



University of California, Santa Barbara  
Program Learning Outcomes

**B.S. in Biochemistry and Molecular Biology**

***Students graduating with a B.S. in Biochemistry and Molecular Biology should be able to:***

*Knowledge*

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1. Apply the processes and methods of scientific inquiry, including the search and retrieval of scientific information, the formulation of scientific hypotheses, the design and conduct of experiments, and the analysis and interpretation of data.
2. Describe the structure and function of cells as the fundamental units of life and as the building blocks of multicellular organisms.
3. Explain the principles of inheritance from molecular mechanisms to population level consequences.
4. Describe the principles and mechanisms of evolution at the molecular, micro and macro levels, and the role of evolution as the central unifying concept in biology.
5. Recognize the scope of biological diversity and the phylogenetic relationships among major groups of organisms.
6. Discuss the interactions between organisms and their environments, and the consequences of these interactions in natural populations, communities, and ecosystems.
7. Describe the nature and behavior of cells and how cells work together to assemble an organism.
8. Use the fundamental tools and knowledge of mathematics, chemistry, and the physical sciences needed for studying biochemical phenomena relevant to understanding the molecular and cellular basis of biological processes.
9. Understand basic biochemistry of proteins, nucleic acids, lipids, and carbohydrates.
10. Understand fundamental concepts concerning metabolic pathways and bioenergetics.
11. Understand regulatory mechanisms at the biochemical level.

*Research and Laboratory Skills*

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12. Construct hypotheses to explain biochemical phenomena and design effective experimental strategies to test the hypotheses.
13. Conduct procedures widely used by biochemists and molecular biologists to elucidate biochemical mechanisms, critically assess data, and draw appropriate conclusions from the results.
14. Read, process, and communicate ideas from the scientific literature.