MÉDECINE CELLULAIRE ET MOLÉCULAIRE (CMM)

Les cours suivants sont offerts par la Faculté de médecine.

CMM 3350 Principles of Neurobiology (3 units)
The structure and function of the nervous system with emphasis on mammalian systems but with reference to non-mammalian groups. Neuronal excitability/neurotransmission; sensory and motor systems; mechanisms of learning and memory; development and regeneration in the nervous system.
Course Component: Lecture
Prerequisite: BIO1140. Previously CMM 4350. The courses BIO3350 and CMM3350 cannot be combined for credits.

CMM 3750 Principes de neurobiologie (3 crédits)
La structure et la fonction du système nerveux en mettant l'accent sur les systèmes mammifères, mais en se référant à des groupes non-mammifères. Excitabilité neuronale / neurotransmission; systèmes sensoriels et moteurs; mécanismes d'apprentissage et de mémoire; développement et régénération dans le système nerveux.
Volet : Cours magistral
Préalable : BIO1540. Antérieurement CMM 4350. Les cours BIO3750 et CMM3750 ne peuvent pas être combinés pour l'obtention de credits.

CMM 4360 The Dynamical Brain: Experimental and Computational Approaches to Neural Networks (3 units)
An advanced course that covers brain function at multiple spatial and temporal scales ranging from the single neuron and the brief millisecond actions of its ion channels to spatially extended neural networks linked by synaptic interactions and acting over seconds to days. Connections from neural network activity to behaviourally evident outcomes, e.g. perception, motor control and memory storage, will be discussed. Focus will be on the normal functioning of the nervous system with some exploration of how disruptions of neural function can lead to neurological and psychiatric diseases. Modern neuroscience methods, including mathematical approaches to quantifying neuronal activity, will be emphasized.
Course Component: Lecture
Prerequisite: BIO 3350 or CMM 3350 or TMM 3106.

CMM 5001 The Pathological Basis of Disease (3 crédits / 3 units)
Introductory course for non-medical graduate students in Life Sciences. This course will consist of a brief introduction to pathology describing the manifestation of disease at the macroscopic and microscopic level. This will be followed by (i) a description of various types of microscopy and methodology; (ii) concepts in flow cytometry, tissue/cell fractionation; (iii) histo-/cytochemistry and immunohisto-/cytochemistry; (iv) normal cells and tissues; (v) organs; (vi) the general pathology of cells and tissues including hypertrophy, aplasia, atrophy, hyperplasia, metaplasia, dysplasia, neoplasia, storage diseases, extracellular space pathologies, necrosis and apoptosis. Blood vessel and cardiac pathologies will be covered as well as concepts in neuropathology, organ/system specific pathologies and genetic diseases.
Volet / Course Component: Cours magistral / Lecture

CMM 5105 Introduction to Cancer Biology (3 units)
An introduction to the biology of cancer. Major topics in cancer biology include the following: tumor suppression/oncogenes; apoptosis in cancer; cell immortalization and senesence; genomic instability; multistep tumorigenesis/inflammation in cancer; biology of angiogenesis; rational therapies.
Course Component: Lecture

CMM 5111 Computational Cell Biology (3 units)
Emphasis is on providing students with the background knowledge and the tools needed to develop and analyze models of cellular processes. Topics include modelling enzyme kinetics, signal transduction pathways, and gene regulatory networks, using differential equations, nonlinear dynamics, and stochastic processes.
Course Component: Lecture
Permission of the Department is required.

CMM 5210 Mammalian Physiology (6 units)
Course Component: Lecture

CMM 5302 Comprehensive Pharmacology I (3 units)
Extensive coverage of pharmacodynamics, pharmacokinetics, and the pharmacology of the autonomic and central nervous system. Courses CMM 5301, CMM 5302 cannot be combined for units.
Course Component: Lecture

CMM 5303 Comprehensive Pharmacology II (3 units)
Extensive coverage of the pharmacology of antibiotic and anti-inflammatory drugs, of chemotherapeutic agents, and of the cardiovascular and gastro-intestinal systems. Courses CMM 5301, CMM 5303 cannot be combined for units.
Course Component: Lecture

CMM 5304 Introduction to Developmental Biology (3 units)
Concepts in development and signalling pathways during development including formation of the germ layers; establishment of the body axis and principles of segmentation; patterning and homeobox genes; neurogenesis; axonal and neuronal guidance; stem cell concepts; germ cells; animal models in developmental biology.
Course Component: Lecture

CMM 5311 Physiology and Pathophysiology of Energy Metabolism and Muscle Functions (3 units)
Advanced comprehensive training in mammalian and human physiology with emphasis on pathophysiology. Topics include: neural and endocrine control of the hypothalamus-hypophysis axis; role of pancreas, adipose tissue and skeletal muscle in carbohydrate and lipid metabolism; cellular and molecular aspects of muscle contraction and fatigue in cardiac and skeletal muscle.
Course Component: Lecture

CMM 5313 Physiology and Pathophysiology of the Reproductive, Renal and Gastrointestinal Systems (3 units)
Advanced comprehensive training in mammalian and human physiology with emphasis on pathophysiology. Topics covered include reproductive physiology, molecular and bulk transport processes in the renal system, enteric control of the gastrointestinal tract.
Course Component: Lecture

CMM 5315 Cellular and Molecular Basis of Cardiovascular Function/ Dysfunction (3 units)
Mechanism of failing heart and cardiovascular system, its associated functions and associated conditions. Therapies for restoring function. Topics include: regulation of heart development, cell signaling, cellular and molecular mechanisms of atherosclerosis and heart disease , hormonal regulation, hypertension, bioenergetics, cardiovascular genomics and genetics, cell therapy, and regenerative medicine.
Course Component: Lecture

CMM 5326 Experimental Preparations and Animal Models (3 units)
Applied and theoretical course intended to give the potential researcher basic surgical skills. Lectures followed by demonstrations and/or practical exercises.
Course Component: Lecture

CMM 5341 Stem Cells (3 units)
Topics in stem cell biology which will include an in-depth look at the properties of embryonic and adult stem cell populations, tissue-specific stem cells (muscle, skin, neural, etc.), differentiation and reprogramming, the stem cell niche, induced pluripotent stem cells, and therapeutic advances using stem cell therapy.
Course Component: Lecture

CMM 5360 Imaging in Cell Biology (3 units)
Microscopy, biological imaging, and image generation. Overviews of common transmitted light, electron microscopic and epifluorescent techniques. Discussion of enhanced fluorescence microscopy and live cell imaging techniques, including image acquisition, processing and analysis with focus on quantitative and ethical issues.
Course Component: Lecture

CMM 5372 Cell Signalling and Hormone Action (3 units)
Topics will include the major cell signaling pathways and the action of steroid and non-steroid hormones. These signaling pathways will be discussed in the context of biological function and pharmacology.
Course Component: Lecture

CMM 7301 Directed Studies (3 units)
A program of study designed for a given student according to the student's educational requirements.
Course Component: Seminar

CMM 8103 Epithelial Cell Polarity (3 units)
Cell polarity with emphasis on tight junctions and Claudins (tight junction molecules). Topics include: the molecular basis of cell polarity and permeability barrier during development, organogenesis and disease including inflammatory disease and cancer.
Course Component: Lecture

CMM 8105 Advanced Topics in Cancer Biology (3 units)
Advanced study of recent developments in the field of cancer biology with emphasis on cellular and molecular aspects. Specific topics to be covered include: angiogenesis, apoptosis, cancer genetics, cell signaling, genetic instability, oncogenes and tumour suppressors.
Course Component: Lecture

CMM 8300 Special Topics in Reproductive and Developmental Biology (3 units)
In-depth study of current topics in reproductive and developmental biology, with emphasis on state-of-the art molecular and cell biology techniques as well as their applications to reproductive diseases. Topics may include assisted reproductive technologies, embryonic stem cells, contraception, endocrine disruptors, reproductive toxicology, and transgenics.
Course Component: Lecture

CMM 8310 Current Topics in RNA Molecular Biology (3 units)
Properties, mechanisms associated with regulation and the function of RNAs and Ribonucleoprotein (RNPs) as well as RNA organisms. Current knowledge on RNA expression (synthesis, processing, transport and localization), the structure-function relationship and molecular mechanisms associated with RNAs and RNA genomes, RNA in evolution and in the origin of life, and RNA as therapeutic agents. Courses BCH 8310 and CMM 8310 cannot be combined for units.
Course Component: Lecture
Courses BCH 8310 and CMM 8310 cannot be combined for units.

CMM 8311 Current Topics in Transcriptional Regulation (3 units)
Topics will include chromatin structure and its impact on gene expression, protein: DNA interactions, the assembly of transcriptional complexes, and the control of gene expression in mammalian systems.
Course Component: Lecture

CMM 83241 Seminars I (Part 1 of 2)
Compulsory for one year for all students enrolled in the master's program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series. (Part 1 of 2)
Course Component: Seminar

CMM 83242 Seminars I (Part 2 of 2) (3 units)
Compulsory for one year for all students enrolled in the master's program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series. (Part 2 of 2)
Course Component: Seminar
Prerequisite: CMM 83241

CMM 8324S Seminars I (3 crédits / 3 units)
Compulsory for one year for all students enrolled in the master's program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series.
Volet / Course Component: Séminaire / Seminar

CMM 83251 Seminars II (Part 1 of 2)
Compulsory for all students enrolled in the doctorate program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series. (Part 1 of 2)
Course Component: Seminar

CMM 83252 Seminars II (Part 2 of 2) (3 units)
Compulsory for all students enrolled in the doctorate program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series. (Part 2 of 2)
Course Component: Seminar
Prerequisite: CMM 83251

CMM 8325S Seminars II (3 crédits / 3 units)
Compulsory for all students enrolled in the doctorate program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series.
Volet / Course Component: Séminaire / Seminar

CMM 8340 Neuromuscular Function and Dysfunction (3 units)
Topics to be covered include factors controlling muscle and synapse-specific gene expression, regulation of myogenesis and muscle cell growth, formation of the neuromuscular junction, motor neuron - muscle interactions, the role of the cytoskeleton in organization of post-synaptic domains, functional role of ion channels in muscle, molecular genetics of neuromuscular disease.
Course Component: Lecture

CMM 8341 Cell Stress (3 units)
Topics will include cellular responses to cell stress and will include hypoxia, oxidative stress, ER stress, autophagy, apoptosis and aging.
Course Component: Lecture

CMM 8345 Special Topics in Gastroenterology (3 units)
Lectures, tutorials and seminar-discussion sessions, designed to provide advanced training in gastrointestinal function. Emphasis on pathophysiological mechanisms.
Course Component: Lecture

CMM 8350 Ion Channels: Cellular and Molecular Aspects of Membrane Functions (3 units)
A study of the diversity, molecular structure, structure-function relationship, electrophysiological characteristics and physiological roles of different ion channels in excitable and non-excitable cells. The channels that are studied include the sodium, potassium, calcium and chloride channels.
Course Component: Lecture

CMM 8355 Renal Physiology (3 units)
Lecture and seminar course with emphasis on electrolyte transport. Topics to include: detailed structure and function of nephron segments, localization of primary and secondary active transport carriers, theories of autoregulation, hormone action in the kidney, drug action in the kidney, and regulation of renal vascular resistance.
Course Component: Lecture

CMM 9998 Examen de synthèse (doctorat) / Comprehensive Examination (PhD)
Volet / Course Component: Recherche / Research