CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

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Project Number
J1521

Project Title
Under the Influence

Abstract

Objectives/Goals
The objective was to determine how a caffeine solution, an adrenalin solution, and a caffeine-adrenalin solution affect the heartbeat of daphnia pulex organisms. The hypothesis was the caffeine-adrenalin solution would increase the heart rate of a daphnia pulex the most, followed by the adrenalin solution, then the caffeine solution, which will increase the heart rate the least.

Methods/Materials
The materials used include a daphnia pulex culture, one large and small pipette, a microscope, pure adrenalin and caffeine powder, 3,000 mL of distilled water, three 1,000 mL graduated cylinders, 4 double-depression slides, and 2 single gallon plastic containers full of water. First the caffeine solution was created and we transferred a daphnia onto a slide using a pipette. The number of times its heart beat in a minute was counted under the microscope. The data and observations were recorded. The caffeine solution was added to the slide. The number of times its heart beat in a minute was counted again under the microscope after it was allowed to absorb the caffeine. The data was recorded. The steps were repeated ten times using separate daphnia. The remaining adrenalin and caffeine-adrenalin solutions were created. The same methods were used to see how they affected the daphnia. A separate daphnia was used each time and the data was recorded.

Results
After testing the daphnia we found that the caffeine solution affected the heart rate the most with an average increase of 95 beats per minute. Next at an average increase of 81 beats per minute was the adrenalin solution. Lastly, the caffeine-adrenalin solution had an average increase of 62 beats per minute. The caffeine solution had the most affect on the heart rate of the daphnia pulex. In our experiments the behavior of the daphnia after they were exposed to the solution were observed.

Conclusions/Discussion
The hypothesis was rejected by the data. The hypothesis was that the mixed solution would affect the heart rate the most, followed by adrenalin, and then caffeine. The actual results were the opposite of our hypothesis. The caffeine affected it most, then adrenalin and lastly the mixed solution. The caffeine solution in proportion to the daphnia could have been an overdose. The adrenalin did not affect the daphnia as much as the caffeine. The caffeine-adrenalin solution could have had little effect because both strong solutions possibly canceled each other out.

Summary Statement
This project was about the effects of a caffeine, adrenalin, and a caffeine-adrenalin solution on daphnia pulex organisms.

Help Received
completed the experimentations at Raney Intermediate under the supervision of Ms. Fisher who also provided some of our needed materials for us, parents provided transportation