

Co-op Program

# MOLECULAR AND CELLULAR BIOLOGY



The only complete bachelor degree program in molecular and cellular biology available in Quebec, it delivers solid academic and hands-on training in biochemistry, microbiology, as well as cellular and molecular biology. Students also acquire skills in areas related to molecular biology and genetics (DNA, RNA, proteins, cell culture, etc.) as well as in manipulation of microorganisms. This allows them to develop expertise in various areas of biotechnology and its adjacent sectors (biopharmaceuticals, genetic engineering, pharmacogenetics, agriculture, gene therapy).

The educational model can be best described as a gradual learning process towards full autonomy, preparing students for their professional career. Such approach combines and balances traditional instruction, project experience, personalized learning and assisted self-training. Starting in the third study term, students are exposed to their professional workplace environment; they acquire the skills and competencies needed to be effective and efficient in demanding true-life situations.

## WHAT OUR STUDENTS CAN DO FOR YOU

### Techniques

- ELISA, complement fixation and hemagglutination
- Genetic manipulation
- PCA and real-time PCA
- DNA and RNA isolation and characterization
- Radioisotope handling
- Bacteriophage and bacteria culture and manipulation
- Cloning and transfection
- Laboratory animal handling
- Cellular culture
- Production, purification and characterization of proteins

### Project management

- Experiment design
- Experiment protocol update and optimization
- Oral and written presentation of results
- Reports
- Team work
- Quality control



## KNOWLEDGE AND SKILLS

Term	Description
S-1	<b>Introduction to biology</b> Properties of organic molecules; structural biochemistry; eukaryotic cells; anatomy, morphology, reproduction and classification of plants; ecosystems; relations between organisms; study of microorganisms.
S-2	<b>Theoretical foundations and tool handling</b> Intermediate metabolism; integration of anabolic and catabolic pathways; basic analytical and biochemical methods; microorganism handling; understanding and analysis of an experiment protocol; descriptive and inferential statistics; principles of animal physiology.
S-3	<b>Supplemental theory</b> Preparing an experiment protocol; molecular biology and modern experimental biochemistry; limits of the methods used; sequence analysis and structural biology software; molecular mechanisms; foundations of genetics; basic in vitro manipulation of nucleic acids and microbial metabolism; animal and plant cell culture.
S-4	<b>Manipulation and new theoretic concepts</b> Advanced in vitro manipulation techniques; immune system; immunology; physiological and molecular manipulation of microorganisms; plant physiology experiments; molecular virology and molecular genetics.
S-5	<b>Analysis and futher studies</b> Main physicochemical and structural characteristics of proteins; purification techniques; analysis of proteins; molecular mechanisms.
S-6 S-7	<b>Introduction to research</b> Molecular endocrinology; integration of acquired skills and supplemental training components.

## ORGANIZATION OF STUDY (S) AND WORK TERM (W)

1st year			2nd year			3rd year			4th year			5th year
FALL	WIN	SUM	FALL	WIN	SUM	FALL	WIN	SUM	FALL	WIN	SUM	FALL
S-1	S-2		S-3	W-1	S-4	W-2	S-5	W-3	S-6			
	S-1		S-2	S-3		S-4	W-1	S-5	W-2	S-6	W-3	S-7