Determining the Cumulative Effects of Saccharin, Ethanol, and Taurine on the Developing Embryo of Danio rerio

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More than 70 countries approve the consumption of artificial sweeteners (Ogungbemi et al., 2019). People, including pregnant women, regularly consume artificial sweeteners to substitute sugar in their drinks, such as diet soda (Palatnik et al., 2020). Zebrafish studies have exposed embryos to artificial sweeteners and other substances, but a gap in the literature exists for studies that combine saccharin and taurine, and ethanol and taurine, emulating combinations in regularly consumed drinks. In this study, zebrafish embryos were exposed to the following solutions: saccharin, ethanol, taurine, saccharin-ethanol, saccharin-taurine, and ethanol-taurine. Heart rate, hatching rate, embryonic development, and spontaneous tail coiling activity were analyzed. STC in zebrafish embryos is an emerging marker for neurotoxicity and locomotion development (Zindler et al., 2019). This year's study revealed that taurine stabilized abnormal heart rate in zebrafish embryos when exposed to saccharin and ethanol but did not make a difference in hatching rate or STC. Additionally, occurrences of cardiac edema, cerebral hemorrhage, and lordosis decreased with taurine in the ethanol groups. However, taurine seemingly increased thigmotaxis, a marker for induced anxiety, when added to saccharin and ethanol (Xu et al., 2008). Expecting mothers can consider this when consuming either saccharin or ethanol (even in small amounts), especially because taurine is naturally produced in the human body and is found in food items such as milk, meat, fish, and energy drinks (WebMd, 2021; Xu et al., 2008). Recommendations for future studies include tracking feeding behavior and swimming kinematics through adulthood with fluorescence technology.

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