

Endogenous cannabinoids linked to fetal brain damage imposed by maternal cannabis use

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A critical step in brain development is governed by endogenous cannabinoids, ‘the brain’s own marijuana’. Studies conducted at Swedish medical university Karolinska Institutet, with participation of scientists from Europe and the US, are now published in *Science* and show that these endogenous molecules regulate how certain nerve cells recognize each other and form connections. The scientists believe that their findings will significantly advance our understanding of how cannabis smoking during pregnancy may damage the fetal brain.

The formation of connections among nerve cells occurs during a relatively short period in the fetal brain. However, proper wiring of hundreds of millions of cells in our brains determine whether we can think, remember, move, or show emotions throughout our lives. For a nerve cell, recognizing its partners and establish connections with them is the key to survive and contribute to the control of brain functions. The process through which nerve cells recognize each other is guided by specific chemical signals whose availability instructs neurons to target or to ignore specific cells.

Scientists have now identified that endogenous cannabinoids, molecules naturally produced by our brains and functionally similar to THC from cannabis, play unexpectedly significant roles in establishing how certain nerve cells connect to each other. These new and exciting results not only bolster out knowledge on the brain’s normal development but may

also take us closer to understanding if and when cannabis damages the fetal brain.

Endogenous cannabinoids use the same mechanism, engaging the CB1 cannabinoid receptor, as THC to exert their effects on nerve cells. Therefore, the finding that endogenous cannabinoids control the establishment of connections amongst certain nerve cells convinces the scientists that they have defined a key mechanism through which maternal cannabis use might impair fetal brain development and impose life-long cognitive, social, and motor deficits in affected offspring.

"Besides identifying a fundamental mechanism in brain development, our findings may provide new perspectives to identifying the molecular changes in the brains of individuals prenatally affected by maternal cannabis abuse", says Dr. Tibor Harkany who has led the studies. "This is of social impact given the continuous growing use of marijuana, the most common illicit drug, in our society."

Earlier studies have already found that children of marijuana-smoking mothers more frequently suffer from permanent cognitive deficits, concentration disorders, hyperactivity, and impaired social interactions than non-exposed children of the same age and social background.

Source: Karolinska Institutet

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