

# **OK Google, What Protein Mutation Should I Study? An Online Practice of Experimental Design in Biochemistry**

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One of the most important and challenging goals of undergraduate education is to prepare students for the real-world application of theories and concepts they are exposed to in the classroom. However, it is often difficult to make the jump from guided experiments to novel biomedical research in lab classes. This workshop bridges this gap through an innovative activity in experimental design that utilizes freely available online resources to hone future discovery-based labs in biochemistry. Using the well characterized tumor-suppressor p53 as an example, participants will learn how to explore protein structure, known associated mutations, and their impact with these online tools: PDB101, COSMIC, and MutationAssessor. Armed with this new knowledge on the protein mutation, the activity addresses how to help students develop hypotheses about the effect of the chosen mutation and design experiments to test these hypotheses. This versatile activity could be implemented in both lab and lecture courses for introductory biology, genetics, molecular biology, and biochemistry. The activity has the advantage of encouraging student's higher thinking skills while increasing interest and experience in experimental design.

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