



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Caitlin M. Marshall	Project Number J0521
Project Title Try 'em All Tylenol	
Abstract Objectives/Goals To determine if there is a significant difference in how long different dose forms of Tylenol and generic acetaminophen take to dissolve in the gastro-intestinal tract compared with Tylenol rapid release gels. Methods/Materials 0.01M hydrochloric acid (at approximately 37.2C) was used as a model for gastro-intestinal conditions. This was stirred via a magnetic stirrer at a fixed speed and a 500 mg dose form of Tylenol or a generic acetaminophen was added. The time to obtain dissolution or uniform dispersal of the material was measured and the temperature recorded to ensure consistency. This was repeated in triplicate for each of 4 dose forms (3 Tylenol + 1 generic). Results The following Mean (+/- SD) results were obtained: Tylenol Rapid Release Gels - 103s (+/- 0), Tylenol EZ Tabs - 108s (+/- 1), Tylenol Caplets - 82s (+/- 15), Generic Acetaminophen Caplets - 440s (+/- 27). None of the dose forms fully dissolved under the experimental conditions due to the insoluble excipients added during the manufacture of the dose forms. Conclusions/Discussion The results demonstrated that the time required to disperse the various formulations of Tylenol did not vary significantly and therefore time to dispersion may not be an accurate model for actual dissolution. The only observation was that the generic acetaminophen took a significantly longer time (~ 4 times longer) to disperse than the Tylenol. This experiment demonstrated that visual inspection is inadequate to determine Tylenol dissolution and a more specific analytical technique such as hplc is required to accurately measure the dissolution of the active ingredient (acetaminophen). As a result no conclusions could be made regarding the original objective.	
Summary Statement An assessment of the rate of dissolution of different dose forms of Tylenol and generic acetaminophen in the G-I tract.	
Help Received Father assisted with experimental design and editing of report.	