



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Ronit B. Abramson</b>	<b>Project Number</b> <b>S1501</b>
<b>Project Title</b> <b>Use of Epilithic Diatoms as Biological Indicators of Pharmaceutical Runoff</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This research is intended to study possible relationships between the diversity of diatoms and the concentration of acetaminophen present in their aquatic environment. The purpose of this work is to determine the potential for epilithic diatoms as biological indicators of pharmaceuticals in water.</p> <p><b>Methods/Materials</b> The effects of acetaminophen on the diversity of diatoms was studied by creating microcosms to simulate the presence of the drug in a slow moving stream containing epilithic diatoms. Concentrations of acetaminophen were introduced into the systems in four ratios of part acetaminophen to part water: one to one hundred thousand, one to ten thousand, zero (control), and one to one thousand. Samples of the diatoms grown in these microcosms were then taken and made into slides from which a three-hundred cell count was conducted and the populations of each species within the three-hundred count was calculated.</p> <p><b>Results</b> In this experiment, amphora and navicula species demonstrated direct concentration-diversity relationships, meaning their populations increased within the three hundred individual cell count as the concentrations of acetaminophen increased, while the nitzschia demonstrated an indirect relationship.</p> <p><b>Conclusions/Discussion</b> Slight concentration-diversity correlations were found for several of the assessed species of diatoms in colonies exposed to acetaminophen in the aquatic microcosms. Navicula, nitzschia, and amphora exhibited related changes in population based on acetaminophen concentrations. Pharmaceutical runoff is commonly dismissed as insignificant and ineffectual to organisms; however, this research refutes that and suggests diatoms as effective indicators of pharmaceutical runoff. The use of diatoms as biological indicators would allow for more accessible and effective detection of pharmaceuticals in bodies of water. These indicators would allow for wider testing and treatment of water sources, protecting ecosystems and organisms from indefinite and dangerous pharmacological effects.</p>	
<b>Summary Statement</b> A study of the effects of acetaminophen on diatom species diversity and the possible uses of diatoms as biological indicators of pharmaceuticals runoff.	
<b>Help Received</b> Used lab equipment under the supervision of Ms. Wendy Slijk, Life Sciences and Biology Teacher, Department Head of Science at Canyon Crest Academy; Mr. Mark Schmid and Mr. Joel Abramson assisted in the construction of the microcosms	