Colorado Science and Engineering Fair

2025 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Mnemonic Metamorphosis : Evidence for Persistence Memory Store beyond the brain in Regenerated Planarian Flatworms

Finalist's Name: Joanna Raguraman

School and City: Discovery Canyon Middle School, Colorado Springs

Sponsor's Name: Dr. Beaulah Aloysius

Category: Biomedical & Health Sciences

Division: Junior (grades 6 - 8)

Abstract (250 words or less):

Each year, neurodegenerative diseases affect over 50 million people globally, making them the seventh leading cause of death worldwide. As these conditions continue to rise, finding potential solutions is crucial. Planaria, unique flatworms with the ability to regenerate lost body parts, including their heads and brains, retain memories even after regeneration, making them valuable subjects for studying neurodegeneration and memory retention.

This research aims to investigate the regenerative properties of planaria and the specialized cells responsible for this process. When a planarian's head is severed, it regenerates both its head and brain, with the new brain preserving old memories. This phenomenon is linked to specialized cells present throughout their bodies.

Two groups of planaria will be used: an experimental group and a control group. Each group will have two petri dishes, one for feeding and one for their home. The experimental group's feeding dish will have a textured surface, while the control group's dish will be smooth. The planaria will be trained over ten days, learning to associate the light environment with food, using hard-boiled egg yolk or liver as food and UV light to mimic sunlight.

After training, both groups will have their heads removed. Once the heads regenerate, the experiment will test whether the planaria retain the memory of eating in a textured environment. Future research will aim to develop methods to generate muscle memory in humans, helping individuals with neurodegenerative diseases perform daily tasks by storing minimal memory through muscle memory.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature: Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. **A signed copy of this form must be included in your notebook.**