



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Ellen M. Azizian	Project Number J1503
Project Title Pain Relievers and Carbohydrates: Analysis of Different Pain Relievers for Dissolving Purposes	
Abstract Objectives/Goals Problem: Does complex carbohydrate/(cornstarch) affect the time it takes for pain relievers with different active ingredients to be absorbed in human body? Methods/Materials Method: The experiment involved mixing water and carbonated water with simulated stomach acid and mixing the same solutions also with carbohydrates. Mixing was done by using magnetic stirrer and measuring pH was done by using a pH Microprocessor Tester. Measured time it took to dissolve acetaminophen, aspirin, ibuprofen, diclofenac sodium, and naproxen base pills in these four solutions. Results Significant Finding: Diclofenac sodium base pills took longest to dissolve and 19-22% longer to dissolve in solutions with carbohydrates. Naproxen base pills took 2nd longest to dissolve and 20%-26% longer in solutions with carbohydrates. Ibuprofen base pills took the 3rd longest to dissolve and 19%-26% longer in solutions with carbohydrates. Acetaminophen and aspirin base pills took the least time to dissolve but 34%-60% longer in solutions with carbohydrates. All pills dissolved quickest in water solution which had the lowest pH (acidic) and took most time in carbonated water solution mixed with cornstarch which had the highest pH (alkaline). Adding carbohydrate such as cornstarch into the drinking solution increased pH (alkaline) and slowed the dissolution rate. Since most pain relievers irritate the stomach, the doctors advise to take them with food. Conclusions/Discussion The data supported my hypothesis that the pain relievers with different active ingredients will take longer to dissolve in water base liquids with simulated stomach acids that contain complex carbohydrates (cornstarch) than in the water base liquids containing only simulated stomach acid.	
Summary Statement The purpose of my project was to determine whether adding carbohydrate to the drinking solution affects the time it takes for the pain relievers to dissolve in the human body.	
Help Received My cousin, the pharmacist, provided me with the prescription pain relievers and supervised me while I was handling them.	