

# A new approach to generate tailed-sperm and oocytes *in vitro* from the same mouse embryonic stem cells

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Embryonic stem (ES) cells have the pluripotency to differentiate into any cell types *in vitro*, including cells of the germ lineage. However, the mechanisms that lead ES cells to differentiate into germ cells *in vitro* remain unknown and the efficiency of reported *in vitro* systems is poor. We have attempted to find a more defined and efficient way to derivate sperm and oocytes from mouse ES cells *in vitro* by manipulating genes such as *Daz* and *Dazl*. The gene *Daz* (deleted in azoospermia), which is essential for sperm development in humans, is expressed in ES cells, as well as in male and female germ cells. In mice, its homolog, *Dazl*, is turned off once mouse ES cells undergo somatic differentiation, but its expression is maintained in germ cells. *Dazl* deficiency can lead to embryonic arrest of germ cell development in mice. Here, we report that *Dazl* as a transgene can promote gametogenesis of mouse ES cells. Overexpression of *Dazl* can induce both tailed-sperm and oocytes from the same mouse ES cells *in vitro*. This finding may provide a novel *in vitro* approach to generate gametes from embryonic stem cells and to study gametogenesis of embryonic stem cells.

**Keywords:** embryonic stem cells; germ cells; sperm; oocytes; *dazl*

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interests concern with the molecular mechanisms regulating the fate of spermatogonial stem cells (SSCs) and germline differentiation of embryonic stem cells. He revealed the signaling pathway that regulate the proliferation of SSCs as well as a new approach to derive both sperm and oocytes from embryonic stem cells *in vitro*.