

# CELL AND DEVELOPMENTAL BIOLOGY

## PREPARATION FOR THE MAJOR

### High School Preparation

Recommended as part of or in addition to UC's "a-g" admission requirements:

**One year of biology,  
One year of chemistry,  
Mathematics through  
trigonometry,  
One year of physics.**

### Transfer Preparation

The following courses are required prior to transfer, with a minimum GPA of 2.7 or higher:

**One year sequence of general chemistry with laboratory, and one sequence (2-3 terms) of general biology.**

**To make normal progress in the major, it is also strongly recommended that students complete all of the following courses prior to transfer:**

**Two terms of calculus and one term of statistics:**

**Two terms of organic chemistry with laboratory,**

**One-year sequence of physics with laboratory.**

Please see the UCSB *General Catalog* ([www.catalog.ucsb.edu](http://www.catalog.ucsb.edu)) or your school counselor for more information on course preparation. California community college students should see [www.assist.org](http://www.assist.org).

Modern cell and developmental biology brings together a diverse group of disciplines and technologies linked by the common goals of understanding the nature and behavior of cells and how these cells work together to assemble an organism. This is a relatively new discipline that has emerged from studies in physiology and biochemistry. Some cell and developmental biologists concentrate on the role that one particular molecule plays within cells. Others study the way in which molecules assemble into structures such as chromosomes or nuclei. Still others examine how groups of cells interact to form systems of greater complexity, such as occurs with the progression of a fertilized egg through developmental stages to become an adult organism. The range of instruments and methods employed by cell and developmental biologists is equally diverse and includes recombinant DNA technology, biochemistry, cell culture, genetics, and light and electron microscopy.

## The Department

The Department of Molecular, Cellular, and Developmental Biology, which offers the Cell and Developmental Biology major, is one of the largest on campus. In addition to the Bachelor of Science (BS) degree in Cell and Developmental Biology, the department offers majors in Biological Sciences, Biochemistry-Molecular Biology, Microbiology, and Pharmacology. The diverse 21-member faculty offers approximately 50 upper-division (junior and senior) courses.

About fifteen of the department's faculty members teach and conduct research in cell and developmental biology. These scientists, many of whom are internationally known in their area of specialty, conduct research in gene expression and regulation, cellular differentiation, cell division, fertilization mechanisms, pattern formation and signal transduction during development and neuronal development. The faculty uses a variety of model systems including local marine invertebrates such as sea urchins and abalone, the frog, the plant *Arabidopsis*, yeast and mammalian cell cultures.

## The Major

Cell and developmental biology are sub-disciplines within the larger, more general area of biology. These sub-disciplines demand a genuine interest in the "hard sciences," including a solid foundation in biology, chemistry, mathematics and physics.

The major exposes students to sophisticated techniques and equipment that emphasize the experimental nature of cell and developmental biology. The major emphasizes "hands-on" experience, and laboratory and field work augment the classroom experience. Independent research is encouraged and undergraduates are invited to participate in ongoing research seminars. UCSB's Undergraduate Research and Creative Activities office (URCA) sponsors a variety of fellowships and awards that fund undergraduate research projects.

Students who plan to major in Cell and Developmental Biology enter UCSB as Pre-Biological Sciences majors and take a common core curriculum consisting of introductory biology, general chemistry, physics, organic chemistry and calculus. Students should complete this preparatory coursework in their freshman and sophomore years. After completing a subset of these courses, students may advance

from Pre-Biology to full major status. Upper-division coursework includes genetics, cell biology, developmental biology (either animal, plant or neuronal development), biochemistry and additional electives.

### **Careers in Cell and Developmental Biology**

The Cell and Developmental Biology major reflects a growing need for scientists who are able to bridge sub-disciplines, bringing to bear modern biochemical and molecular biology techniques on classic problems in cell and developmental biology. As such, successful completion of UCSB's BS degree in Cell and Developmental Biology provides students with many career options.

The major is excellent preparation for graduate training (master's and Ph.D. degree programs) in a wide range of molecular, cellular and developmental biology disciplines. The course requirements for the major satisfy most graduate program requirements and students are well prepared in coursework, understanding, and practical experience.

The laboratory work combined with the practical approach in the classroom are advantages to students interested in research careers, for example in the pharmaceutical and biotechnology sectors of the marketplace. The degree is excellent preparation for a career combining science and law such as forensics.

The Cell and Developmental Biology major is also excellent preparation for medical, dental, pharmacy or veterinary school. These professional programs demand a basic understanding in molecular, cellular and developmental biology. Students interested in the health sciences and related professions can take advantage of the University's excellent health sciences advisory system. They can seek advice and support from the beginning of their studies in biology up to their entrance into health sciences graduate programs and professional schools.

Students interested in teaching biological sciences and/or conducting research at the university level should plan to complete the Ph.D. degree. Students interested in teaching at the community college level should pursue graduate work at least through the master's degree. Secondary school teaching requires the California single subject teaching credential; students considering this last option should discuss their plans with the credential advisor in UCSB's Graduate School of Education early in their academic careers.

For more information about the Cell and Developmental Biology major, please call or write to the department's undergraduate advisor at:

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