

Cannabis during pregnancy endangers fetal brain development

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An increasing number of children suffer from the consequences of maternal drug exposure during pregnancy, and *Cannabis* is one of the most frequently used substances. This motivated the study, published in the *EMBO Journal*, conducted in mice and human brain tissue, to decipher the molecular basis of how the major psychoactive component from *Cannabis* called delta-9-tetrahydrocannabinol or THC affects brain development of the unborn foetus.

The study highlights that consuming *Cannabis* during [pregnancy](#) clearly results in defective development of nerve cells of the cerebral cortex, the part of the brain that orchestrates higher cognitive functions and drives memory formation. In particular, THC negatively impacts if and how the structural platform and conduit for communication between nerve cells, the synapses and axons, will develop and function. Researchers also identified Stathmin-2 as a key protein target for THC action, and its loss is characterized as a reason for erroneous nerve growth. It is stressed that *Cannabis* exposure in experimental models precisely coincided with the fetal period when [nerve cells](#) form connections amongst each other.

According to study leader Professor Tibor Harkany, who shares his time between Karolinska Institutet and the Medical University Vienna in Austria, these developmental deficits may evoke life-long modifications to the brain function of those affected. Even though not all children who have been exposed to *Cannabis* will suffer immediate and obvious deficits, Professor Harkany warns that relatively subtle damage can significantly increase the risk of delayed neuropsychiatric diseases.

"Even if THC only would cause small changes its effect may well be sufficient to sensitize the [brain](#) to later stressors or diseases to provoke neuropsychiatric illnesses in those affected in the future", says Professor Harkany. "This concerns also the medical use of *Cannabis*, which should be avoided during pregnancy."

More information: 'Miswiring the brain delta-9-tetra-hydro-cannabinol disrupts cortical development by inducing an SCG10/stathmin-2 degradation pathway', Giuseppe Tortoriello, Claudia V. Morris, Alan Alpar, Janos Fuzik, Sally L. Shirran, Daniela Calvigioni, Erik Keimpema, Catherine H. Botting, Kirstin Reinecke, Thomas Herdegen, Michael Courtney, Yasmin L. Hurd and Tibor Harkany, *EMBO Journal*, online 27 January 2014.

Provided by Karolinska Institutet

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