

ADHD more common in offspring of mothers with genetic serotonin deficiencies

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Children whose mothers are genetically predisposed to have impaired production of serotonin appear more likely to develop attention-deficit hyperactivity disorder (ADHD) later in life, according to a report in the October issue of *Archives of General Psychiatry*.

"[Serotonin](#) is a hormone and transmitter that performs a broad range of physiological functions in the human body," the authors write as background information in the article. "In addition to its transmitter function in the mature [nervous system](#), serotonin has an important role during development"; it is involved in the formation and differentiation of neurons, their migration to their proper position and the arrangement of the synapses between them. The human genome encodes two enzymes involved in the biosynthesis of serotonin; previous studies have suggested alterations in these [genes](#) or enzymes in pregnant females could result in birth defects.

Anne Halmøy, M.D., of University of Bergen, Norway, and colleagues studied 459 adult outpatients with [ADHD](#), 97 of their family members and 187 control individuals recruited from across Norway. Participants provided blood samples for gene sequencing along with information about psychiatric diagnoses and symptoms.

By sequencing 646 individuals, the researchers identified nine different mutations, of which eight were significantly associated with impaired function of the enzymes. Family analysis of 38 individuals who carried these mutations and 41 of their offspring revealed that children of

mothers who had one of the mutations—and, therefore, had impaired serotonin production—had a 1.5- to 2.5-time higher risk of ADHD than control individuals or offspring of fathers with the mutations.

There was a large variance in the number and severity of symptoms reported by these individuals, suggesting that for offspring of mothers with these mutations, "the clinical outcome probably depends on a sum of many different genetic or environmental factors in addition to variations in maternal serotonin levels."

The results may have public health implications, the authors note. "Whether it is caused by genetic vulnerability, chronic inflammation, malnutrition or other processes, maternal serotonin deficiency during pregnancy might predispose to neuropsychiatric disorders and cardiovascular illnesses," they conclude. "However, further replication studies, preferably in larger samples, will be required to corroborate this relationship."

More information: Arch Gen Psychiatry. 2010;67[10]:1033-1043.

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