



Icahn
School of
Medicine at
Mount
Sinai

COURSE INFORMATION SHEET

Title of Course: Molecular, Cellular and Genomic Foundations (MCG)

Academic Year: 2018-2019

Duration of Course: 8 weeks

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Mission Statement of Course:

MCG will lay the foundation for understanding the genetic and molecular basis of cellular function and its relationship to human disease.

Goals of Course:

One goal of the MCG course is for students to have an integrated understanding of the mechanisms by which cells receive and process extracellular signals, regulate gene expression, control organellar biogenesis, and divide or differentiate.

A second goal is for students to gain an appreciation of the fundamentals of carbohydrate, fatty acid, and nitrogen metabolism. The relationship of these cellular processes to human disease is emphasized throughout the course.

A third goal is for students to comprehend the principles of classical genetics and genomic medicine, in order to effectively evaluate and apply future advances in genomic medicine.



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Objectives of Course:

- Discuss basic concepts in protein structure and enzyme kinetics.
- Describe signal transduction pathways that are activated in cell responses, cell growth, and differentiation.
- Contrast the characteristics of ion movement through various types of ion channels, and their effects on cell function.
- Apply a basic understanding of cell biology (protein folding, protein trafficking, cytoskeleton, extra-cellular matrix) to interpret phenotypes that arise from defects in cell processes.
- Distinguish different forms of gene regulation and formulate nucleic acid-based tests to diagnose genetic changes that underlie disease.
- Interpret genetic and genomic information to assist patient diagnosis and guide personalized treatment.
- Apply principles of cell cycle and tumor/suppressor gene biology to understanding cancer cell pathways.
- Diagram metabolic pathways involving carbohydrates, lipids, and nitrogen-containing compounds.
- Formulate nutrition plans that ameliorate the effects of inborn errors of metabolism.