

# DEVELOPMENTAL BIOLOGY

Courses offered by the Department of Developmental Biology are listed under the subject code DBIO on the Stanford Bulletin's ExploreCourses web site.

A fundamental problem in biology is how the complex set of multicellular structures that characterize an adult animal is generated from the fertilized egg. Recent advances at the molecular level, particularly with respect to the genetic control of development, have been explosive. These advances represent the beginning of a major movement in the biological sciences toward the understanding of the molecular mechanisms underlying developmental decisions and the resulting morphogenetic processes. This new thrust in developmental biology derives from the extraordinary methodological advances of the past decade in molecular genetics, immunology, and biochemistry. However, it also derives from groundwork laid by the classical developmental studies, the rapid advances in cell biology and animal virology, and from models borrowed from prokaryotic systems. Increasingly, the work is directly related to human diseases, including oncogene function and inherited genetic disease.

The Department of Developmental Biology includes a critical mass of scientists who are leading the thrust in developmental biology and who can train new leaders in the attack on the fundamental problems of development. Department labs work on a wide variety of organisms from microbes to worms, flies, and mice. The dramatic evolutionary conservation of genes that regulate development makes the comparative approach of the research particularly effective. Scientists in the department labs have a very high level of interaction and collaboration. The discipline of developmental biology draws on biochemistry, cell biology, genetics, molecular biology, and genomics. People in the department have a major interest in regenerative medicine and stem cell biology.

The department is located in the Beckman Center for Molecular and Genetic Medicine within the Stanford University Medical Center.

## Master of Science in Developmental Biology

University requirements for the M.S. are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin.

Students in the Ph.D. program in Developmental Biology may apply for an M.S. degree, assuming completion of their course requirements and preparation of a written proposal. The master's degree awarded by the Department of Developmental Biology does not include the possibility of minors for graduate students enrolled in other departments or programs.

Students are required to take, and satisfactorily complete, at least three lecture courses offered by the department, including DBIO 210 Developmental Biology. In addition, students are required to take three courses outside the department. Students are also expected to attend Developmental Biology seminars and journal clubs. In addition, the candidate must complete a research paper proposing a specific experimental approach and background in an area of science relative to developmental biology.

## Doctor of Philosophy in Developmental Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin.

The graduate program in Developmental Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists Training Program (MSTP (<http://mstp.stanford.edu>)) in which individuals are candidates for both the M.D. and Ph.D. degrees.

### Units

Students are required to complete at least five courses, including:

DBIO 210	Developmental Biology	4
DBIO 215	Frontiers in Biological Research (1 unit per quarter; students are required to take at least two quarters)	2

An advanced graduate course in genetics or genomics;

An advanced graduate course in cell biology of biochemistry;

A course in quantitative or computational biology.

Students are expected to attend Developmental Biology seminars and journal clubs.

Completion of a qualifying examination is required for admission to Ph.D. candidacy. The examination consists of an off-topic proposal on a subject different from the dissertation research. The final requirements of the program include presentation of a PhD dissertation as the result of independent investigation and constituting a contribution to knowledge in the area of developmental biology. The student must pass the University oral examination, taken only after the student has substantially completed research. The examination is preceded by a public seminar in which the research is presented by the candidate. The oral examination is conducted by a dissertation reading committee.

*Emeriti: (Professors)* David S. Hogness, A. Dale Kaiser, Stuart Kim, Harley McAdams, Ellen Porzig

*Chair:* Roeland Nusse

*Associate Chair:* David Kingsley

*Professors:* Ben Barres, Philip Beachy, Gerald Crabtree, James Chen, Margaret Fuller, Seung Kim, David Kingsley, Roeland Nusse, Lucy Shapiro, William Talbot, Anne Villeneuve, Irving Weissman, Joanna Wysocka

*Associate Professors:* Gill Bejerano

*Assistant Professors:* Maria Barna, Alistair Boettiger, Daniel Jarosz