CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)

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Project Number

S0408

Project Title

Inhibiting Chemosensory Function via Introduction of Anticonvulsant Ethosuximide for Net Extension of Schmidtea mediterr

Abstract

Objectives/Goals

Experimentally influencing the chemotaxis of Schmidtea mediterranea, a planarian oft chosen for biomedical research because its genome (which is currently being sequenced) shares certain sequences of DNA also found in humans, and subsequently inducing an increase in planarian lifespan, holds vast implications for substantiating the existence of evolutionarily conserved mechanisms for organismal lifespan control.

Methods/Materials

1.Breeding of four different sets of Schmidtea mediterranea and Dugestia tigrina in 500 mL beakers (one in mineral/distilled water environment, others in same setup, characterized by 5%, 10% and 15% net ethosuximide solutions, respectively).

Results

The results of this experimentation support my hypothesis that by inhibiting a certain neurological function/sense (as in olfaction), lifespan can be lengthened.

Conclusions/Discussion

The fact that inhibiting a planarian#s ability to respond to trophic stimuli after already being deprived from necessary nutrient positively affected the planarian#s lifespan gives insight into possible evolutionary conserved means for lifespan augmentation/control. This is to parallel the phenomenon demonstrated by humans, where the sizeable depreciation or total loss of one sense is compensated with the amplification of another sense. Evolutionarily speaking, it is plausible that an organism as stem-cell-based in composition as a planarian would have the genetic programming to respond to certain drastic threats to survival, such as the loss of an entire function. In this way, it would go well to surmise that the neoblasts of the planarian#s body would respond with the differentiation of its progeny to aid in other biological processes (as the embryonic stems cells of planaria are hypersensitive to DNA damage and automatically induce apoptosis to rid the body of damaged cells, impaired olfactory sense could be tagged as extraneous, with neoblast cells aiding the function of other processes). Such a claim is in part substantiated by the fact that planarian sense of smell actually decreased during prolonged exposure to ethosuximide.

Summary Statement

Inhibiting Chemosensory Function for Net Extension of Organismal Lifespan: Unveiling an Evolutionarily Conserved Mechanism for Lifespan Control

Help Received

Used laboratory glassware from Clovis West High School; otherwise, experimentation and board executed independently