# How adult fly testes keep from changing into ovaries

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New research in flies shows how cells in adult reproductive organs maintain their sexual identity. The study, publishing online on November 13 in the Cell Press journal *Developmental Cell*, also identified a mutation that can switch the cells' sexual identity. The findings could lead to new insights on how to alter cells for therapeutic purposes.

Sperm and eggs are made from germ cells, but instructions from their neighboring support cells—called somatic cells—are also essential for their development. By studying the formation of sperm in fruit flies, which is remarkably similar to the process that occurs in people, investigators serendipitously found a mutation that gave testes a very unusual appearance. "Rather than becoming sperm, germ cells were stuck at an early stage, and they were surrounded by support cells that looked suspiciously like those belonging in an ovary," says senior author Dr. Erika Matunis of The Johns Hopkins School of Medicine. Her research team found that the mutation blocked the function of a specific gene in the stem cells that becomes support cells in the testis, causing the fruit flies to change from a male to a female identity.

The research is the first to show that adult stem cells actively maintain their sexual identity. The mutation the investigators found causes the stem cells in males to switch their sexual identities and start making support cells that belong in the ovary. This ultimately derails the production of sperm. "The molecules that govern this process are highly conserved, which suggests that similar mechanisms could operate in human testes," says Matunis.

The changes seen in this study are an example of transdifferentiation, or the conversion from one cell type to another. The topic is of considerable interest because promoting transdifferentiation in a directed manner may be useful for regenerating damaged organs or tissues. Doing so will require a thorough understanding of how cell fate conversions are regulated. "We are excited to have a powerful genetic system for studying transdifferentiation of stem cells at the mechanistic level," says Matunis. The research might also provide insights into how cells transform from a normal state to a cancerous one.

**More information:** *Developmental Cell*, Ma et al.: "The Jak-STAT target Chinmo prevents sex transformation of adult stem cells in the Drosophila testis niche" www.cell.com/developmental-cel … 1534-5807(14)00628-5

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