

# Sex-based prenatal brain differences found

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Prenatal sex-based biological differences extend to genetic expression in cerebral cortices. The differences in question are probably associated with later divergences in how our brains develop. This is shown by a new study by Uppsala University researchers Elena Jazin and Björn Reinius, which has been published in the latest issue of the journal *Molecular Psychiatry*.

Professor Elena Jazin and doctoral student Björn Reinius at the Department of Physiology and Developmental Biology previously demonstrated that genetic expression in the cerebral cortices of human beings and other primates exhibits certain sex-based differences. It is presumed that these differences are very old and have survived the evolutionary process. The purpose of the new study was to determine whether they appear during the process of [brain](#) development or first upon the conclusion of that process. Identifying the initial genetic mechanisms that prompt the brain to develop in a female or male direction is a long-range research objective.

The Uppsala University researchers analysed data, on the basis of sex, from another extensive study of the prenatal human brain.

"The results show that many of the genes situated on the [Y chromosome](#) are expressed in various parts of the brain prior to birth and probably provide a developmental basis for the sex-based differences exhibited by adult brains," according to Elena Jazin.

More than a third of Y-chromosomal genes appear to be involved in sex-

based human brain differentiation. Some of the genetic activity in question is evident in the adult brain, while other of it only appears at earlier stages of [brain development](#). It is yet unknown whether the differences in [genetic expression](#) among female and male brains have any functional significance.

"The findings are consistent with other factors, such as environment, also playing a role in how we develop," emphasizes Elena Jazin.

Knowledge of the development of sex-based brain differences is of potential significance for the treatment of brain disturbances and diseases. A large number of psychiatric illnesses, including depression and autism, affect men and women differentially.

"Taking account of sex-based differences is crucial to the study of normal and abnormal brain activity," according to Elena Jazin.

More information: [www.nature.com/mp/journal/v14/n11/index.html](http://www.nature.com/mp/journal/v14/n11/index.html)

Source: Uppsala University ([news](#) : [web](#))

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