Investigating the Biochemical Activity of Organic Curcuma caesia and Curcuma longa (Turmeric) on Neuroblastoma Cancer Cells

Oishi, Maya (School: Hilo High School)

Curcuma caesia and Curcuma longa (turmeric) have been found to have anti-cancer agents. Both turmeric species were used to determine the ability to inhibit cellular pathways targeted in Neuroblastoma cancer. The hypothesis stated that Curcuma longa (red) extract will have a stronger apoptosis signal on neuroblastoma cancer cells compared to Curcuma caesia (black) turmeric extract. Initially, powdered extracts were attempted to be made at home but due to broken lab machines, the powdered extracts could not be used. Aliquots made by the student in year one were used in the western blots conducted. COVID-19 prevented student access to the lab therefore, the western blot experiments were completed virtually with the mentor. All database mining and result analysis was done by the student, including the use of Pubmed (gene names), R2 Database (patient data), and IMAGEJ (results-optical density) to analyze the results from the Western Blots. The most prominent genes in Neuroblastoma affected by red turmeric are p-Akt, p53, and B-cantenin. Curcuma caesia (black) turmeric extract had a strongest reduction in expression of p53, with 62.3% of the gene unexpressed. Analysis from the Kaplan curves produced for INSS Neuroblastoma, revealed that B-catenin is strongly expressed, reducing patient survival rates greatly. Both extracts reduced expression of B-catenin by more than 50% and reduction of the highly expressed B-catenin has the potential to greatly increase survival rates. Future research will include using the powdered mature red and black turmeric extracts on Pancreatic cancer cells, which have similar molecular pathways to those of neuroblastoma.