CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)
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Project Number
J2207

Project Title
Drosophila melanogaster Addiction to Sugar

Abstract

Objectives/Goals
Sugar addiction has become an epidemic problem causing many adverse effects on human health as well as financial and economic burdens for the families and society. The objective of my project is to identify factors that can affect sugar addiction using a Drosophila Melanogaster (fruit fly) model. My hypothesis is that D. Melanogaster prefers physiological concentration of sugar; however, different food flavors and long-time feeding can make them prefer higher concentrations of sugar.

Methods/Materials
I used a model of D. Melanogaster sugar addiction. I placed 4 pieces of equal size filter paper into 4 equally divided areas in each petri dish. I added the tested solutions to different papers, and 80 to 100 flies into each petri dish. I recorded the number of flies in each area of the petri dish after different lengths of feeding times. I tested different concentrations of sugar with and without common food flavors including banana, cinnamon, chocolate and salt. The experiments were independently repeated several times, each with 3 repeats. The results were analyzed by comparing different treatment groups with statistical calculations using the Microsoft Excel Program. I further modeled the trends of sugar preference over time.

Results
Flies preferred physiological levels of sugar at early feeding times. Only cinnamon induced flies to prefer lower concentrations of sugar while banana, chocolate and salt had no effect. However, after long-time feeding, flies preferred higher concentrations of sugar (above physiological levels) regardless with or without food flavors.

Conclusions/Discussion
My overall hypothesis is correct. Although flies might normally prefer physiological levels of sugar, long-time feeding of sugar can induce addiction of flies to sugar. These observations have implications to human behaviors: as you taste or eat more sugar, you become more addicted to it. Therefore, proper control or abstention of sugar consumption can avoid sugar addiction and is likely to improve human health.

Summary Statement
I tested the preference of fruit flies to different concentrations of sugar under different food flavors overtime and found that flies became addicted to higher concentrations of sugar after long-time feeding regardless of what food flavors

Help Received
My science teacher Ms. Wong provided guidance for my project. My parents provided moral support.