

## **A Dome of Four Pillars: Perspectives of Pre-medical and Medical Students on Combined Teaching Modalities in Undergraduate Biochemistry**

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### **Abstract**

Despite biochemistry being a traditionally vital coursework for pre-medical and medical students, it often suffers from inadequate appreciation given the challenging nature of the subject and stagnation of teaching modalities. A first semester biochemistry course was designed focusing on knowledge application through activities and problem-based learning. In a two-year period between 2020-2021, a multi-item, anonymous and voluntary questionnaire to record perspectives towards four undergraduate biochemistry teaching modalities (lectures, recitations, case studies, and student group presentations) was distributed among second year undergraduate (“premedical”) students. First year preclinical (“medical”) students who previously enrolled in the course also took a similar questionnaire to evaluate its effectiveness for preparation towards medical school. 86 (46%) of 186 total students responded. Students strongly believed that the use of multimodal teaching techniques improved overall preparedness for future coursework, understanding and enjoyability. Lectures and recitations were found to be the most useful for information retention and learning, although less enjoyable than other modalities. In contrast, although case studies and presentations were enjoyable, they were ranked low for information retention and were the most voted to be removed from the course. There was general agreement between premedical and medical students’ perception on the usefulness of the multimodal teaching techniques for medical curriculum biochemistry and standardized exams, suggesting that premedical students accurately evaluated the usefulness of the course, thus validating the usefulness of the premedical student surveys. Use of multiple modalities in biochemistry education can be of substantial benefit to foster engagement and prepare students for further education.

**Keywords:** medical education, pre-medical education, student-centered learning, biochemistry, survey