ASSISTANT PROFESSORS

Massimo Attanasio  
M.D., University of Naples “Federico II,” Italy, 1990

Roberto Coppari  
Ph.D., University of Marche, Italy, 2002

Todd N. Eagar  
Ph.D., Northwestern University Medical School, Chicago, 2001

Rana K. Gupta  
Ph.D., University of Pennsylvania, Philadelphia, 2006

Lu Q. Le  
Ph.D., M.D., University of California, Los Angeles, 2002, 2003

Guosheng Liang  
Ph.D., Ohio State University, 1997

Pradeep Mammen  
Ph.D., University of Wisconsin, Madison, 1995

Chieko Mineo  
Ph.D., University of Tokyo, 1992

Hamid Mirzaii  
Ph.D., Purdue University, 2005

Nikhil Munshi  
Ph.D., M.D., Columbia University, 2001, 2003

Juan M. Pascual  
M.D., Universidad de Granada, Spain, 1990; Ph.D., Baylor College of Medicine, 1995

Benjamin Tu  
Ph.D., University of California, San Francisco, 2003

Yihong Wan  
Ph.D., University of Colorado Health Sciences Center, 2001

Chengcheng “Alec” Zhang  
Ph.D., University of Illinois at Urbana-Champaign, 1999

DESCRIPTION OF THE DISCIPLINE

The Integrative Biology Graduate Program fosters training in scientific investigations that relate biological processes to normal or pathological organismal functions. Principles and techniques used to study multicellular biological preparations are applied to investigate and verify hypotheses arising from knowledge of molecular and cellular biology. Multicellular preparations may include co-cultures of different cell types, isolated tissues, organ systems, or whole animals. Thus, cells and tissues are studied in their “social” context. This Program promotes effective cross-disciplinary research involving faculty in basic science and clinical departments with the goal of training a student for a career as an independent investigator. Some areas of interest in this Program include response and adaptation to physiological (exercise, microgravity, and pregnancy) and pathological (ischemia, hypertension, cancer, diabetes, sepsis, and inflammatory and immune disease) stresses. Specific subjects of investigation include cell-cell signaling, including the basis of fertilization; exocrine secretion; renal tubular transport; gene regulation in development and differentiation; regulation of cardiovascular function and metabolism; regulation of muscle contraction and protein turnover; sensory regulation of behavior; carbohydrate and lipid metabolism; and tumor biology.

OBJECTIVES

The Integrative Biology Graduate Program offers doctoral training in a multidisciplinary, integrative discipline that seeks to understand the complexity of interacting organismal systems and the molecular basis of involved processes. This approach provides insights into derangements caused by disease and thereby provides biomedical advances for treatment of humans through molecular medicine. Students in this Program have the opportunity to master scientific principles through classroom, seminar, and discussion experiences and have the opportunity to perform original and innovative research in this new area. The goal of this Program is to prepare students for biomedical research in academia, industry, or government. The dissertation project should combine studies on multicellular culture preparations, isolated tissue or organs, organ systems, or whole animals with aspects of cell or molecular biology. The Program encourages the recruitment of two mentors if this requirement is not met in a single laboratory. The two-mentor system is intended to promote ongoing or newly initiated cross-disciplinary studies providing a broad-based education for the student.

SPECIAL REQUIREMENTS FOR ADMISSION

Students wishing to join the Integrative Biology Graduate Program must be enrolled in the Division of Basic Science and be in good standing academically. Usually students seek enrollment in the Program toward the end of the first year of study following completion of the set of research rotations and selection of a mentor.

CURRICULUM

All students in the Integrative Biology Graduate Program must have satisfactorily completed the first-year core curriculum and three laboratory rotations. In the second year, students complete at least nine credit hours of advanced course work. Three hours must include Human Biology and Disease, and three hours are selected from the following list of courses.

Additional courses may be selected from courses listed in the Division of Basic Science section and from the Biomedical Engineering and Radiological Sciences Graduate Programs.

Students are strongly encouraged to develop, in collaboration with the graduate student adviser and appropriate faculty, special topic courses dealing with the physiological systems related to future dissertation research. These tutorial-type courses may cover fundamental knowledge as well as methodological approaches and recent primary literature. Students will participate in a seminar-journal club each term.

At the end of the second year, students take a qualifying examination, which consists of an oral defense of an original, written proposal.

Admission to candidacy for the Ph.D. requires satisfactory performance in the core and advanced courses and on the qualifying exam.

INTEGRATIVE BIOLOGY COURSES

Advanced Genetics I: Model Systems  
Advanced Genetics II: Human Genetics  
Experimental Approaches to Complex Genetic Disease and Therapy  
Fundamentals of Neuroscience  
Human Biology and Disease  
Molecular Basis of Metabolic Regulation  
Responses to Stress  
Signal Transduction I  
Topics in Developmental Biology