

Scientists find malformations and lower survival rates in zebrafish embryos exposed to cannabinoids

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A U of A study found mortality and malformations increased in zebrafish that were exposed to chemical components of cannabis five hours after fertilization. Credit: Wikimedia Commons

Exposure to the main chemical components of cannabis has a detrimental effects on developing zebrafish embryos, according to a new study conducted by University of Alberta biologists.

"We found that fewer eggs hatched and fewer fish survived," explained Declan Ali, a professor in the Department of Biological Sciences and author of the study. "The [embryos](#) also tended to be smaller in length. They exhibited some mild malformations such as cardiac edema and curvature of the back and the trunk."

Ali added the research also found troubling effects on neurological development.

For the study, fish embryos were exposed to tetrahydrocannabinol (THC) and cannabidiol (CBD) during a critical developmental stage known as gastrulation. In zebrafish, gastrulation occurs five hours after fertilization, and lasts for about five hours. In humans, gastrulation occurs about three weeks after fertilization and lasts about six days.

Ali and his team exposed the zebrafish to THC and CBD during this [gastrulation](#) period, simulating the effects of a pregnant woman consuming cannabis during this same period. The compounds are then removed, and the embryos develop. Then, they studied how the embryos developed after exposure.

"We exposed these embryos for a short, finite period of time and then let them develop normally. Despite this, we are seeing effects throughout development, and even into adulthood," explained Ali.

Human connection

While Ali and his colleagues are hesitant to translate this research directly to humans, the results call for significant future investigation, especially in light of the upcoming legalization of cannabis in Canada in October 2018. Existing research on humans has shown that exposure to cannabis during pregnancy is related to memory and attention deficits in children.

"We need to be mindful of the possible negative effects of these compounds on development, even if only taken for a brief period of time," said Ali. "I have two daughters. If they were thinking of having a baby and were to ask me, I'd tell them to stay far away from cannabis until we have a much better idea of what these effects are."

More information: Kazi T. Ahmed et al. Motor neuron development in zebrafish is altered by brief (5-hr) exposures to THC (Δ^9 -tetrahydrocannabinol) or CBD (cannabidiol) during gastrulation, *Scientific Reports* (2018). DOI: [10.1038/s41598-018-28689-z](https://doi.org/10.1038/s41598-018-28689-z)

Provided by University of Alberta

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