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: Sorry, I Didn't See You: Testing the Effects of Photosensitive Medications on Crystallin Alpha to Study the Development of Cataracts

Finalist's Name: Maria Horn

School and City: Yuma High School, Yuma CO

Sponsor's Name: Amy Melby

Category: Biomedical Sciences (BMED) Division: Senior (9th - 12th grades)

Abstract (250 words or less):

Cataracts, the decomposition of crystallins found in the lens of the eye, are increasingly common among today's population of aging and diabetic patients. Photosensitive medications can increase the chance of developing cataracts.

It was hypothesized that 1. Aspirin would cause the most gel decomposition with a p-value of 0.05; 2. Ibuprofen would cause the least amount of decomposition with a p-value of 0.05; and 3. The experimentation set with UV-B exposure would have more gel decomposition than the set without UV-B exposure with a p-value of 0.05.

Crystallins from bovine lenses were purified (using agarose gel and EDTA) and incubated at 37℃ for 30 minutes. Lenses were then centrifuged at 3,000 rpm at 4℃ until gelatinized and then dialyzed overnight with Tripotassium Phosphate. The gel was divided into spectrophotometer vials and test medications of Benadryl, ibuprofen, and aspirin were used. One set was exposed to UV-B light for three weeks. Data was recorded weekly using a spectrophotometer (at 950 nm) and a refractometer. Data was analyzed using the ANOVA test.

The first and second hypotheses were rejected. Ibuprofen caused the most decay (via spectrophotometer and refractometer) with a p-value < 0.01, and Benadryl caused the least amount of decay (via refractometer) with a p-value < 0.01. The third hypothesis was accepted as the set exposed to UV-B had more decay (via spectrophotometer and refractometer) than the set without UV-B exposure with a p-value of < 0.01.

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: Maria Horn Date: 3/1/24

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.