



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Elaine Chan	Project Number 38807
Project Title Effect of Omega 3 Fatty Acid Precursor 17-HDHA and Its Lipid Mediator Metabolite RvD1 in Planaria Regeneration	
Abstract Objectives/Goals The focus of this project was to observe the role of 17-HDHA and Resolvin D1 supplementation in regeneration and whether organisms could synthesize their own Resolvins when given the precursor (17-HDHA). Planaria were used to model regeneration because of their unique ability to regenerate fully even after large portions of their body has been removed. This project revolved around two main questions: 1) Can planaria synthesize resolvins if given the precursor 17-HDHA? If so, to what extent in whole and regenerating planaria and how does resolvin production progress during regeneration? 2) How do planaria respond differently to 17-HDHA compared to RvD1? Methods/Materials Besides performing protein assays and Resolvin D1 ELISA assays on lysed planaria tissue and their surrounding water environment, different dosages of supplementation were tested and a regeneration index (based on planaria eye development during regeneration) were created to appropriate qualify and quantify a planaria's stage in regeneration. Results The results showed that planaria can synthesize their own Resolvin D1 when given the precursor 17-HDHA and that the supplementation of such lipid mediators enhances regeneration at a much greater extent than no supplementation. Regenerating planaria were also found to synthesize much more resolvins than whole planaria and in a time course of 8 days, planaria were found to produce much more resolvins at Day 8 rather than Day 2. Additionally, based on eye-scoring by a regeneration index, it was found that both 17-HDHA and Resolvin D1 positively enhance regeneration in planaria. Conclusions/Discussion While this experiment is only the tip of the iceberg, further research can have the potential to revolutionize regenerative medicine and how chronic inflammation (the basis of many terminal diseases) is treated. This study observes the underlying chemical and molecular mechanisms in the regeneration of planaria, which may become applicable in the study and treatment of diseases across many kingdoms and phyla.	
Summary Statement 17 HDHA and Resolvin D1 supplementation both significantly enhance regeneration in planaria.	
Help Received I researched, designed, and performed all parts of the experiment. I also analyzed the data and synthesized it into my poster and written report. My mentor guided me in finding helpful additional research papers and teaching me how to use graphpad prism before I analyzed my data.	