CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
22332

Project Title
A Zebrafish Model Provides Clues to Parkinson's Disease

Abstract

Objectives/Goals
Drug-induced parkinsonism, characterized by loss of balance and movement disorders, is a serioust adverse effect of many neuropsychiatric drugs. The goal of this study was to develop a zebrafish modx that could be used to study the pathophysiology and genetics of drug-induced parkinsonism, which coux ultimately lead to a greater understanding of Parkinson#s Disease in humans.

Methods/Materials
Randomly selected zebrafish fry (2-3 weeks old) were exposed to various concentrations of fluphenazine, an anti-psychotic drug that induces parkinsonism in humans, or tricaine (0.05mg tricaine / 50mL water), | sedative. Movement of fry was recorded with a video camera, and speed and activity were quantitatedx using a computer assisted tracking system. In addition, untreated fry and fry exposed to fluphenazine o| tricaine were observed microscopically.

Results
Fry exposed to fluphenazine (0.025 mg/50 mL) for six hours swam more slowly on average than control fish (0.127 cm/s vs. 0.302 cm/s, respectively, $p<0.05$), and they exhibited more oscillations in theix movement patterns. Fry exposed to the sedative, tricaine (0.05 mg/50 mL), which is not associated wix parkinsonism, also exhibited significantly reduced swimming velocity (0.042 cm/s), but did not exhibx oscillations in their movement. Microscopic examination revealed that fry exposed to fluphenazine wex unable to maintain postural control in contrast to fry exposed to tricaine.

Conclusions/Discussion
These data indicate that zebrafish fry exposed to fluphenazine exhibit characteristics of drug-inducx parkinsonism; that is, loss of postural control and bradykinetic movement. These characteristics paralle| Parkinson#s Disease in human. This model can be used in the study of the pathophysiology and genetix of drug-induced parkinsonism and Parkinson#s Disease.

Summary Statement
In this project, I developed a zebrafish model that can be used to study the pathophysiology and genetics of drug-induced parkinsonism and ultimately Parkinson#s Disease in humans.

Help Received
I worked in the laboratory of Dr. Su Guo at the University of California, San Francisco. The equipment belonged to her laboratory, and I consulted with Dr. Guo regarding experimental methods and behavior patterns of zebrafish.