and the molecular mechanisms of disease. The first third of the course covers the basic biochemistry of amino acids, proteins (e.g., enzymes), nucleic acids, vitamins and coenzymes, carbohydrates and lipids. Normal as well as disease-related pathways for the processing of these biological materials are discussed. Species differences in metabolic pathways and clinical relevance are pointed out, wherever pertinent. The latter part of the course includes discussions of molecular genetics, and the physiological-biochemical functioning and regulation of cellular structures, tissues and organs: membranes, endocrine glands and hormones, blood, bone and connective tissue, liver, muscle, etc. Diseases specific to these structures are discussed in the context of veterinary medicine. Also included are such topics as prostaglandins, biochemistry of growth regulation, vision, taste, cell cycle and cancer. Laboratories include clinically relevant problem-based and library research projects that relate biochemistry to veterinary medicine, and identification of reproductive and endocrine conditions by diagnostic problem solving using student generated biochemical data.

10 Credit Hours

VBMS 6060 Animal Physiology

A strong training in animal physiology is crucial for veterinary education. Extensive and profound knowledge of normal processes that maintain animal life and enable animals to cope with a changing environment provides the crucial foundation for the understanding of breakdowns in homeostasis and disease states, and of key principles underlying diagnostics and treatment of animal diseases. The course provides a brief review of relevant molecular and cell biology concepts that enhance the comprehension of physiology (including metabolism, cell membrane permeability, bioelectric potentials, active transport, etc.) and a detailed study of the functional processes in the circulatory, respiratory, digestive, endocrine, muscular, renal and reproductive systems. This course primarily focuses on normal physiologic mechanisms in mammals yet includes comparative physiology material pertinent to other vertebrates of veterinary interest. Furthermore, pathophysiological alterations of normal function and physiological principles of diagnostics and therapy are amply illustrated by clinical case examples.

10 Credit Hours

VBMS 6070 Pharmacology & Toxicology

The major objective of this course is to help veterinary students learn the principles of pharmacokinetics, the mechanisms of drug action, the sites at which drugs act, and how drugs may interact with, and alter the activity of, various organ systems. The material will also include properties, mechanisms of action, and biological effects of various chemical substances (drugs, environmental pollutants, toxins of plant origin, etc.) that interfere with normal cell and organ function. The course is intended to deal chiefly with basic Pharmacology and Toxicology rather than clinical therapeutics, although some therapeutics and clinical material will be discussed in relevant areas.

10 Credit Hours