Phenotypic Expression of Two Candidate Genes of Nonsyndromic Craniosynostosis in Danio rerio

Annemarie Carver

Follow this and additional works at: https://scholarscompass.vcu.edu/uresposters

© The Author(s)

Downloaded from

This Book is brought to you for free and open access by the Undergraduate Research Opportunities Program at VCU Scholars Compass. It has been accepted for inclusion in Undergraduate Research Posters by an authorized administrator of VCU Scholars Compass. For more information, please contact libcompass@vcu.edu.
**Phenotypic Expression of Two Candidate Genes of Nonsyndromic Craniosynostosis in Danio rerio**

Annemarie Carver¹, Martha Cozzo², Christopher Steele², James Lister², and Rita Shiang²

Departments of Biology¹ and Human and Molecular Genetics²
Virginia Commonwealth University, Richmond Virginia

---

**Background**

Craniosynostosis is the premature fusion of one or more sutures in the skull. The early fusion of a single or multiple suture can cause deformities in the head as well as neurological problems (Johnson et al., 2011). Nonsyndromic craniosynostosis is the premature fusion without the presence of other features (Heuzé et al., 2014). Humans (A) and zebrafish (B) have similar sutures of the skull, as seen in the figure, making zebrafish an effective model for this study.

**Skull Development of slc30a9**


**Comparison of Bone Area of slc30a9**

There was no significant difference between all groups when comparing average frontal bone areas.

**Comparison of Length of slc30a9**

No significant difference found in the average length of slc30a9 homozygous mutant, heterozygous, and wildtype fish.

**Comparison of Sutures of slc30a9**

There was no significant difference between all groups when comparing average parietal bone areas.

**Conclusion and Future Directions**

The heterozygous slc30a9 fish had larger measurements in the length. The heterozygous fish also seemed to have a larger overlap of bone over sutures but this was not shown to be statistically significant most likely because of the small sample size. This is most likely due to the mutation being a dominant negative mutation. This shows that the mutation in the gene may effect the growth of the skull as the length of each group of fish at 8 weeks showed no significant difference, but the overlap of every suture was larger in heterozygous fish indicating the premature fusion of sutures. The larger interfrontal suture length seen in slc30a9 when compared to wildtype is interesting. Another 6 week study should be performed to confirm these results.

The overexpression of bambia in the heat shocked fish that is concentrated in the head shows that the gene could effect skull development. A 6 week study similar to that done with the slc30a9 fish should be performed with heat shocked to further investigate this.

---

**References**


Scholars Compass 2(3), 135.

Oncology Reports, 30(3), 1315-1322.

Danio rerio. Craniosynostoses.