STEM CELLS

A case of mistaken identity

“sperm-producing germ cells were also arrested at an early stage”

Adult somatic stem cells in *Drosophila melanogaster* actively maintain their sexual identity, a new study published in *Developmental Cell* finds.

Sex maintenance has been shown to occur in the adult mammalian testis and ovary, but whether this phenomenon is present in fruitflies was unknown. By screening phenotypes, Ma *et al.* identified a spontaneous mutation that caused the appearance of cells resembling ovarian follicle cells throughout the adult testis as the organism aged. Genetic complementation and rescue experiments localized this mutation to the regulatory region of the *chinmo* gene, which encodes the essential cell-fate determinant Chronologically inappropriate morphogenesis (Chinmo), a target of the Jak-STAT signalling pathway.

Reduced expression of Chinmo in adult testes caused somatic stem cells — cyst stem cells (CySCs) — to transdifferentiate into cells resembling multipotent female follicle stem cells, as confirmed by

cell type-specific RNA interference (RNAi) knockdown of *chinmo*. Sperm-producing germ cells were also arrested at an early stage.

Chinmo was shown to act through the canonical sex determinant Doublesex^M (Dsx^M) to maintain the male identity of adult CySCs. The authors posit that “Chinmo promotes expression of Dsx^M, which in turn regulates its own set of target genes that are critical for male sex identity”. Given that re-establishing Dsx^M expression is insufficient to rescue the phenotype, Chinmo probably affects the expression of Dsx^M-independent target genes that are required for CySC self-renewal.

This study represents another step to unravelling the process of transdifferentiation of stem cells at the mechanistic level.

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ORIGINAL RESEARCH PAPER Ma, Q. *et al.* The Jak-STAT target Chinmo prevents sex transformation of adult stem cells in the *Drosophila* testis niche. *Dev. Cell* <http://dx.doi.org/10.1016/j.devcel.2014.10.004> (2014)

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