

CELL BIOLOGY

Sterling Hall of Medicine C207, 203.737.5603
<http://cellbiology.yale.edu>
 M.S., M.Phil., Ph.D.

Chair

James Rothman

Director of Graduate Studies

Karin Reinisch (SHM C214a, 203.785.6469, karin.reinisch@yale.edu)

Professors Joerg Bewersdorf, Christopher Burd, David Calderwood (*Pharmacology*), Michael Caplan (*Cellular and Molecular Physiology*), Daniel Colón-Ramos, Lynn Cooley (*Genetics*), Peter Cresswell (*Immunobiology*), Pietro De Camilli, Jorge Galán (*Microbial Pathogenesis*), Fred Gorelick, Valentina Greco (*Genetics*), Carl Hashimoto (*Emeritus*), Diane Krause (*Laboratory Medicine*), Thomas Lentz (*Emeritus*), Haifan Lin, Jun Liu (*Microbial Pathogenesis*), Vincent Marchesi (*Pathology*), Mark Mooseker (*Molecular, Cellular, and Developmental Biology*), Michael Nathanson (*Internal Medicine/Digestive Diseases*), Karla Neugebauer (*Molecular Biophysics and Biochemistry*), Karin Reinisch, James Rothman, Martin Schwartz (*Internal Medicine/Cardiology*), Derek Toomre, Felix Weiland (*Adjunct*), Sandra Wolin (*Emerita*)

Associate Professors Julien Berro (*Molecular Biophysics and Biochemistry*), Jonathan Bogan (*Internal Medicine/Endocrinology*), Shawn Ferguson, Shangqin Guo, Megan King, Chenxiang Lin, Patrick Lusk, Malaiyalam Mariappan, Thomas Melia, Christian Schlieker (*Molecular Biophysics and Biochemistry*), Julia von Blume, Min Wu, Yongli Zhang

Assistant Professors David Baddeley (*Adjunct*), Kallol Gupta, Xiaolei Su, Peter Takizawa, Siyuan Wang (*Genetics*), Shaul Yogev (*Neuroscience*)

FIELDS OF STUDY

Fields include membrane traffic and protein sorting, organelle biogenesis, epithelial cell polarity, membrane function in the nervous system (synapse formation and function), neural circuit development, cell biology of protozoan parasites and of pathogen/host interactions, cell biology of the immune response, mRNA biogenesis and localization, RNA folding, non-coding RNAs, stem cells, the cytoskeleton, nuclear structure and dynamics, DNA nanostructures, cellular signaling and motility, cytokinesis. Approaches to these topics include biochemistry, biophysics, molecular biology, crystallography, and single-particle electron microscopy; bacterial, yeast, *Drosophila*, *C. elegans*, and mouse genetics; immunocytochemistry and electron microscopy and tomography; live cell and super-resolution imaging.

To enter the Ph.D. program, students apply to an interest-based track, usually the Molecular Cell Biology, Genetics, and Development (MCGD) track or the Biochemistry, Quantitative Biology, Biophysics, and Structural Biology (BQBS) track, within the interdepartmental graduate program in Biological and Biomedical Sciences (BBS), <https://medicine.yale.edu/bbs>.

SPECIAL REQUIREMENTS FOR THE PH.D. DEGREE

Students are required to take at least five graduate-level courses. No specific curriculum of courses is required, but CBIO 602 (Molecular Cell Biology) is recommended for all students to attain a solid foundation in molecular cell biology. Also recommended is a seminar course, such as CBIO 603 (Seminar in Molecular Cell Biology), in which students can develop the skill for critical analysis of research papers. Students design their own curriculum of courses to meet individual interests and needs, in consultation with the director of graduate studies. During the first year, students participate in three laboratory rotations. In the second year, a committee of faculty members determines whether each student is qualified to continue in the Ph.D. program. There is an oral qualifying examination by the end of the third term. In order to be admitted to candidacy, students must have met the graduate school Honors requirement, maintained a High Pass average in course work, passed the qualifying examination, submitted an approved prospectus, and received a positive evaluation of their laboratory work from the thesis committee. All students are required to present a talk at the departmental progress report series each year after passing the qualifying exam. The remaining degree requirements include completion of the dissertation project, submission for publication of at least one first-author paper to a peer-reviewed journal describing the dissertation research, the writing of the dissertation and its oral defense, the formal submission of copies of the written dissertation to the graduate school, and the deposit of an additional copy with the department.

An important aspect of graduate training in cell biology is the acquisition of teaching skills through participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school levels. Ph.D. students are required to participate in two terms (or the equivalent) of teaching. Students are not expected to teach during their first year.

In addition to all other requirements, students must successfully complete CBIO 900 and CBIO 901 (Research Skills and Ethics I and II) prior to the end of their first year of study. In their fourth year of study, all students must successfully complete B&BS 503 (RCR Refresher for Senior BBS Students).

M.D.-PH.D.

M.D.-Ph.D. students are required to take a total of five graduate-level courses for a grade, including the CBIO 501/CBIO 502 sequence (Molecules to Systems), CBIO 602 (Molecular Cell Biology), and a seminar course that involves the reading and class discussion of research papers. The remaining courses can be in areas such as genetics, neuroscience, immunology, microbiology, pharmacology, and physiology. Students must meet the graduate school requirement of a grade of Honors in two courses, if necessary taking additional courses beyond the five required in the department to fulfill this requirement. Students must also maintain an average grade of High Pass in all courses. One term of teaching is required.

MASTER'S DEGREES

M.Phil. Requirements for the M.Phil. degree are the same as for admission to candidacy (see above).

M.S. This degree is normally granted only to students who are withdrawing from the Ph.D. program. To be eligible for the degree, a student must have completed at least five graduate-level term courses at Yale, including CBIO 602 (Molecular Cell Biology) and a seminar course, with a grade of Pass and at least one grade of Honors or three of High Pass. In addition to these five courses, the student must have received a Satisfactory grade in the following five courses: CBIO 900 (Research Skills and Ethics I), CBIO 901 (Research Skills and Ethics II), CBIO 911 (First Laboratory Rotation), CBIO 912 (Second Laboratory Rotation), and CBIO 913 (Third Laboratory Rotation). Students who are eligible for or who have already received the M.Phil. will not be awarded the M.S.

Prospective applicants are encouraged to visit the BBS website (<https://medicine.yale.edu/bbs>), MCGD and BQBS tracks. Program materials are available upon request to the Director of Graduate Studies, Department of Cell Biology, Yale University, PO Box 208002, New Haven CT 06520-8002.