

Introduction

The purpose of this experiment was to determine if infecting zebra fish with *Pseudocapillaria Tomentosa* had any effect on the expression of tumor necrosis factor α or Interferon γ . $\text{TNF}\alpha$ is a cytokine that's naturally produced in the host, whose primary responsibilities are to cause apoptotic cell death, inflammation, and to prevent viral replication. Interferon γ is also a naturally produced cytokine whose primary role is to adapt the host's immune system to fight off viruses (immunomodularity). The research was done by LaLee Lo, a student of BioResource Research at Oregon State University. Previous research has determined that the species of parasite commonly infecting zebra fish in research facilities has been *Pseudocapillaria tomentosa*. Mr. Lo additionally collaborated with the OSU College of Veterinary Medicine for his research.

Materials and Methods

Zebra fish were chosen for the study because of their history of being excellent lab organisms. Factors that make them so include size, reproduction time, and relatively low cost of living. Researchers intend to answer the question of whether *Pseudocapillaria tomentosa* affects $\text{TNF}\alpha$ and $\text{IFN}\gamma$ by taking sets of fish, infecting them, and allowing the parasite to replicate and mature inside the fish. At specific intervals a fish would be sliced/separated and coated with paraffin wax to insulate and prevent desiccation. A stain was created by applying a staining tag to a secondary antibody, which was placed on antibodies that bound to the antigen of interest. Then a stain was applied to the sections, and color measured to determine the amount of exposure in each area of the fish. The sample size for this experiment was 20 fish.

Data Results

Results of the organisms were inconclusive. The first set of 20 organisms were only tested a specific time (12 weeks), and as a result showed little to no difference against control (non-infected) fish. Through additional research it became evident that the effects should be present much sooner than that, so another set of 20 was tested. This time, tests were run at 3, 5, 7, 12, and 30 weeks after infection. This set of testing revealed that starting at 5 weeks, both $\text{TNF}\alpha$ and $\text{IFN}\gamma$ levels increased noticeably in all cases. Additionally,

higher levels of macrophages were found around inflammed tissue, suggesting that they might also have some involved function/purpose.

Conclusion

To conclude, the results of this research tell us many things, but also pose more questions to answer. Indeed, infection of *Pseudocapillaria tomentosa* does cause $\text{TNF}\alpha$ and $\text{IFN}\gamma$ expression to increase, but what role does the increased levels of macrophages play? What other research is needed to advance this area of study?