

# Women's Brains Contain Male DNA

**The brains of women often contain male DNA, which is most likely acquired from a pregnancy with a male fetus.**

Scientists have yet to discover what male DNA and male cells in the brain indicate, but there has been research of other kinds of microchimerism showing a link between the phenomenon to autoimmune diseases and cancer. Sometimes the connection is beneficial, but not always.

**Microchimerism** is the existence of a small number of cells that emerge from another person, which in turn, makes them genetically different from the cells of the host.

Most commonly, during pregnancy, the genetic material and cells are exchanged between fetus and mother. This form is called fetomaternal microchimerism.

Previous research has indicated that during pregnancy, some fetal cells can migrate into the mother's organs, and stay there long after the baby is born. For example, fetal cells have been found at tumor sites in women, but scientists have yet to discover whether the cells help destroy it or make matters worse.

This current study, published in *PLoS One* and conducted at Fred Hutchinson Cancer Research Center, is important because it is the first of its kind to report male microchimerism in the brains of women.

**The discovery provides evidence for the probability that fetal cells often cross the human blood-brain barrier, while showing also that microchimerism in the brain is comparatively common.** This is the first study to reveal that these cells can cross the barrier in humans.

Brain autopsy specimens from 59 females (26 had no neurological disease and 33 had Alzheimer's disease) who passed away between the ages of 32 and 101 were analyzed by the team, including William F. N. Chan, Ph.D., in the Department of Biochemistry at the University of Alberta, and J. Lee Nelson, M.D., a member of the Center's Clinical Research Division and a leading international authority on microchimerism.

**The scientists detected male microchimerism in 63% of the women**, which was spread across several regions of the brain. After learning that the oldest female in whom male fetal DNA was found in the brain was 94 years old, the experts believe there is a great chance that this was constant throughout the human lifespan.

A slightly lower prevalence of male microchimerism was seen in the patient's with Alzheimer's, which also appeared in lower concentrations in regions of their brains that were most influenced by the disease.

A link between Alzheimer's disease and the level of male cells of fetal origin can't yet be made, the researchers pointed out, because of the small number of women observed, and their history of pregnancy unknown.

The findings do not show a connection between male microchimerism in the female brain and relative health versus disease. "Currently, the biological significance of harboring male DNA and male cells in the human brain requires further investigation," Chan explained.

Other research conducted at Hutchinson Center of male microchimerism has demonstrated that this phenomenon affects a female's risk of some types of cancer and autoimmune disease.

Cells of fetal origin can be beneficial, for example in cases such as breast cancer. However in others, like colon cancer, the cells have been shown to cause an increased risk.

A link has also been identified in previous studies between lower risk of rheumatoid arthritis to women who had given birth to at least one child, as compared to those who never got pregnant.

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