Determining the Cumulative Effects of Artificial Sweeteners and Ethanol on the Developing Embryo of Danio rerio

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Danio rerio embryos have been identified to have over eighty-two percent of genes similar to mammals and have recently been used as models for human embryos. This investigation exposed Danio rerio embryos to three different solutions; two were artificial sweeteners (Rebiana and Saccharin) and ethanol, and one was sucrose (table sugar) and ethanol. The artificial sweeteners chosen were based on findings from the previous year's research which proved that Rebiana resulted in the least negative effects and Saccharin resulted in the most negative effects on the embryonic development of a zebrafish. The same concentration of each solution was administered during different stages of a zebrafish embryo's development. Embryos were then observed for embryonic development, average heart rate, and mortality rate. The embryos were studied at 24-hour intervals over a 5 day period. Based on observations, data collection and the fact that zebrafish genes are similar to that of mammals, one can raise questions about whether women drinking a sugary alcohol beverage (with sucrose or the alternative artificial sweetener) during the different stages of pregnancy would affect their developing baby. The findings indicated that maternal consumption of alcohol (ethanol) during pregnancy can result in a continuum of embryonic development abnormalities that vary depending on the severity, duration, and frequency of exposure of ethanol during gestation, especially when combined with artificial sweeteners such as Rebiana and Saccharin. Unexpected masses in about 30% of the embryos exposed to saccharin were observed and compared to images from cancer studies in zebrafish embryos.