

UNIVERSITY OF CALIFORNIA MAJORS ASSOCIATED WITH THE SUBJECT AREA COMMONLY KNOWN AS BIOLOGICAL SCIENCES

Prepared for
University of California
Ensuring Transfer Success, *Spring 2004*

Q&A

1. *What majors are related to Biological Sciences at each UC campus?*

UCB: Integrative Biology, Molecular & Cellular Biology, and Public Health. The College of Natural Resources also offers: Microbial Biology; Molecular Environmental Biology; and Genetics and Plant Biology. Berkeley also offers a wide variety of interdisciplinary undergraduate major and minor programs through **Undergraduate and Interdisciplinary Studies**.

UCD: The Division of Biological Sciences (DBS) houses nine majors: Biochemistry and Molecular Biology, Biological Sciences, Cell Biology, Evolution and Ecology, Exercise Biology, Genetics, Microbiology, Neurobiology, Physiology and Behavior, and Plant Biology. In addition, there are numerous other majors on campus, not housed in DBS, that are biology-related, e.g., Entomology; Wildlife, Fish and Conservation Biology; Biomedical Engineering; Anthropology, etc.

UCI: Applied Ecology (offered jointly with the School of Social Ecology), Biological Sciences, Biochemistry and Molecular Biology, Biomedical Engineering; Premedical, Developmental and Cell Biology, Earth and Environmental Sciences, Ecology and Evolutionary Biology, Environmental Analysis and Design, Genetics, Neurobiology, and Plant Biology.

UCLA: Biology; Marine Biology; Ecology, Behavior, and Evolution; Plant Biology; Physiological Science; Microbiology, Immunology and Molecular Genetics; Molecular, Cell and Developmental Biology; Plant Biotechnology; Neuroscience; Psychobiology

UCM: Upon opening in fall semester 2005, UC Merced will offer a B.S. in Biological Sciences. A B.A. in Human Biology is also anticipated. In 2006, a Biochemistry major is planned. In traditional programs, ecology is considered to be part of biology. However, at UC Merced ecology is part of the Earth Systems Science major.

UCR: College of Natural and Agricultural Sciences houses a B.A. or B.S. in Biology, and a B.S. in Biological Science

UCSB: B.S. in Aquatic Biology, B.S. in Biochemistry-Molecular Biology, B.A. or B.S. in Biological Sciences, B.S. in Cell & Developmental Biology, B.S. in Ecology & Evolution, B.S. in Microbiology, B.S. in Pharmacology, B.S. in Physiology, B.S. in Zoology, and B.A. in Creative Studies-Biology Emphasis. Students may also want to take note of the following majors offered at UCSB outside of the biological sciences: Biochemistry, B.S. in the Chemistry Department; Biopsychology, B.S. in the Psychology Department; and Environmental Studies, and B.S. in the Environmental Studies Program.

UCSC: A B.A. or B.S. in Biology (general), B.S. in Ecology & Evolution, B.S. in Health Sciences, B.S. in Marine Biology, B.S. in Molecular, Cell, & Developmental Biology, B.A. or B.S. in

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Neuroscience Behavior, B.S. in Plant Sciences, B.S. in Biochemistry & Molecular Biology (administered in conjunction with the Chemistry & Biochemistry Department), B.S. in Bioinformatics (administered in conjunction with the School of Engineering).

UCSD: Within the Division of Biological Sciences there are eight majors. There is no distinction made between research and medical tracks. All majors (exception of Ecology, Behavior, Evolution, & Biology with a Specialization in Bioinformatics) are preparatory for medical school. All majors could potentially lead to a career in research. The eight majors are: Animal Physiology & Neuroscience; Biochemistry & Cell Biology; Ecology; Behavior & Evolution; General Biology; Microbiology; Molecular Biology; and Biology with a specialization in Bioinformatics - Human Biology.

2. *What is the main focus of each major?*

UCB: The **Department of Integrative Biology** offers a program of instruction that focuses on the integration of structure and function in the evolution of diverse biological systems. It investigates integration at all levels of organization, from molecules to the biosphere, and in organisms ranging from viruses to higher plants and animals. The department has special strength in the disciplines of morphology (the form and structure of organisms), Organismal Physiology, Ethology (animal behavior, especially in respect to natural environments), Ecology, Systematic Biology, Paleobiology, and Evolution.

Teaching and research in the **Department of Molecular and Cell Biology** involves the molecular structures and processes of cellular life and their roles in the function, reproduction, and development of living organisms. This agenda covers a broad range of specialized disciplines, such as biochemistry, biophysics, molecular biology, genetics, cell physiology, cell anatomy, immunology, and neurobiology. The types of living organisms from which the departmental faculty draws its working materials are as diverse as its disciplinary specializations, ranging from viruses and microbes through plants, roundworms, annelids, arthropods, and mollusks to fish, amphibians and mammals.

The nature of public health requires a wide variety of approaches and perspectives. The courses and requirements of the major naturally follow this interdisciplinary pattern. The curricular emphasis of a major in **Public Health** is on providing students with an understanding of epidemiology, biostatistics, environmental health, health behavior and health policy. These areas of emphasis range across the spectrum of natural science to social science. The combined knowledge is then brought to bear on solving problems in human health. The major is constructed from a series of "overview" courses that produce an awareness of theories and methods in the fundamental areas and a selection from a large number of specific electives that allow the pursuit of specialized interests. Please visit the College of Natural Resources website for information on their majors.

UCD: The Division of Biological Sciences is an intercollege unit that coordinates campuswide programs in basic biology and administers undergraduate programs in the core disciplines of biology on behalf of the College of Agricultural and Environmental Sciences and the College of Letters and Science. The division is organized into sections that represent major themes of modern biology. Please see the Division of Biological Sciences Web site for descriptions of each major, available at <http://dbs.ucdavis.edu>. Click on the "Academics" section of the site.

UCI: Applied Ecology: The Applied Ecology major provides a strong undergraduate foundation in human-environment interactions, develops skills in the areas of resource quality and

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management, molecular and genetic methodology for environmental protection, and field sampling techniques for data collection.

Biological Sciences: The Biological Sciences major presents a unified, in-depth study of modern biology. The Biological Sciences Core is an 11-quarter series of courses ranging from diversity, ecology, genetics, biochemistry and molecular biology, to cell biology, physiology, and neurobiology. Important laboratory techniques and methodology are presented in upper-division laboratories.

Biochemistry and Molecular Biology: The Biochemistry and Molecular Biology major presents an in-depth study of the molecular basis of microbiology, immunology, virology, developmental biology, pathogenesis, and evolution, emphasizing laboratory experience in biochemistry and molecular biology.

Biomedical Engineering - Premedical: The Biomedical Engineering - Premedical major prepares students for medical school or allied health professions. Emphasis is less on engineering content and more on the biological sciences as it provides future physicians with a quantitative background in biomechanics, bioelectronics, and biotransport.

Developmental and Cell Biology: The Developmental and Cell Biology major is intended to provide students with intensive training in innovative approaches to understanding the structure and function of cells and how they interact to produce a complex organism, starting with an the fertilized egg. The focus of the B.S. in Developmental and Cell Biology is to provide students with intensive training to prepare them for graduate programs in modern Developmental and Cell Biology or other biomedical sciences.

Earth and Environmental Sciences: The Earth and Environmental Science major is designed to link the fields of oceanography, atmospheric and terrestrial sciences, climatology, hydrology, biology, physics, and chemistry in order to understand the climate system and global biogeochemical cycles.

Ecology and Evolutionary Biology: The Ecology and Evolutionary Biology major is designed to allow students “to make sense” of biology, it includes components of evolutionary biology, ecology and physiology. Following graduation, students will be especially well prepared to enter graduate programs in either ecology or evolution for advanced study. The major also provides a foundation for pursuing careers in governmental and non-governmental environmental organizations, as well as professional schools.

Environmental Analysis and Design: The Environmental Analysis and Design major is an interdisciplinary major concerned with the interactions between the physical and the social environment and human health and behavior. Students in Environmental Analysis and Design begin with basic courses in human ecology, environmental quality, epidemiology, and environmental health sciences. Research topics include, among others, effects of environmental pollution; the biology and politics of water pollution; potential impacts of natural disasters; compliance with environmental regulations; the way in which changes in the community affect health and well-being of its residents; environmental stressors (e.g., crowding, smog, noise); the effects of stress on health; and the causes and consequences of urbanization and population change.

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Genetics: The Genetics major is designed to benefit motivated undergraduates who have a particular interest in learning about developmental genetics, evolutionary genetics, and molecular genetics. Students have the opportunity to explore how our knowledge of genetic mechanisms contributes to our understanding of human development and disease. The Genetics major provides students with advanced training in the skills necessary to pursue graduate degrees in biomedical research. These would include Ph.D. graduate programs, teacher training programs, medical school and veterinary school. Genetics graduates may also use their backgrounds effectively in planning careers in law, business, education, and public affairs.

Neurobiology: The Neurobiology major is designed to teach students how neurobiologists apply cellular, molecular, systems, and behavioral analyses in understanding how the nervous system works. The hallmark of the major is a year-long, in-depth exploration of the intellectual tools used to create, advance, and disseminate knowledge about the nervous system. Students in this major will be competitive for positions in the pharmaceutical industry, the health care delivery industry, or in medically or biologically related technologies. Additionally, the major provides excellent preparation for students who wish to become high school science teachers.

Plant Biology: Plant Biology Majors take courses primarily focusing on cellular, developmental and molecular aspects of plant biology in lecture and laboratory classes. The Plant Biology major is intended to provide graduates with the knowledge and skills necessary to pursue graduate degrees in medicine, health sciences, biological research, including Ph.D. and M.S. training.

UCLA: Please see the individual departmental websites.

UCM: **Biological Sciences:** Courses in this major will teach students the molecular mechanisms of biological processes, which are the building blocks of life. Students will be exposed to cutting-edge technologies as they learn that our understanding of biological processes has changed as a result of genome sequencing. Biology is no longer a ‘memorization science’, but rather can be viewed as an ‘information science’. Students in the UC Merced biological sciences program will develop computational skills that allow them to access and interpret biologic information from diverse sources. An emphasis on learning how to integrate biological sciences with quantitative and physical sciences should make all of the science courses highly relevant. These concepts are taught with a strong emphasis on real-world applications of this knowledge in understanding health and disease and complex biological systems.

Students majoring in Biological Sciences will select from either a cell biology and development or microbiology/immunology emphasis available during UC Merced's first year. A biophysics emphasis will be added in 2006. The cell biology and development emphasis focuses on the molecular interactions that govern cell function, life cycle and specialization, as well as the cellular interactions that mediate the development and function of multicellular organisms. The microbiology/immunology emphasis focuses on understanding the gene regulation and protein functions that mediate the biology of yeast, viruses and bacteria, as well as the mechanisms of microbial pathogenesis and host immune response. Because fundamental advances in the past decade have changed the way we view biological sciences, UC Merced integrates quantitative and physical sciences with biological sciences to better see the relationships between genetics, organismal biology, evolution,

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biochemistry and biological systems. Students will be exposed to cutting-edge technologies as they learn that genome sequencing has changed fundamental understanding of biological processes.

Human Biology (Anticipated in 2005): The undergraduate major in Human Biology will provide students with an interdisciplinary and broad based education in biological sciences, social sciences and humanities. The undergraduate major in Human Biology is anticipated to offer two emphasis tracks upon opening: natural sciences and social sciences. Both emphasis areas have a foundation in biology and require the courses expected for entrance into medical and other biomedical professional schools. The natural science track in human biology includes an upper division course emphasis in biology, while the social science emphasis curriculum includes a greater emphasis in both the lower and upper division on social sciences, particularly psychology. The program is designed to allow maximum student flexibility in choosing courses to fulfill major requirements.

UCR: **Biology:** Undergraduates learn scientific methods, observation and experimental techniques, and rational approaches to biological problems. In addition to concentrating on the scientific core curriculum, they also study living organisms from the level of molecules to the interactions between populations.

Biological Sciences: Undergraduates concentrate on a core curriculum that provides a foundation in Biology, Chemistry, Mathematics, Physics, Statistics, and Biochemistry. Biological Sciences majors then select a track to match their interests and career goals. Each track consists of a combination of required courses, electives from specific subfields of Biology, and free electives in the Life Sciences and other fields of Science.

UCSB: **Aquatic Biology:** Provides students with interests in marine biology, biological oceanography, limnology, marine and freshwater ecology, and population biology of aquatic organisms with an opportunity to gain a general background in these areas. UCSB's unique location is used to excellent advantage by faculty members engaged in the study of aquatic environments.

Biochemistry-Molecular Biology: The vast and complex array of chemical reactions occurring in living matter and the chemical composition of the cell are the primary concerns of the biochemist. Life processes occurring at the molecular level, including the storage and transfer of genetic information and the interactions between the cells and the viruses that infect them are the investigatory concerns of the molecular biologist.

Biological Sciences: The B.A. degree is intended to provide flexibility in curriculum planning for students interested in obtaining a degree in biology accompanied by a broader background in the liberal arts. The B.S. degree is intended for those students desiring a more focused and intensive curriculum in biology, including the development of laboratory skills. Either degree is acceptable to most graduate and professional schools.

Cell & Developmental Biology: The major 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. The range of instruments and methods employed by cell and developmental biologists is equally diverse, including recombinant DNA technology, biochemistry, cell culture, genetics, light and electron microscopy and many others.

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Ecology & Evolution: This major provides a solid foundation in the study of interactions among organisms, and of their relations to the environment. This is the appropriate major for a field-oriented biologist and for students interested in graduate work in plant or animal population biology, ecology, or evolution.

Microbiology: Emphasis is placed on the fundamental aspects of microbiology with specialization in one of these areas: 1) General Microbiology-provides the basis for understanding the relationships between various groups of microorganisms and their environments and the relationship of those microorganisms to human welfare; 2) Biomedical Sciences-provides a specialized background for students whose career goals lie in the field of medical or clinical microbiology; 3) Genetic Engineering-provides specialized training in the methodology of recombinant DNA research.

Physiology: The major is concerned with the functioning of organisms. It is designed to provide an understanding of the integrated functioning of organ systems in the whole organisms in the context of cellular and molecular levels of organization.

Pharmacology: The major addresses itself to the identification of the site and mechanisms of drug action on animal tissue. The emphasis in this major is on pharmacology as a basic science, rather than on therapeutic principles of pharmacology. It is intended for students pursuing research careers and is not related to pharmacy training.

Zoology: It is designed to provide an understanding of animal structure and diversity, evolutionary relationships, functional systems, and environmental relationships within the animal kingdom.

Creative Studies-Biology Emphasis: Students interested in laboratory and field research might wish to consider the College of Creative Studies biology program. It is designed to meet the needs of students who show promise of being able to begin advanced work early in their undergraduate careers. Biology students are expected to engage in independent research from the first year on.

UCSC: Biology B.A. or B.S. (general): Areas of research strength within the biological sciences include RNA molecular biology, molecular and cellular aspects of genetics and development, neurobiology, endocrinology, immunology, microbial biochemistry, plant biology, animal behavior, physiology, evolution, ecology, and marine biology.

Ecology and evolution B.S.: The ecology and evolution major provides students with interdisciplinary skills necessary for understanding and solving complex problems in ecology, evolution, behavior, and physiology. While some of these disciplines focus on molecular or chemical mechanisms, they all address questions on larger spatial and temporal scales that can be applied to important environmental problems, including genetic and ecological aspects of conservation biology and biodiversity.

Health Sciences B.S.: The B.S. major in health sciences is designed for students interested in careers in medicine or biomedical research and satisfies the admission requirements for most U.S. medical schools. It is based on the existing B.S. degree in molecular, cell, and developmental biology, with similar course requirements in chemistry, physics, and math. Students are required to take five courses directly relevant to human health in addition to

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genetics, biochemistry, and cell biology. Students in this program must also fulfill Spanish language and health care internship requirements.

Marine biology B.S.: The marine biology major is designed to introduce students to marine organisms and the chemical and physical processes that affect these organisms. The emphasis is on basic principles that help us understand the processes that shape life in marine environments. The marine biology major is a demanding program that offers a B.S. degree and requires several more courses than the general biology B.A. major.

Molecular, cell, and developmental biology B.S.: The molecular, cell, and developmental (MCD) biology major is designed for students interested in medical or other professional graduate programs and those preparing for careers in biotechnology industries. This major is more structured than the general biology major and requires that students pay careful attention to the prerequisites required for upper-division biology courses.

Neuroscience and behavior B.A./Neuroscience and behavior B.S.: Neuroscience, the study of the nervous system and behavior of animals, is a frontier area in biology, touching psychology on the one hand and computer science on the other. The neuroscience and behavior majors provide students with rigorous preparation for graduate studies and research in the fields of neuroscience and behavior. The brain and determinants of behavior are studied at all levels, from biological molecules to individual nerve cells to functioning organisms to social behavior. The majors emphasize the interrelationship between the two fields, building on a common core of general and biological science course work. Students select a pathway in either behavior or molecular neuroscience. Rigorous course work is supplemented by opportunities for hands-on laboratory and field courses and independent research.

Plant sciences B.S.: The plant sciences major is designed for students with an interest in plant biology and its associated curricular fields such as plant ecology, plant physiology, plant pathology, plant molecular biology, soils, and applied plant sciences. After completion of the core courses, students can proceed in one of several directions depending on their interest. For example, a more in-depth study of physiology and molecular biology courses can serve as preparation for work in the biotechnology field or for graduate school; further studies in plant ecology, tropical ecology, or restoration ecology can lead to careers such as resource ecologist or naturalist or to the pursuit of related fields in graduate school; upper-division training in agroecology can lead to careers in agriculture or food systems. A special feature of this major is a one-quarter internship and/or independent research requirement. There are many opportunities for internships both on the UC Santa Cruz campus and in the community at large.

Biochemistry and molecular biology B.S (administered in conjunction with the Chemistry and Biochemistry Department): The BMB major constitutes an integrated curriculum of basic instruction in biology, chemistry, mathematics, and physics, followed by the opportunity to pursue advanced study in specialized areas of interest.

Environmental studies/biology combined major B.A. (administered in conjunction with the Environmental Studies Department): This course of study provides students with the basic tools of biological science and sufficient understanding of resource conservation, conservation biology, and concerns about environmental sustainability to apply these tools to environmental problems.

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Bioinformatics B.S. (administered in conjunction with the School of Engineering): Bioinformatics combines mathematics, science, and engineering to explore and understand biological data from high-throughput experiments, such as genome sequencing, gene expression chips, and proteomics experiments. Students in the major complete core sequences in mathematics (including calculus, statistics, and discrete mathematics), science (including biology, chemistry, and biochemistry), and engineering (including programming, algorithms, and databases.) The undergraduate bioinformatics degree program prepares students for graduate school or a career in the fast-paced pharmaceutical or biotechnology industries and builds a solid foundation in the constituent areas of the field.

UCSD: Animal Physiology & NeuroScience: This major provides a program for studying the bodily and neural functions of complex organisms. Within this major a student may concentrate on specialized areas of study such as: human biology, neurobiology, ethology, endocrinology, marine biology, and reproduction. This major is most directly applicable to health-related professions such as medicine, nursing, dentistry, veterinary medicine, pharmacy, physical therapy, and medical technology. Animal Physiology and Neuroscience majors are also well prepared to enter other professions such as physiological research, physical education, agriculture, and wildlife management.

Biochemistry and Cell Biology: This major is designed to provide students with the educational foundation in and fundamental understanding of the fields of biochemistry, cell biology, molecular biology and genetics. This foundation will prepare students for work and advanced studies in a wide variety of areas of biological and biomedical sciences including developmental biology, microbiology, virology, biophysics, human biology, pharmacology and plant biology. The major will also prepare students for entry into graduate and professional schools including schools of medicine and pharmacology. The program includes two required upper-division biology laboratory courses to provide practical experience with modern techniques and useful technology for those seeking positions as lab technicians in clinical and basic research laboratories. The opportunity to select five elective courses allows students to pursue either a more broad background in a variety of biology subjects or a focused specialization in a chosen field of study.

Ecology, Behavior, and Evolution: This major includes population biology, ecology, conservation biology, animal behavior, population genetics, biogeography, and evolution. These fields focus on evolutionary processes and how whole organisms relate to each other and their environments. Research careers in ecology, behavior and evolution are found in universities, government agencies, and biotechnology. Applied careers for ecologists are varied: Recent graduates work in forestry and wildlife management, as ecological consultants for the U.S. and foreign governments and private industry, as teachers, or in new fields such as ecological medicine and epidemiology, environmental design and planning and conservation biology. Organismal biology spans a wide variety of topics. The major has been designed to provide the basic fundamentals while allowing maximum flexibility within the general topic areas.

General Biology: This program allows the most diversified exposure to biology of any of the majors offered by the Division of Biological Sciences. It is designed for students with broad interests who do not wish to be constrained by the specialized requirements of the other majors and who desire maximum freedom to pursue their particular educational goals. In addition to the requirements of Organic Chemistry, Biochemistry and Genetics, this major

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requires two formal Biology laboratory courses (to be chosen by the student) and eight elective lecture courses chosen from any of the upper-division courses offered by the Division of Biological Sciences.

Microbiology: This major is designed to prepare students for graduate studies and professional careers in a variety of health-related programs. The specialization in microbiology can provide the basic background for work in medical technology, for further training in public health, and other health-related specialties. The program is also designed to provide a foundation for graduate studies in microbiology, virology, and a variety of allied fields as well as for medical school and dental school.

Molecular Biology: The program for molecular biology is designed to provide intensive exposure to the theoretical concepts and experimental techniques of molecular biology. The concepts and techniques of molecular biology are the foundation for the studies of all aspects of biology in modern time. A focus on molecular biology, therefore, provides an excellent preparation for a wide range of advanced studies including basic research, medicine, bioengineering and biotechnology. Considerable emphasis is placed on chemistry, biochemistry and genetics for students enrolled in the program. As such, it is recommended for those students who have a particularly strong interest in this field of study.

Biology with a Specialization in Bioinformatics: This program offers a rigorous, interdisciplinary training in the new and rapidly evolving field of bioinformatics within the Division of Biological Sciences. Bioinformatics refers to advanced computational and experimental methods that model the flow of information (genetic, metabolic and regulatory) in living systems to provide an integrated understanding of the systems and properties of model organisms. Given that this is a new and rapidly evolving field, and the fact that large volumes of both qualitative and quantitative biological data will accrue at an increasing pace in the next decade, the bioinformatician of the future must have a substantial mastery in the sciences and in engineering. The program offered by the Division of Biological Sciences is aimed at a student interested in applying, and to some extent developing, tools of bioinformatics for the study of biological systems.

Human Biology: The core classes required of all Human Biology majors provide the student with the basic principles that help us understand normal human physiology and the molecular basis of human disease. The courses options in human physiology, human disease, and biomedical-related laboratories provide the student with educational breadth while still allowing the student considerable flexibility in tailoring their course of study to suit their educational goals.

3. *What emphases are available within those majors at your campus?*

- UCB:** Integrative and Developmental Biology – None
Molecular & Cell Biology – Plan I: Emphasis in Biochemistry and Molecular Biology, Genetics and Development, or Immunology, and Plan II: Emphasis in Cell and Developmental Biology or Neurobiology.
Public Health – None
- UCD:** There are a variety of emphases available among the many majors. Please see the Division of Biological Sciences Web site at <http://dbs.ucdavis.edu>. Click on the “Academics” section of

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the site for additional details. The *UC Davis General Catalog*, available online at <http://registrar.ucdavis.edu/UCDWebCatalog/> is an additional resource.

- UCI:** Concentration: Biochemistry and Biomedical Physics
Minor: Biological Sciences, Earth and Atmospheric Sciences, Environmental Analysis and Design, Environmental Design, Epidemiology and Public Health.
- UCLA:** There are no formal emphases within majors in these areas.
- UCM:** Biological Sciences: Cell Biology and Development Microbiology/Immunology
Human Biology (Anticipated in 2005): Natural Sciences and Social Sciences
- UCR:** Biology: Cell and Molecular Biology, Molecular Genetics, Organismal Genetics, Zoology and Physiology, Ecology and Population Biology.
Biological Sciences: Bioinformatics and Genomics Track; Biology Track; Cell, Molecular, and Developmental Biology Track; Conservation Biology Track; Entomology Track; Environmental Toxicology Track; Evolution and Ecology Track; Medical Biology Track; Microbiology Track; and Plant Biology Track
- UCSB:** The majors do not have official emphases stated on the degrees but, unofficially, students may emphasize specific course subjects within all individual majors, by completing more courses within major elective areas. Note that for Microbiology majors, students are encouraged to select a special track in genetic engineering, general microbiology, or biomedical sciences. For Pharmacology, students should select a track from neurobiology and behavior, molecular and cellular biology, biochemical pharmacology, or physiology and development.
- UCSC:** Since each of the majors listed above are separate offerings within the Biological Sciences and provide a different focus, concentrations or emphases are not offered within the separate Biological Sciences single or combined majors.
- UCSD:** Please see answer to #2.

4. *What are some of the current topics researched at the undergraduate level by students who are majoring in the Biological Sciences?*

UCB: Integrative Biology: Amphibian Disease Dynamics in a Fragmented Landscape, The effects of introduced bullfrogs and livestock grazing on aquatic food webs in the East Bay Regional Parks, Stable Isotopes in the Study of Metabolism, Flight Performance of Hummingbirds, Biomechanics of Marine Organisms: How Larvae Land in the Right Habitat, Monitoring environmental pollution in shallow-waters of San Francisco Bay, Exploring Reptile and Amphibian Biodiversity and Biogeography Through An International On-line Community.

Molecular & Cell Biology: Computational Approaches to Structural & Functional Genomics, Critical evaluation of software that predicts structural characteristics of proteins from sequence, Drug resistance of cancer cells via chromosome reassortments, Why the Stomach Does Not Digest Itself, Cell Activation and Membrane Trafficking Inflammatory interactions between bacteria and lung airway epithelial cells, Inflammatory interactions between bacteria and lung airway epithelial cells.

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Public Health: Community Nutrition Project - Nutrition Education and Behavior Change
Small Group Discussions, Investigation of a possible viral etiology of breast cancer, 20-year
Follow-up for Early Breast Cancer Test, Pathogenesis of Salmonella, Molecular Epidemiology
and Evolution in Staphylococcus aureus, Genealogy of a Gene.

- UCD:** Research covers all topics within the majors listed above. DBS publishes on the Web a research guide for undergraduates that lists over 300 faculty on the campus who welcome undergraduate science majors into their labs.
- UCI:** Current Research Topics: There are over 300 research topics in which undergraduate students may participate. To name a few research topics: Endocrinology/Cancer, Neurochemistry, Evolution Genetics, Exercise/Muscle Physiology, Animal Ecology, Cell Different, Cancer Genetics, Protein Function, Evolution of Disease, Human Brain/Behavior, Immunology and Cell Biology, Membrane Genetics, Cholesterol Genes, Learning & Memory, Pathology, Auditory Neurobiology, Immunology, Plant Cell Physiology, Hormone Endocytosis, and etc.
- UCLA:** Life Sciences at UCLA bring together an extraordinary range of interests, from ecology and evolution to neuroscience. At any given time, more than 3,000 funded research programs are in progress at UCLA. The current listing of undergraduate and graduate research opportunities can be located at www.research.ucla.edu/oru.htm. Research topics include: Congenital Heart Disease, Memory Disorders (Alzheimer's Disease Program), Neurobiology of human trauma brain injury at the Brain Research Center, Molecular Parasitology in Microbiology, Immunology and Molecular Genetics of several types of parasitic protozoa, how does HIV becomes AIDS, and what makes cancer cells tick?
- UCM:** Topics available for research could include: Cancer cell biology (Which proteins are expressed in breast cancers and leukemias that fail therapy?) Which signaling pathways are important in stress? What determines whether a cell decides to divide or to differentiate to another type of cell? How do bacteria, such as chlamydia, know when to die?
- UCR:** A current listing of undergraduate research opportunities can be located at the following: <http://www.ora.ucr.edu/vc/UndergradResearch/OnlineOpportunities>.
- UCSB:** Aquatic Biology: Current faculty and student research areas include coral reef ecology, symbiosis, kelp bed ecology, the biology of deep sea organisms, marine bioluminescence, biology of marine plankton, behavior of marine organisms, marine microbiology, intertidal ecology, marine natural products chemistry, freshwater biology, stream ecology, and acid rain.

Biochemistry-Molecular Biology: Research is being done in the areas of virology, gene expression & regulation, cellular differentiation, membrane biochemistry, immunology and mammalian cell genetics.

Cell & Developmental Biology: Research areas include gene expression and regulation, cellular differentiation, cell division, fertilization mechanisms, pattern formation and signal transduction during development and neuronal development. Faculty members use 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.

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Pharmacology: Faculty instructors teach and conduct research in areas related to pharmacology such as cell biology, neurophysiology, endocrinology, biochemistry, immunology, biotechnology, genetics and ecology.

Physiology: Research areas include reproductive physiology and the hormonal control of reproduction, metabolism and metabolic adaptations in deep-sea and hydrothermal vent animals, muscle bioenergetics and the biochemistry of animal locomotion, neurophysiology and sensory physiology of marine animals, and metabolic regulation.

UCSC: The development and application of parallel methods such as microarrays and high throughput screening to understand RNA splicing; knowledge-based analysis of microarray gene expression data using support vector machines; studies on the structure and function of ribosomal RNA; live analysis of free centrosome behavior in normal and aphidicolin-treated *Drosophila* embryos; the penetration of local anesthetics into the red blood cell membrane as studied by fluorescence quenching.

UCSD: Topic include: Control of behavioral states involved in egg-laying by serotonin and neuropeptides, Evolution of animal communication: functionally referential communication in highly social bees, Molecular mechanisms governing development of potassium current., Calcium transients: Mechanisms of generation and action, Regulated degradation of HMG-R using a combination of genetic, cell biological, molecular biological, and biochemical approaches.

5. **Give examples of current opportunities for students to do internships, research projects or programs associated with Biological Science.**

UCB: Research: The Undergraduate Research Apprentice Program (URAP) is designed to involve Berkeley undergraduates more deeply in the research life of the University. The Program provides opportunities for students to work with faculty on the cutting edge research projects for which Berkeley is world-renowned. Working closely with faculty, students will deepen their knowledge and skills in areas of special interest, while experiencing what it means to be part of an intellectual community engaged in research.

New research opportunities are open at the start of each semester. Faculty and undergraduates from all of the schools and colleges at the University of California at Berkeley are welcome to participate.

Internships: The Cal Internship Directory is for University of California, Berkeley students. Use this Directory to locate on-campus and off-campus internship resources, especially in California, New York City, Washington, DC, and international. Included are field positions, internships, and community service work which have educational, career value or service orientation and are open to undergraduate and/or graduate students. The experience may be paid or not paid, may or may not be awarded academic credit, and may be of any length as long as it involves active participation.

UCD: At least 75% of the students in the division participate in independent research and/or internships. Research topics run the gamut as do the internship topics. With School of Veterinary Medicine, the UCD Medical Center and the Shriners's Hospital in such close proximity, students are always able to find a myriad of opportunities.

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UCI: Current Internship/Research Project Opportunities: The Beckman Laser Institute and Medical Clinic – a research, training, and service facility in the area of laser microbeam technology School of Biological Sciences Biohazard Facility – provides laboratory facilities or working with biological agents or biological molecules such as recombinant DNA which would be hazardous when used in open laboratories; The Developmental biology Center – devoted to analyzing the cellular and genetic mechanisms underlying growth, development, and regeneration; The Center for the Neurobiology of Learning and Memory – a research center for studies of the brain mechanisms underlying learning and memory; The Institute for Brain Aging and Dementia; the Center for Virus Research – which includes the Viral Vector Design research group; The Conservation Biology Project; the Cancer Research Institute; The UCI Arboretum a botanical garden facility; The San Joaquin March Reserve which supports controlled marsh biota; The Burns Pinon Ridge Reserve, a high-desert habitat in San Bernardino County; The UCI Ecological Preserve, which includes coastal hills on the campus.

UCLA: We have a program called the Student Research Program emphasizing the entry levels of research, as well as upper-division units for research. There are also specific research courses in each department. Website: www.college.ucla.edu/ugresearch/res/srp.html

UCM: All faculty are interested in and looking forward to working with undergraduate students. Some students may be paid from research programs, or other funds, others may do research by enrolling in research courses for unit credit.

UCR: CAMP-UCR (California Alliance for Minority Participation in Science, Engineering and Mathematics at UCR): funded by the National Science Foundation and the University of California, CAMP-UCR offers academic support, research opportunities, and enriched coursework to students of color majoring in science and/or engineering to encourage them to complete undergraduate science degrees and further pursue their studies at the graduate and professional level. Coordinator: Teresa Cofield, (909) 787-5326.

MARC U*STAR Program: Funded by the National Institutes of Health, the MARC U*STAR Program is open to juniors and seniors from ethnic backgrounds that are under-represented in the sciences and who intend to earn a graduate degree and pursue a research career in fields with applications to biomedical research. Director: Professor of Biochemistry Jolinda A. Traugh, (909) 787-4239.

Research Experiences for Undergraduate Studies in Plant Cell Biology: this National Science Foundation Research Experiences for Undergraduates (NSF-REU) program offers 10-week summer research traineeships for students working in laboratories of faculty participating in the UCR Center for Plant Cell Biology. Director: Associate Professor of Plant Physiology Elizabeth A. Bray, (909) 787-4548.

UC LEADS (UC Leadership Excellence in Advanced Degrees): UC LEADS is a two-year program funded by the University of California system for educationally and/or economically disadvantaged undergraduates (rising junior through senior year) pursuing majors in science, engineering, or mathematics. The program seeks to prepare students to pursue Ph.D.s, preferably at UC campuses, and to prepare them for leadership roles in government, industry, academia, and public service. Director: Marie Steward, (909) 787-3689.

UCSB: See previous question for examples of research topics. UC Santa Barbara actively supports the efforts of undergraduate students to pursue meaningful research and creative activities

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under faculty supervision. The Undergraduate Research and Creative Activities (URCA) Office in the College of Letters and Science sponsors student projects with funding from university, federal and private sources. Web site: <http://www.ltsc.ucsb.edu/urca/research/research.php>. Students can also secure research and internship opportunities through academic departments and Counseling and Career Services.

UCSC: There are several bulletin boards near the Biology department where internship listings are posted. In addition, there are several internship programs on the UC Santa Cruz campus, and/or affiliated with the campus, for those pursuing areas of study associated with the Biological Sciences majors: *UC Santa Cruz Arboretum internships* (Plant Sciences, Ecology & Evolution, Environmental Studies); the *Campus Natural Reserve Internship* (Ecology & Evolution, Environmental Studies, General Biology); *Center for Agroecology & Sustainable Food Systems internships* (Environmental Studies, Ecology & Evolution, Plant Sciences); *Center for Biomolecular Science/Engineering internships* (Biomolecular Engineering); *Environmental Studies Field and Internship Program placements* (Environmental Studies, Ecology & Evolution, General Biology); the *Health Sciences Internship; internships in the Health Sciences; internships with Plant Growth Facilities* (Plant Sciences, Ecology & Evolution, Environmental Studies, Molecular, Cell & Developmental Biology); the *Santa Cruz Museum of Natural History Museum Science Internship; Seymour Marine Discovery Center Volunteer Internship* (Marine Biology, Ecology & Evolution, Environmental Studies.)

Biological Sciences students may also receive credit for independent studies projects with the official sponsorship of a faculty member.

UCSD: Special Studies courses (BISP 196, 197, 199) – These courses allow students to earn academic credit while participating in internships in the local biotechnology community and/or doing research with faculty members throughout the UCSD campus.

6. Describe the advising process at your campus for students who are interested in medical school. Identify specific advising departments, if any.

UCB: Career Center Counselors are available to assist students with any aspect of career planning, job search, or graduate/professional school preparation and application. They are available by appointment or on a "drop-in" basis.

UCD: The campus has a Health Sciences Advising Office that specializes in advising students interested in applying to any health-related field.

UCI: The Biological Sciences Student Affairs Office coordinates the advising program for students interested in medical school and provides academic and career counseling in the health sciences, particularly in the area of pre-professional career counseling. Bio 3A is a course developed to take students through the application process to medical, dental, optometry and pharmacy school.

UCLA: No. Advising for pre-medical students is done by students' major counselors in the sciences departments. Pre-medical advising for students in non-science departments is split among the life science counselors according to the majors of the students involved. In addition, the UCLA Career Center offers Pre-Health Career Services, and students have access to a variety of Pre-Health groups.

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UCM: UC Merced does not yet have a specific advising department for students interested in medical school. However, several faculty come from medical school environments, and will undertake the advising role in this area.

UCR: UCR has a Health Professions Advisor within the College of Natural and Agricultural Sciences who acts as a guide and information source for undergraduates who are interested in pursuing Medical programs. The program web address is <http://cnas.ucr.edu/health/>.

UCSB: Students can receive advising about medical school and other health fields from a variety of resources on campus. Career advisors are available in Counseling & Career Services, as well as academic advisors in the College of Letters & Science. However, for the most comprehensive resource on health professions, students should consult with the Health Professions Advising Program. Services include a faculty advisor, a resource room, student initiated health professions associations, and an annual health professions conference.

UCSC: UC Santa Cruz students interested in working in the health fields are supported by the Division of Physical and Biological Sciences' Undergraduate Advising Office, the Health Sciences Internship Coordinator, and the Health Sciences Career Advising Office. Services provided by the Health Sciences Career Advising Office include a Career Library, drop-in advising, individual advising, and workshops, in addition to the following resources: information sessions with representatives of health professions; liaison with professional schools; applications for National Health Professional Schools services such as American Medical College Admissions Service (AMCAS), American Association of Dental Schools (AADS), Osteopathic Application service (ACOMAS) and Veterinary Medical College Admission Service (VMCAS); admissions test applications; general directories of medical and allied health careers; and web access to information on health career resources.

UCSD: Limited advising about medical school is available from the Biology Undergraduate Staff Advisors. The main source of advising is via the Professional & Graduate School Advising Office located in the Career Services Center.

7. *Does your campus have a medical school or programs in the health professions at the graduate level?*

UCB: School of Optometry - <http://spectacle.berkeley.edu>, School of Public Health - <http://sph.berkeley.edu>.

UCD: UC Davis has both Schools of Medicine and Veterinary Medicine as well as a full range of graduate programs in the sciences.

UCI: College of Medicine areas of study: Anatomy and Neurobiology, Biological Chemistry, Environmental Toxicology, Genetic Counseling, Medical Residency Programs, Medical Scientist Program, Medicine, Medicine/Business Administration, Microbiology and Molecular Genetics, Pharmacology and Toxicology, Physiology and Biophysics.

UCLA: Yes.

UCM: No

UCR: UCR has the **Thomas Haider Program** in Biomedical Sciences, a unique path of entrance to one of the country's leading medical schools. Beginning with the students entering medical

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school in Fall 2006, students from any major can apply for one of the 24 seats in the medical school each year in the university's joint program with the David Geffen school of Medicine at UCLA. Admitted students take the first two years of their medical education at UCR and the remaining two years at UCLA. They receive their M.D. degrees from UCLA.

UCSB: No.

UCSC: No, UC Santa Cruz does not have any professional schools in the Health Sciences.

UCSD: Yes: UCSD School of Medicine, UCSD School of Pharmacy and Pharmaceutical Sciences, Graduate Programs (select listing): Biological Sciences, Biomedical Sciences, Molecular Pathology, Neuroscience.

8. *What are the opportunities at the graduate level for Biological Sciences majors at your campus?*

UCB: Biophysics M.A., Ph.D.; Biostatistics M.A., Ph.D.; Comparative Biochemistry M.A., Ph.D.; Health & Medical Sciences-Medical Program M.S. / M.D. (UCSF); Integrative Biology M.A., Ph.D.; Microbiology M.A., Ph.D.; Molecular & Biochemical Nutrition M.A., Ph.D.; Molecular & Cell Biology M.A., Ph.D.

UCD: The division houses 11 graduate programs, and there are several other biology-related graduate groups administered by other units on campus.

UCI: Anatomy and Neurobiology, Ph.D.; Biological Chemistry, Ph.D.; Biological Sciences, M.S., Ph.D.; Biomedical Engineering, M.S., Ph.D.; Developmental and Cell Biology, Ph.D.; Ecology and Evolutionary Biology, Ph.D.; Environmental Health Science and Policy, M.S., Ph.D.; Environmental Toxicology, M.S., Ph.D.; Microbiology and Molecular Genetics, Ph.D.; Molecular Biology and Biochemistry, Ph.D.; Neurobiology and Behavior, Ph.D.; Physiology and Biophysics, Ph.D.; Protein Engineering Science, Ph.D.

UCLA: They can enter M.S. or Ph.D. programs in nearly all science departments on campus.

UCM: Quantitative and Systems Biology Program: The Quantitative and Systems Biology program offers individualized research-based courses of study leading to the Ph.D. degree. While the M.S. degree is also offered, admissions will usually be granted only to students who intend to complete a Ph.D.

The Quantitative and Systems Biology Graduate Group at UC Merced offers a multidisciplinary research and training program for doctoral students who want to be at the forefront of this revolution of the biological sciences. Research projects are available on topics ranging from intercellular signaling to computational molecular biology. Coursework will provide a background in the tools of modern biology, including computational biology, genomics and advanced instrumentation. The graduate group will offer opportunities for students interested in multidisciplinary projects at the interface between biology, computer science and bioengineering.

UCR: Biology M.S., PhD.

UCSB: UCSB offers graduate degrees in Ecology, Evolution & Marine Biology and Molecular, Cellular & Developmental Biology.

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UCSC: Ecology and Evolutionary Biology: M.A., Ph.D.; Marine Sciences: M.S.; Molecular, Cell, and Developmental Biology: M.A., Ph.D.; Chemistry and Biochemistry: M.S. (thesis or course work), Ph.D.; Earth Sciences: M.S., Ph.D.; Environmental Studies: Ph.D.; Environmental Toxicology: M.S., Ph.D.; Ocean Sciences: Ph.D.; Science Communication: Graduate Certificate in Science Writing; Graduate Certificate in Science Illustration.

UCSD: Limited Master's degree programs (M.S.), Doctoral programs (Ph.D.), Medical Doctorates (M.D.), and Pharmaceutical Doctorates (Pharm.D.)

9. *What are graduates within the Biological Sciences doing with their degrees? Please provide examples.*

UCB: Integrative Biology - Most baccalaureate graduates report that they are currently employed (37%) or attend graduate school (30%). Those students who report that they are employed work for profit organizations, or in the area of education. Many are working as Research Associates, Laboratory or Technical Assistants, Biotechnicians, or Teachers. Students in graduate schools programs are pursuing advanced degrees in areas such as Medicine, Dentistry, Pharmaceutical Sciences, Law, City and Regional Planning, Education, and Biological Sciences.*

Molecular and Cell Biology - Most baccalaureate graduates report that they are currently employed (40%) or attending graduate school (30%). Employed students report that they work for in profit organizations or in the area of education. Students are working as Research or Technical Assistants, Medical and Laboratory Assistants, and Criminalists. Students in graduate schools are pursuing advanced degrees in Biology, Biochemistry, Biomedical Engineering, Biotechnology, Criminology, Education, Epidemiology, Genetics, Health Careers, Law, Public Administration, and Public Health.*

**This report is an excerpt from the information baccalaureate graduates provided about their initial career choices following graduation. For more information on this survey, go to <http://career.berkeley.edu/Major/MajorSurvey.stm>*

UCD: Our graduates go everywhere – e.g., medicine, veterinary medicine, graduate school, , government, dentistry, optometry, computers. As with any discipline, it is not possible to list the gigantic range of opportunities.

UCI: Career Areas: Bioanalysis, Biochemistry, Biomedical Engineering, Cell Biology, Chiropractic Medicine, Dentistry, Developmental Biology, Dietetics, Environmental Management, Forestry, Genetic Engineering, Health Administration, Industrial Hygiene, Marine Biology, Medical Technology, Medicine, Microbiology, Nurse Practitioner, Occupational Therapy, Oceanography, Optometry, Osteopathy, Plant Biology, Pharmacology, Pharmacy, Physicians' Assistant, Physical Therapy, Podiatry, Public Health, Quality Control, Sales, Speech Pathology, Teaching, Technical Writing and Editing, Veterinary Medicine.

UCLA: Our students enter a wide variety of careers. For examples, please see our list of "Over 500 Careers in Biology" at http://www.obee.ucla.edu/undergraduate/careers_500careers.shtml.

UCM: Biological Sciences: The Biological Sciences major will provide excellent preparation for students who want to prepare for careers in the health sciences, including medicine, nursing, pharmacy and dentistry, as well as other allied health fields. Graduates of this program will

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be competitive for positions in the pharmaceutical industry, and in health care delivery as well as in other careers such as law, policy and administration, which increasingly interface with the biological sciences. The program's strong linkage with physical and information sciences will also appeal to computationally oriented students with interests in biological applications. In addition, the breadth and hands-on emphasis of this program will be an excellent preparation for graduates to become K-12 science teachers.

Human Biology (Anticipated in 2005): The Human Biology major will provide majors with the appropriate background for entrance into biomedical research and professional education in areas of medical, allied health, and public health, including medicine and dentistry, pharmacy, genetic counseling, health education, nursing, clinical psychology, epidemiology, environmental health sciences, and health administration, as well as biotechnology, teaching, medical technology, patent law, physical therapy, and nutrition.

UCR: Many graduates go on to graduate programs in the Sciences, enter the teaching field, or work in private industry/government research.

UCSB: UCSB graduates from any of the biological science majors go on to do a variety of things ranging from graduate and professional schools to employment in private and public sectors. The following are some specific major related examples: Aquatic Biology - Careers options include conservation of marine and other resources, fisheries, aquaculture and water quality control; Cellular & Developmental Biology - Careers may be found in the pharmaceutical and biotechnology sectors. This is also excellent preparation for careers combining science and law such as forensics; Ecology & Evolution - Career opportunities may be found with local, state, and federal agencies, environment assessment firms, and privately-funded environmental and conservation organizations; Pharmacology - Careers are available in private, state, and federally funded drug research laboratories, drug and chemical regulatory agencies, pharmaceutical companies, and environmental toxicology; Zoology - Students may obtain opportunities with wildlife management and environmental assessment, with zoos, and environmental impact firms.

UCSC: Biomedical, pharmaceutical, and genetic research; graduate study at the masters and doctorate levels; medical school; work as laboratory technicians; teaching biology at the K-12 levels; teaching at the university level.

UCSD: At UCSD, 21% of graduates pursue employment in the area of life/health sciences. Graduates with majors in the Biological Sciences are employed in jobs such as: Development Scientists, Associate Scientist, Biological Quality Assurance Technician and Technical Marketing/Sales. Visit the UCSD Career Services Center website for the most updated information.

10. What are the most popular medical programs for graduates at your campus? (For example - staying at the UC, going out of state for medical school).

UCB: The top 20 medical schools and California medical schools for graduating UCB seniors (1998-2002) are: (National Ranking among Top 20 according to US News and World Report)

- Baylor
- Columbia University
- Cornell University
- Drew/UCLA Medical Program
- Duke University

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Emory University
Harvard
Johns Hopkins
Keck-University of Southern California
Loma Linda
Mayo Medical School
Stanford
University of California-Davis
University of California-Irvine
University of California-Los Angeles
University of California-San Diego
University of California-San Francisco
University of Michigan
University of Pennsylvania
University of Pittsburgh
University of Texas Southwestern
University of Washington
Vanderbilt
Washington University in St. Louis
Yale

Please visit our Career Center website for more Medical School Statistics at:
<http://career.berkeley.edu/MedStats/MedStats.stm>

- UCD:** Most of our students would prefer to stay within the state of California, but will go where admitted.
- UCI:** UCI students are accepted to medical schools throughout the country. While UC medical schools are excellent and their fees are reasonable, there are important attributes of many out-of-state medical schools that make them attractive to UCI students as well.
- UCLA:** Our students can be found all over the country; the UC programs are among the most sought after.
- UCM:** N/A
- UCR:** Currently, the most popular program for students considering medical school is the Haider Program.
- UCSB:** The most popular is going to a UC medical school (or other medical school in California), although many students go to medical schools in other states.
- UCSC:** UC San Francisco, UC Los Angeles, UC San Diego, UC Davis, UC Irvine, Stanford University, Loma Linda University. Also, private institutions in the following states are ones to which our graduates most often apply: New York, Illinois, Pennsylvania, and Massachusetts.
- UCSD:** Over one-third of students pursue advanced degrees. Graduates with majors in the Biological Sciences pursue graduate and professional study in such areas as: Medical School, Dental School, Veterinary Medicine, Osteopathic Medicine, Optometry, Public Health, Physical

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Therapy, and Law School. Please visit the UCSD Career Services Center website for the most updated information.

11. What are the admission requirements/selection criteria for Biological Sciences majors at your campus?

UCB: Applicants must complete either: (1) the L&S Essential Skills Requirements (Reading & Composition, Foreign Language, and Quantitative Reasoning) or (2) IGETC by the end of the spring term that precedes fall enrollment at Berkeley. In addition, applicants must be prepared to undertake upper division courses in their intended major by completing as many lower division major requirements as possible before transfer. In general, strength of academic preparation and grade point average are the primary selection criteria for admission. **

***Molecular and Cell Biology students must minimally complete the equivalent of General Biology, General Chemistry, and Organic Chemistry. Please refer to ASSIST for specific lower division major requirements. Integrated Biology students must minimally complete the equivalent of General Biology and General Chemistry.*

UCD: Transfer students are required to complete courses comparable to the following UC Davis courses for each of the three groups of courses with no grade less than “C”: Mathematics 16A, B, C or Mathematics 21A, B, C; Chemistry 2A, B, C; Biological Sciences 1A or 1B or 1C.

If only one course in the biological sciences is completed the GPA must be a “B” grade or better. It is strongly recommended that students complete the entire series. If students complete two or three biological science courses, they must earn an overall GPA of 2.50 or better among these courses with no grade less than “C.”

It is strongly recommended that students complete courses comparable to the following UC Davis courses with a GPA of at least 2.50 for the group: Organic Chemistry 8A, B or 118A, B, C.

Minimum transfer overall GPA range to be competitive: 2.80 – 3.00 or higher.

UCI: In addition to meeting the minimum UC admission requirements, Biological Science students must have a minimum overall 3.0 GPA and must complete one year of general chemistry, with laboratory, with a minimum letter grade of B.

UCLA: Entering transfer students must have completed two semesters of biology with lab for majors, two semesters of general chemistry with lab for majors, two semesters of calculus, plus either one semester of organic chemistry with lab.

UCM: Transfer applicants are considered based on the extent to which the lower division prerequisites have been completed, and the academic performance in transferable coursework. Preference will be given to junior-level California community college students who will have completed at least 60 transferable semester (90 quarter) units.

UCR: Students transferring to the Biology or Biological Sciences major are required to complete courses comparable to the following one-year sequences with a minimum grade of “C” before they transfer (with the exception of Organic Chemistry – see below):

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General Chemistry 1A-1B-1C, and at least two of the following one-year sequences, First Year Calculus 9A-9B; General Biology and Organismal Biology 5A, 5LA, 5B (and 5C if available); General Physics (calculus based) 2A-2B-2C or General Physics 40A-40B-40C; and Organic Chemistry 112A, B and C with at least “B” grades.

Students must also have a cumulative 2.7 GPA and are strongly encouraged to complete as many as possible of the remaining courses from the additional selection criteria list above before entering the University.

UCSB: Aside from the general admissions requirements for transferring, all biological science majors must attain a grade point average of 2.7 or better in science and math preparatory courses. Students must complete one year of general chemistry with lab and complete at least one additional yearlong sequence from within calculus, general physics with lab, general biology with lab, or organic chemistry with lab.

UCSC: General admissions requirements for students transferring to UC Santa Cruz are provided at the UC Santa Cruz admissions web site: <http://admissions.ucsc.edu>.

Selection criteria for the biological sciences majors are as follows. Students may not declare any of the biological science majors until they have completed their biological science prerequisites (see below.) However, a student can declare him or herself as a Pre-Biology major, if s/he has not completed the necessary prerequisites to declare a biological sciences major. Declaration as a Pre-Biology student satisfies UC Santa Cruz's Declaration of Major requirements. Once a Pre-Biology student has completed his/her prerequisites, s/he can come to the Undergraduate Biology Advising Office and change the declared major from Pre-Biology to one of the specific biological sciences majors.

The prerequisites for declaring any biological science major are as follows: Pre-calculus: [MATH 2] or [MATH 3] or [Math Placement Exam of 31+]; Calculus: [Math 11A & 11B] or [Math 19A & 19B] or [Calculus BC Exam Score of 8+]; General Chemistry: CHEM 1B/M & 1C/N; Organic Chemistry: [CHEM 108A/L & 108B/M] or [CHEM 112A/L & 112B/M]; Biology: BIOL 20A, 20B, and 20C (20C waived for Health Sciences, BMB, & Environmental Studies/Biology combined major).

UCSD: Admission to UCSD is determined by the Admissions Office and not by any academic department/division within UCSD. Any student may declare one of the Biology majors upon application or during their career as a UCSD student. However, there are certain requirements that must be met in order to remain in the major. Continuing as a Biology major will be contingent upon the following:

1. Students must complete eight of the following courses during their first five quarters:
BILD 1, BILD 2, BILD3; Chemistry 6A, Chemistry 6B, Chemistry 6C; Math 10A/20A, Math10B/20B, Math 10C/11/20C (Molecular Biology majors MUST take Math 20 series); Physics 1A/2A, Physics1B/2B, Physics 1C/2C; Chemistry 140A, Chemistry 140B; BIBC 103; BICD 100.
2. A student's highest six grades from the eight courses listed above will be used to calculate a GPA which must be at least a 2.5.
3. Student who do not meet these requirements will be dropped from the major.

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As a *freshman*, you must complete these requirements by the end of your fifth quarter with a GPA of at least 2.5.

Transfer students who have not met the above requirements prior to transfer will be allowed a maximum of three quarters to satisfy any unmet screening requirements.

NOTE: These requirements are only part of the Divisional requirements for Biology majors. You are still required to complete the full, three-quarter series of Math, Chemistry and Physics, including appropriate lab courses.

12. Who are the contact people for Biological Sciences at your campus; including research and medical school advisors?

UCB: Integrative Biology - Diane Nakamura/Gwen Johnson, Student Affairs Officers,
Integrative Biology
College of Letters & Sciences
2033 Valley Life Sciences Building
510-643-7204

Molecular and Cell Biology - Regan Ronayne, Manager, Undergraduate Affairs Officer,
MCB
College of Letters & Sciences
2083 Valley Life Sciences Building
510-643-8895

Public Health - Anatole (Tony) Soyka, M.A., Student Advisor, Public Health:
516 Warren Hall
510-643-0874
Email: sphug@uclink.berkeley.edu

Microbial Biology, Genetics and Plant Biology
Kyle Dukart, Student Affairs Officer
510-642-5167
Email: kdukart@nature.berkeley.edu

Molecular Environmental Biology
Maire Lanigan, Student Affairs Officer
510-642-4249
Email: mlanigan@nature.berkeley.edu

UCD: Division of Biological Sciences - Ellen Tani, Assistant Dean
<http://dbs.ucdavis.edu>
530-752-0410

UCI: Office of Admissions and Relations with Schools
204 Administration Building
Irvine, CA 92697-1075
949-824-6703

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School of Biological Sciences

Biological Sciences Student Affairs
231 Steinhaus Hall
Irvine, CA 92697-1460
949-824-5318

UC Irvine Medical School Information

Eileen M. Munoz, Program Director
COM - Medical Education
802 Medical Education
Irvine, CA 92697-4089
949-824-8930

UCLA: Life Science Division, UCLA College of Letters and Sciences
www.lifesci.ucla.edu

Microbiology, Immunology, and Molecular Genetics (MIMG)

Bridget Wells, Undergraduate Student Services Student Affairs Officers
1602B Molecular Science Building
(310) 825-8482
www.mimg.ucla.edu

Organismic Biology, Ecology, and Evolution (OBEE)

Nancy Putrill, Student Affairs Officers
2325 Life Science Building 16606
(310) 825-7929
www.obee.ucla.edu

Molecular, Cell, and Developmental Biology (MCDB)

2312 Life Science Building 16606
Undergraduate Counseling
(310) 825-3482
www.mcdb.ucla.edu

Physiological Science

Student Services Graduate Student Office
2329 Life Sciences Building
(310) 825-1959
www.physci.ucla.edu

UCM: Natural Sciences - Maria Pallavicini, Dean of Natural Sciences
P.O. Box 2039
Merced, CA 95344
209-724-4400
mpallavicini@ucmerced.edu

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UCR: College of Natural and Agricultural Sciences Student Academic Affairs

<http://cnas.ucr.edu/>

Phyllis Thornsberry, Student Affairs Officer, Undergraduate Advisor
phylliss.thornsberry@ucr.edu

Tamra Marlar, Student Affairs Officer, Undeclared Students Advisor
tamra.marlar@ucr.edu

Carol Moffet, Health Professions Advisor
carol.moffett@ucr.edu

1140 Batchelor Hall
Riverside, CA 92521
909-787- 3100

UCSB: Ecology, Evolution, & Marine Biology - Pam Bayer, Undergraduate Academic Advisor

805-893-3052

E-mail: bayer@lifesci.ucsb.edu

www.lifesci.ucsb.edu/eemb

Molecular, Cellular, & Developmental Biology - Andrew Kroes, Undergraduate Academic Advisor

805-893-5281

E-mail: kroes@lifesci.ucsb.edu

www.lifesci.ucsb.edu/mcdb

College of Letters & Science - Dr. Paula Y. Bruice, Faculty Health Advisor

805-893-3852 (health professions resource room)

E-mail: pybruice@bioorganic.ucsb.edu

UCSC: Biological Sciences - Amanda Russo, Betty O'Donnell, Undergraduate Advisors

Thimann Labs 103A

831-459-4143

bioadvise@biology.ucsc.edu.

Health Sciences Career Advising - Rosejoanne Cirincione, Program Advisor

831-459-2954

ACCESS (UC/California Community College bridge program) - Caroline Henton,

Program/Associate Director

831-459-4197

access@chemistry.ucsc.edu

CAMP (California Alliance for Minority Participation) - Marlene Robinson, Regional

Coordinator

831-459-3487

mrobinson@natsci.ucsc.edu

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MARC/MBRS (Minority Access to Research Careers/Minority Biomedical Research Support) - Bernice Frankl, Staff Director/Program Coordinator
831-459-4770
frankl@biology.ucsc.edu

Jacob Martinez, Program Assistant
831-459-4770
jmartinez@biology.ucsc.edu

UCSD: Division of Biological Sciences

<http://www.biology.ucsd.edu/>

Staff Advisors and Faculty Advisors
858-534-0557

Career Services Center
<http://career.ucsd.edu>

School of Medicine
<http://medicine.ucsd.edu>

General UCSD information
<http://www.ucsd.edu>