Microbiology and Molecular Genetics

Building B, Room 240, Medical Sciences I; (949) 824-5261
http://www.microbiology.uci.edu/
Rozanne M. Sandri-Goldin, Department Chair
Marian L. Waterman, Department Vice Chair
Klemens J. Hertel, Departmental Graduate Advisor

The Department of Microbiology and Molecular Genetics provides advanced training to individuals interested in the regulation of gene expression and the structural and functional properties of proteins encoded by these genes. The research in the Department covers a wide range of topics with special emphasis on bacterial gene expression and pathogenesis; viral gene expression and host interactions; trypanosome molecular biology; vector-borne malaria and dengue fever transmission; nuclear-cytoplasmic transport and intracellular signaling; eukaryotic gene expression; mRNA splicing, editing, and processing; cancer genetics and tumor suppressors; ion channel expression and function; genomics and bioinformatics.

The Department offers graduate study under the auspices of the School of Medicine and in conjunction with the program in Cellular and Molecular Biosciences (CMB) and the program in Mathematical and Computational Biology (MCB), which are described in the School of Biological Sciences (catalogue.uci.edu/previouseditions/2013-14/schoolofbiologicalsciences/#graduatetext) section. Students are eligible to enter the Department program after meeting the specific requirements of the CMB gateway curriculum or by direct application to the Department. The Department program leads to the M.S. or Ph.D. degree in Biomedical Sciences, awarded after successful completion of all requirements. Students admitted into the CMB program who select a research advisor in the Department begin following the departmental requirements for the Ph.D. at the beginning of their second year.

Participation in the Department’s seminar series and completion of at least one advanced topics course per year for three years are expected of all students. In their third year, students take the advancement-to-candidacy examination for the Ph.D. degree by presenting and defending an original proposal for specific dissertation research. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is seven years.

Faculty

Alan L. Goldin: Molecular analysis of ion channel function and its roles in human diseases
Klemens J. Hertel: Regulation of gene expression by alternative splicing
Anthony A. James: Methods for controlling the transmission of vector-borne diseases, specifically malaria and dengue fever
Janos K. Lanyi (Joint): Bacteriorhodopsin; halorhodopsin; light-driven ion pumps
Manuela Raffatellu: Mechanisms of Salmonella interaction with the intestinal mucosa; mucosal barrier function during Salmonella infection
W. Edward Robinson, Jr. (Joint): Molecular pathogenesis of lentivirus infection and drug discovery against HIV
Suzanne B. Sandmeyer (Joint): Molecular genetics of a position-specific yeast retrovirus-like element
Rozanne M. Sandri-Goldin: Structural and functional analysis of a multifunctional herpes virus regulatory protein
Paolo Sassone-Corsi (Joint): Signal transduction, gene expression, oncogenesis, circadian clock
Bert L. Semler: Replication and translation of picornaviruses; RNA-protein and protein-protein interactions
Yongsheng Shi: Post-transcriptional gene regulation and its role in human diseases
Ming Tan: Bacterial pathogenesis; gene regulation in Chlamydia
Marian L. Waterman: Wnt signaling in cancer and lymphocytes

Courses

M&MG 200A. Research in Microbiology and Molecular Genetics. 2-12 Units.
Individual research supervised by a particular professor.
Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.

M&MG 200B. Research in Microbiology and Molecular Genetics. 2-12 Units.
Individual research supervised by a particular professor.
Prerequisite: M&MG 200A.
Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.

M&MG 200C. Research in Microbiology and Molecular Genetics. 2-12 Units.
Individual research supervised by a particular professor.
Prerequisite: M&MG 200B.
Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.
M&MG 200R. Research in Microbiology and Molecular Genetics for First-Year Students. 2-12 Units.
Independent research within the laboratories of graduate training faculty in the Department of Microbiology and Molecular Genetics for first-year Ph.D. students.

Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be taken for credit 3 times.

M&MG 201A. Research topics in Microbiology and Molecular Genetics. 1 Unit.
Seminars presented by graduate students and faculty of the Department which explore research topics in specialized areas of microbiology and molecular genetics. Opportunity for students to gain experience in the organization, critical evaluation, and oral presentation of current research developments.

Repeatability: May be repeated for credit unlimited times.
Restriction: Graduate students only.

M&MG 201B. Research topics in Microbiology and Molecular Genetics. 1 Unit.
Seminars presented by graduate students and faculty of the Department which explore research topics in specialized areas of microbiology and molecular genetics. Opportunity for students to gain experience in the organization, critical evaluation, and oral presentation of current research developments.

Prerequisite: M&MG 201A.
Repeatability: May be repeated for credit unlimited times.
Restriction: Graduate students only.

M&MG 201C. Research topics in Microbiology and Molecular Genetics. 1 Unit.
Seminars presented by graduate students and faculty of the Department which explore research topics in specialized areas of microbiology and molecular genetics. Opportunity for students to gain experience in the organization, critical evaluation, and oral presentation of current research developments.

Prerequisite: M&MG 201B.
Repeatability: May be repeated for credit unlimited times.
Restriction: Graduate students only.

M&MG 203A. Advanced Studies in Microbiology and Molecular Genetics. 1 Unit.
Organized within each laboratory group, one to four hours. Advanced study in areas related to faculty research interests. Involves small group study based on readings, discussions, and guest speakers. May be conducted as journal clubs.

Grading Option: Satisfactory/unsatisfactory only.

M&MG 203B. Advanced Studies in Microbiology and Molecular Genetics. 1 Unit.
Organized within each laboratory group, one to four hours. Advanced study in areas related to faculty research interests. Involves small group study based on readings, discussions, and guest speakers. May be conducted as journal clubs.

Prerequisite: M&MG 203B.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.
Restriction: Graduate students only.

M&MG 203C. Advanced Studies in Microbiology and Molecular Genetics. 1 Unit.
Organized within each laboratory group, one to four hours. Advanced study in areas related to faculty research interests. Involves small group study based on readings, discussions, and guest speakers. May be conducted as journal clubs.

Prerequisite: M&MG 203B.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.
Restriction: Graduate students only.

M&MG 205A. Basic Immunology Core Lectures. 1 Unit.
Basic concepts in human immunology including development of the immune system, innate immunity, immunoglobulin structure and genetics, antigen-antibody reactions, the major histocompatibility complex and antigen presentation, T cell and B cell development, initiation of the immune response, effector mechanisms.

Prerequisite: M&MG 205A.
Grading Option: Satisfactory/unsatisfactory only.

M&MG 205B. Basic Immunology Core Lectures. 1 Unit.
Basic concepts in human immunology including development of the immune system, innate immunity, immunoglobulin structure and genetics, antigen-antibody reactions, the major histocompatibility complex and antigen presentation, T cell and B cell development, initiation of the immune response, effector mechanisms.

Prerequisite: M&MG 205A.
Grading Option: Satisfactory/unsatisfactory only.

M&MG 205C. Basic Immunology Core Lectures. 1 Unit.
Basic concepts in human immunology including development of the immune system, innate immunity, immunoglobulin structure and genetics, antigen-antibody reactions, the major histocompatibility complex and antigen presentation, T cell and B cell development, initiation of the immune response, effector mechanisms.

Prerequisite: M&MG 205A.
Grading Option: Satisfactory/unsatisfactory only.
M&MG 206. Regulation of Gene Expression. 4 Units.
Aspects of gene expression including organization of the eukaryotic nucleus in terms of protein-nucleic acid interaction; comparisons between prokaryotic and eukaryotic gene expression, enzymology and regulation of RNA transcription in E. Coli and other prokaryotes; enzymology of transcription in eukaryotes.

M&MG 210A. Medical Microbiology. 4-6 Units.
Biology of microbial pathogens (viruses, bacteria, fungi, parasites) as foundation for subsequent study of infectious diseases. Topics: molecular basis of microbial pathogenesis; clinical presentation and epidemiology; diagnostic testing; antimicrobial therapy; prevention strategies. Format: lectures, laboratory, clinical cases, liveclasstech interactive questions.

M&MG 210B. Medical Immunology. 6-6 Units.
Cellular and molecular basis of immune response and roles of the immune system in both maintaining health and contributing to disease.
Prerequisite: M&MG 210A.
Restriction: Medical students only.

M&MG 215. Integrative Immunology. 4 Units.
Lectures and student presentations of primary literature. The main goal is to achieve a basic understanding of the cellular and molecular basis of innate and adaptive immunity, and how immune function is coordinated at a systems level.

Same as MOL BIO 215.

M&MG 216. Pathogenic Microbiology. 4 Units.
Biochemical and genetic properties of infectious agents; identification and behavior of pathogens; activities of toxins; the chemotherapy, biochemistry, and genetics of drug resistance; and epidemiology of infectious diseases.

M&MG 219. Medical Virology. 4 Units.
Animal viruses as disease causing agents, including mechanisms of infection at both the cellular and organismic levels. Topics include comparative studies of different groups of viruses, viral transformation, and mechanisms of viral gene expression.

M&MG 221. Immunopathogenic Mechanisms of Disease. 3 Units.
Examination of the mechanisms underlying disease states mediated by immune dysregulation. Topics include innate and adaptive immunity, autoimmunity, immunodeficiency, inflammatory disorders, and certain infectious diseases. Emphasis on biological basis of immunopathologies taught from reports in the original scientific literature.
Prerequisite: M&MG 215.
Same as PATH 221.
Restriction: Graduate students only.

M&MG 222. Molecular Pathogenesis of Viral Infections. 4 Units.
Features lectures by faculty on the molecular aspects of viral pathogenesis, highlighting both viral and cellular functions. Students give oral presentations and write a research proposal on a selected topic.
Prerequisite: MOL BIO 205.

M&MG 225. Molecular Mechanisms of Human Disease. 3 Units.
Provides an overview of the molecular mechanisms of human diseases, including neurologic, hematologic, neoplastic, and infectious diseases. Students gain an understanding of these mechanisms, as well as models of human diseases.
Same as PATH 225.

M&MG 227. Immunology Journal Club. 2 Units.
Advanced topics in immunology as related to an understanding of human disease.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.

M&MG 230. Topics in Stem Cells. 2-4 Units.
One-hour seminar presentation by participating faculty or guest lecturer and open to the science community, followed by one-hour discussion of the lecture topic or related topic. Students are responsible for presentations and readings.

M&MG 240. M.D./Ph.D. Tutorial. 1 Unit.
Explores a variety of topics that impact careers of medical scientists (M.D./Ph.D students). Topics range from scientific, such as recent advances in particular research areas, to ethical problems brought on by increased technology and intervention in the disease process.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.
Restriction: Graduate students only.

M&MG 250. Responsible Conduct of Research. 2 Units.
Each session includes a formal presentation by faculty/invited speaker followed by a discussion of case studies related to the topic under consideration.
Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only.

M&MG 270. Career Development. 2 Units.
Topics include preparation of papers, grants and fellowships, scientific presentations, and curriculum vitae, and career opportunities.
Repeatability: May be repeated for credit unlimited times.

M&MG 280. Tutorial in Microbiology and Molecular Genetics. 2 Units.
Tutorial in Microbiology and Molecular Genetics. Presented by the department chair; relates current laboratory research to the literature.
Repeatability: May be repeated for credit unlimited times.

M&MG 292A. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.
M&MG 292B. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

M&MG 292C. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

M&MG 298. Independent Study. 1-12 Units.
Provided for MSTP students to synthesize the basic science information learned during the basic science years of medical school and learn how to apply that knowledge toward graduate research directed at understanding the basis of human disease.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

M&MG 299. Dissertation—Microbiology and Molecular Genetics. 1-12 Units.
Course provided for Ph.D. students to prepare and complete the dissertation required for a Ph.D. degree.

Repeatability: May be repeated for credit unlimited times.