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EFFECT OF EMBRYONIC ALCOHOL EXPOSURE ON THE CRANIOFACIAL DEVELOPMENT; INSIGHTS FROM ZEBRAFISH (DANIO RERIO)

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Background:

Cleft Lip and /or Palate (CLP) is the second most common birth defect with the prevalence of 1:700 live births. Maternal alcohol consumption during the first trimester of pregnancy has been found to increase the incidence of craniofacial birth defects. However, teratogenic effects of maternal alcohol consumption on CLP is not clearly understood. Zebrafish (*Danio rerio*) has been identified as an excellent model in craniofacial developmental biology.

Objective:

Investigate the effect of the embryonic alcohol exposure on the facial development and CLP, using Zebrafish as a model organism.

Methods:

Wild-type AB zebrafish (*Danio rerio*) 24 hours post fertilization (hpf) eggs were used for this experiment. Eggs were incubated in 3% alcohol for 6 hours. Control fish were raised in the fish water. Fish were raised until 5 days post fertilization (dpf). Fixed unstained samples were imaged using Zeiss microscope. To quantify the facial differences between the treated and control samples, morphometric analyses were conducted using SHAPE, a computer program that statistically measures the outline of a shape in an image. Alcian blue cartilage stained samples were used to examine the ethmoid bone which is homologous to the human palate.

Results:

- 1) Unstained samples observation: 3% alcohol treated sample (n=5) head size was smaller compared to the control samples (n= 5).
- 2) PCA analysis: There is no significant separation between PC1, PC2 and PC3 parameters and random distribution of samples were observed (n= 5).
- 3) Alcian blue staining; Samples were dissected to compare shape of the ethmoid. There weren't any significant shape difference between the 3% alcohol treated samples (n=5) and control (n= 5).

Conclusion:

We could not find any significant difference in the shape of the ethmoid bone between alcohol-treated and control samples. Exposure to alcohol during early embryonic development might have caused the small skull size which needs to be further investigated.