

ABSTRACT SUBMISSION FORM

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Exploring the role of sex and gender on health research



CHR D 2020: Abstract Submission Form

Submitter Name

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Title

Deciphering the Mechanisms of bmp4 gene - ethanol interactions in Cleft Palate Development; Insights from Zebrafish (*Danio rerio*)

Background

Non-syndromic Cleft Palate (CP) is one of the common birth defects. Cell signaling pathways are found to influence the ethanol teratogenicity; however such mechanisms for CP development are less studied. Zebrafish (*Danio rerio*) is an emerging model organism and the neurocranium of zebrafish is homologous to the human palate.

Objective

Investigating the effect of bmp4 gene – ethanol interactions on zebrafish CP development.

Methods

Wild-type (AB) zebrafish embryos of 10 hours post-fertilization (hpf) were treated with 1% alcohol and with Bone Morphogenetic Protein (BMP) pathway antagonist Dorsomorphin. All treatments were carried out for 14 hours and embryos were fixed at different developmental stages for gene expression and phenotypic analysis. The cartilage skeleton of treated and control samples was stained with the Alcian blue. Embryos were scored on the shape and size of each element of the neurocranial skeleton. Shape differences of the ethmoid bone and paired trabeculae of the neurocranium were compared using the one-way ANOVA. Furthermore, Turkey's pairwise comparison test was conducted. mRNA expression was examined using the whole-mount in-situ hybridization technique.

Results

The Alcian blue-stained samples have less stained hypoplastic areas with exposure to different treatments ($n = 10$). The defects were more prominent in the medial ethmoid bone. Morphological analysis revealed that the entire shape of the medial and lateral ethmoid bone is not affected by alcohol exposure. But with morphometric data significant difference was observed with treatment concerning height and width ($P <$

0.05). Less expression of the bmp4 gene observed in the ethanol treated samples.

Conclusion

In zebrafish, alcohol affects early development and the patterning of the medial ethmoid bone. Bmp4 signaling is found to influence the ethmoid bone development. Our results highlight the efficiency of zebrafish as a model in investigating the morphological and molecular mechanisms of BMP pathway – ethanol interactions induced CP development.

Theme:

Basic Science

Do you have a table/figure to upload?

No

Are you willing to participate in Goodbear's Den?

Yes

Presenter Status:

Masters Student

What was your role in the project?

Perform Experiments

Authors

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