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Research Category

Basic Science

Abstract Title

Effects of ethanol and Wnt-signaling modulators on taste perception and taste bud development, insight through Mexican tetra (*Astyanax mexicanus*).

Background

Taste perception is a gustatory process involved in survival, facilitating the identification of harmful substances through bitter and sour perceptions. Fetal alcohol spectrum disorder (FASD) is a condition encompassing physical and cognitive abnormalities associated with prenatal alcohol exposure (PAE). literature stating Individuals with FASD being at higher risk of developing substance abuse, such as alcohol addiction, into adulthood. Highlighting the potential teratogenic effects of alcohol on a child's taste bud development and perception.

Objective

Therefore, this project aims to explore the effects of alcohol on taste development and perception via modulation of the canonical Wnt/ β -catenin pathway using *Astyanax mexicanus* (Mexican tetra).

Methods

Taste bud morphology was assessed in larvae at 8-, 15-, and 30-days post-fertilization following pharmacological modulation of the Wnt pathway. Treatments included 10 nM WntC-59 (antagonist), 2 nM LiCl (activator), 1% ethanol, and 100 μ M folic acid. Stained with Ponceau S and stereomicroscopy quantifying taste bud development, while behavioral assays with agar-embedded flake food containing 1% ethanol, 1M glucose, 3 mM quinine, or control tested taste perception, through EthoVision 3.1.

Results

Wnt modulation and ethanol exposure altered taste bud count and distribution along the ventral mandible, while taste bud size remained unchanged. Reduced diameters were observed across experimental conditions. In contrast, no significant group differences were detected in behavioral assays of taste perception.

Conclusion

These findings suggest that PAE may disrupt taste bud development through Wnt pathway modulation, particularly altering taste bud count and distribution along the mandible. While no behavioral changes were observed, qPCR of T2R1, T2R4, T2R114, Wnt10a, Wnt10b, Axin2, and Pitx2 needs to be conducted to further explore functional consequences. Examining these targets will clarify molecular pathways underlying altered taste bud patterning and perception, providing new insight into PAE during pregnancy and its contribution to sensory and behavioral vulnerabilities in children affected by FASD.

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