Colorado Science and Engineering Fair

2024 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: Healthy Gut! Healthy You!: Using Dorotocephala Dactyligeria as a Model to Treat Gastrointestinal and Psychological Disorders with Novel Regenerative Enzymes

Finalist's Name: Vanya Lavu

School and City: The Classical Academy, Colorado Springs

Sponsor's Name: Klement Lavu

Category: Biomedical Sciences (BMED)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

As of 2022, 49% of adolescents and 25% of adults suffer from psychological disorders. Out of those groups, approximately 60% (from each group) suffer from gastrointestinal disorders. In addition, for the past decade, these disorders have been increasing exponentially, especially amongst people of low socio-economic status, ultimately making it extremely important to find cost-effective ways to treat these disorders. My research aims to discover not only a possible treatment for those who have a psychological and gastrointestinal disorder(s) but also provide cost-effective solutions that improve quality of life substantially.

The research design included modeling human digestive and nervous systems using Dorotocephala Dactyligeria, known as Planaria. Four groups of planaria were established: the control group, the negative enzyme, positive ethanol group, the positive ethanol, positive enzyme group, and the positive enzyme, negative ethanol group.

The enzymes (Papain, Amylase, Bromelain) and Ethanol were used to test and see if planaria under various conditions will substantially improve gastrointestinal, and psychological health/disorders. Behavioral data was collected and analyzed i.e. coiling tail, sociability, irregular sense of direction, metabolism, seizure-like movements, upward head movements, and amount of isolation within five minutes.
After data collection, chi-squared analyses were performed. Groups where the enzyme was present outperformed their non-enzyme counterparts. ($p=0.00001$). The control versus the positive ethanol group was also statistically significant ($p=0.0031$).

The results show that the enzymes are effective at increasing metabolism and decreasing symptoms associated with psychological distress. This novel discovery will pave the way for treating diseases such as ulcerative colitis, Crohn's disease, and chronic Gastritis.

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: Vanya Lavu Date: 3/3/24

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 o 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.