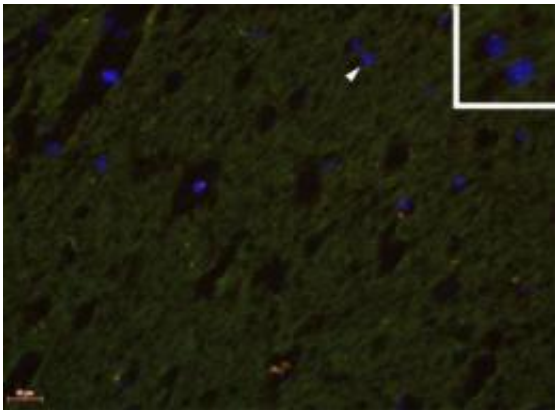


# Men on the mind: Study finds male DNA in women's brains

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This shows a male cell in female human brain. Credit: Citation: Chan WFN, Gurnot C, Montine TJ, Sonnen JA, Guthrie KA, et al. (2012) Male Microchimerism in the Human Female Brain. *PLoS ONE* 7(9): e45592. doi:10.1371/journal.pone.0045592

Male DNA is commonly found in the brains of women, most likely derived from prior pregnancy with a male fetus, according to first-of-its-kind research conducted at Fred Hutchinson Cancer Research Center. While the medical implications of male DNA and male cells in the brain are unknown, studies of other kinds of microchimerism – the harboring of genetic material and cells that were exchanged between fetus and mother during pregnancy – have linked the phenomenon to autoimmune diseases and cancer, sometimes for better and other times for worse.

The study findings are published Sept. 26 in [PLOS ONE](#). Lead author William F. N. Chan, Ph.D., in the Department of Biochemistry at the University of Alberta, conducted the research while working in the Hutchinson Center laboratory of J. Lee Nelson, M.D., a member of the Center's Clinical Research Division and a leading international authority on microchimerism. Nelson is senior author on the paper.

Chan said the study is the first description of male microchimerism in the female [human brain](#). The findings support the likelihood that [fetal cells](#) frequently cross the human blood-[brain](#) barrier and that microchimerism in the brain is relatively common. Until this study, it was not known whether these cells could cross the barrier in humans.

For this research, scientists examined brain autopsy specimens from 59 women who had died between the ages of 32 and 101. Male microchimerism was detected in 63 percent of subjects, was distributed in multiple [brain regions](#) and was potentially persistent throughout the human lifespan; the oldest female in whom male fetal DNA was detected in the brain was 94.

Twenty six of the women had no neurological disease and 33 had Alzheimer's disease. The brains of women with Alzheimer's had a somewhat lower prevalence of male microchimerism, which appeared in lower concentrations in regions of the brain most affected by the disease. However, the authors noted that the small number of subjects and largely unknown pregnancy history of the women means a link between Alzheimer's disease and level of male cells of fetal origin cannot be established.

The study also does not provide an association 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 said.

However, other Hutchinson Center studies of male microchimerism in women have found it to impact a woman's risk of developing some types of cancer and autoimmune disease. In some conditions, such as breast cancer, cells of fetal origin are thought to confer protection; in others, such as colon cancer, they have been associated with increased risk. Hutchinson Center studies also have linked lower risk of rheumatoid arthritis to women who previously had given birth at least once as compared to nulliparous women.

**More information:** Chan WFN, Gurnot C, Montine TJ, Sonnen JA, Guthrie KA, et al. (2012) Male Microchimerism in the Human Female Brain. *PLOS ONE* 7(9): e45592. doi:10.1371/journal.pone.0045592

Provided by Fred Hutchinson Cancer Research Center

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