



## Implementing authentic research experiences in an eight-week microbiology course to crowdsource antibiotic discovery

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### Abstract

Offering authentic research experiences is a transformational learning experience and a powerful tool for student engagement that results in increased persistence, retention, and graduation rates. Herein, we describe implementing an authentic research experience to crowdsource for antibiotic discovery in an eight-week microbiology course. Students collected soil and ocean water samples from various locations in Southern California. They then determined the potential antibiotic-producing isolates by culturing and testing the bacterial isolates against gram-positive and gram-negative bacteria. Using Qiagen BiOstic Bacteremia kits, students extracted bacterial genomic DNA from ocean water and soil isolates and performed PCR to amplify the 16srRNA gene for 16S Sanger sequencing. Sequencing results were further analyzed using the NCBI Basic Local Alignment Search Tool (BLAST) website. Reflecting on this experience, students found the lab engaging and “felt like a scientist,” potentially transforming their negative beliefs and attitudes toward science. Students were active research participants and generated a large dataset of bacterial isolates while honing their perseverance, critical thinking, communication, and collaboration skills.

**Keywords:** Antibiotic, Discovery, CURE

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