



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> Courtney H. McKee	<b>Project Number</b> <b>S0515</b>
<b>Project Title</b> <b>The Effect of Pill Type on Disintegration Rate and Process</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to determine which ibuprofen product dissolved quickest and by what process in the stomach, and therefore which pill could potentially provide the fastest symptom relief.</p> <p><b>Methods/Materials</b> In order to best approximate the conditions of the stomach, I dissolved pills in distilled white vinegar with a pH equal to the stomach while digesting (pH 2.) I timed the pills dissolution, recording the time of the initial change in pill shape as well as final dissolution time. I recorded whether the pills dissolved symmetrically or asymmetrically and did a cost per pill analysis of my pills. I completed ten trials for each of five pill types: generic Longs ibuprofen (control), Advil Tablets, Advil Caplets, Advil Liqui-gels, and Advil Gelcaplets.</p> <p><b>Results</b> The generic Longs ibuprofen had both the fastest dissolution time and lowest cost, and therefore could provide the fastest symptom relief and best value. The Advil Caplets were second in dissolution time but the most expensive. The Advil Tablets were a close third in dissolution time and had the second lowest cost. The Advil Gelcaplets were fourth in dissolution time and tied for second in cost. The Advil Liqui-gels had the longest dissolution time and were third most expensive. All pill types dissolved asymmetrically every trial, except the Advil Gelcaplets, which dissolved symmetrically every trial.</p> <p><b>Conclusions/Discussion</b> My data suggests that there is not as wide a margin between pill types as many believe, and that generic drugs are not necessarily lower in quality, in fact, they can be as or more efficient than brand-name products. However, I found that I was not able to completely mirror the conditions in the stomach; I had no way to provide constant heat or motility, or any way to obtain hydrochloric acid. This may have affected the results of the Advil Liqui-gels and Advil Gelcaplets, which have a gelatin coating that is dependent on heat to dissolve.</p>	
<b>Summary Statement</b> My project was designed to find out if there was a difference in the dissolution of brand-name and generic ibuprofen products and which pill type could potentially provide the fastest symptom relief.	
<b>Help Received</b> Monetary assistance from parents.	