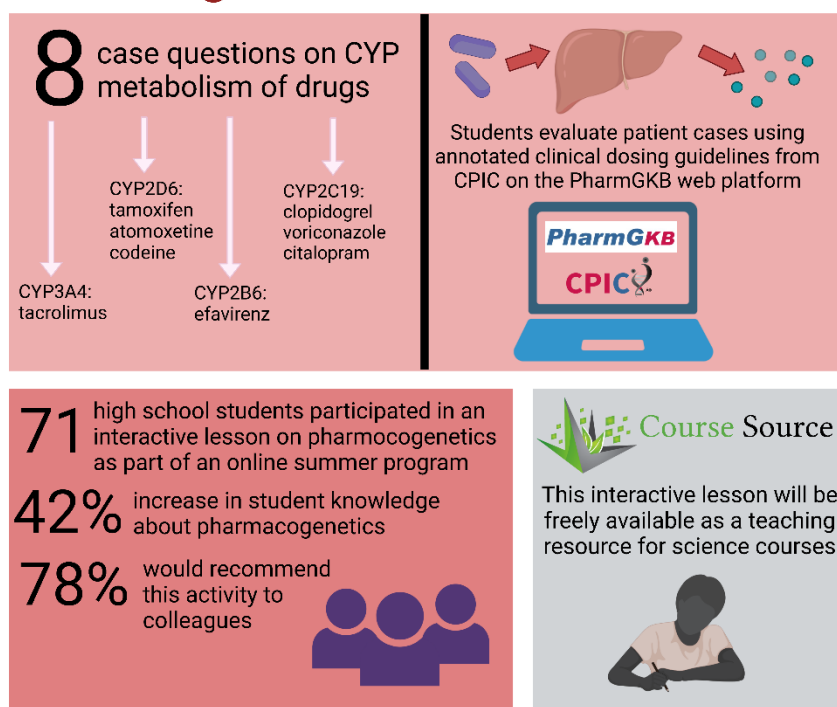


Learning Pharmacogenetics Through Patient-Centered Cases Using the PharmGKB Database

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PharmGKB is a user-friendly online pharmacogenomics database that annotates clinical guidelines for optimizing drug therapy based on patient genotypes. The majority of guidelines in PharmGKB are based on the interindividual variability in cytochrome P450 (CYP) enzymes responsible for metabolizing drugs. By individualizing patient therapy according to CYP genotypes, there is potential to improve pharmacotherapy outcomes and minimize the risk of adverse events. Although there is growing interest amongst educators and students to integrate pharmacogenetic content into health science curricula, there is a lack of educational resources that teach students how to utilize resources such as PharmGKB to inform clinical decision making. The purpose of this study was to assess and disseminate a case-based interactive lesson on pharmacogenetic-based drug dosing principles that uses PharmGKB. Seventy-one high school students participated in a two-hour Zoom session as part of a four-day Toxicology, Health, and Environmental Disease Program. The lesson was divided into a didactic lecture on pharmacogenetics followed by a group-based analysis of hypothetical case scenarios. Case questions focused on genetic variation in CYP enzymes in the context of different clinical scenarios. Examples included the use of codeine for analgesia (CYP2D6) and clopidogrel for stroke prevention (CYP2C19). Assessment of student understanding was measured by percent gain in response correctness to pre-post assessment polling questions. The first question focused on pharmacology concepts while the last two focused on genetics concepts. Students had high pre-test scores on the pharmacology question having learned these concepts earlier in the program. For the additional two questions, there was a positive gain (43-44%) demonstrating an increase in knowledge during the lesson. This lesson will be shared on Course Source, an online educational resource that publishes evidence-based teaching material that can be replicated for use in diverse educational environments. We propose that an interactive, group-based activity can be used to teach basic principles of pharmacogenetics and empower students and educators to effectively use online drug dosing resources.

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