

Jennifer McCann

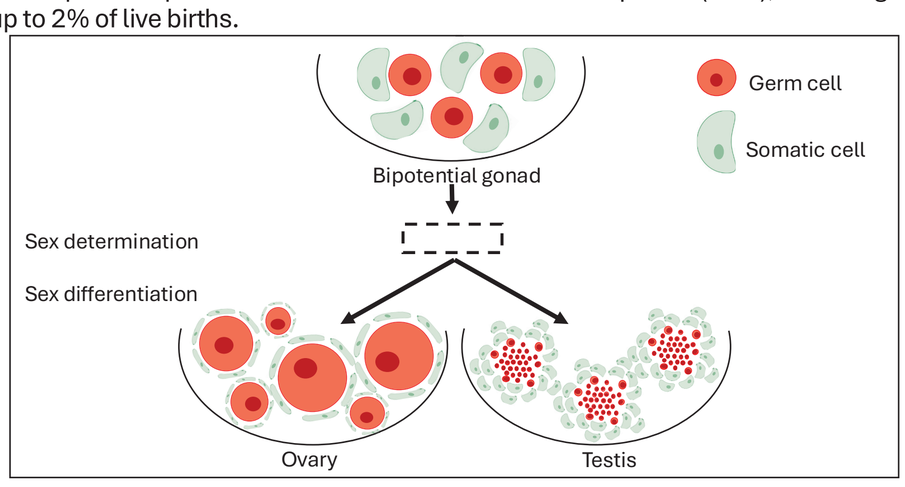
Burtchaell Award
Ph.D. Student, Genetics
Third Year ARCS Scholar

UNIVERSITY OF GEORGIA
1785

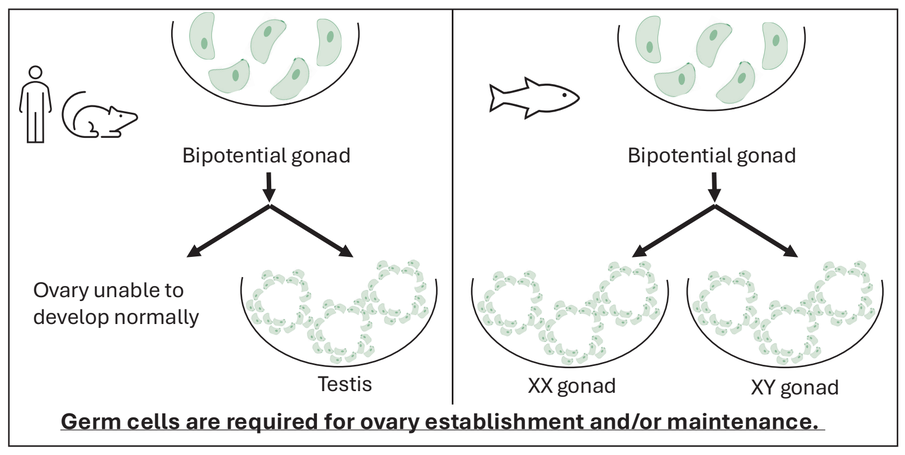
Investigating the role of germ cells in sex development

Germ cells are necessary for ovary development, but their genetic contribution is largely unknown. Through investigating germ cells as a mechanism of sex determination in a model organism, we can begin to uncover the crucial genetic factors germ cells provide during sex development.

Sex development is crucial for reproductive health and fertility. Issues in this developmental process result in disorders of sex development (DSD), occurring in up to 2% of live births.



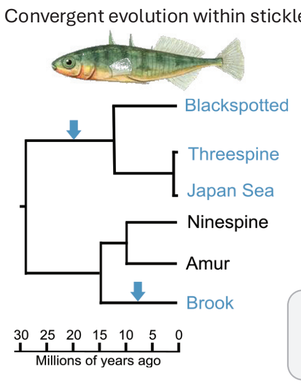
An outstanding question in the field is how germ cells contribute to sex development. Understanding how germ cells contribute to ovary development and maintenance can help support reproductive health including after germ cell-reducing events like chemotherapy.

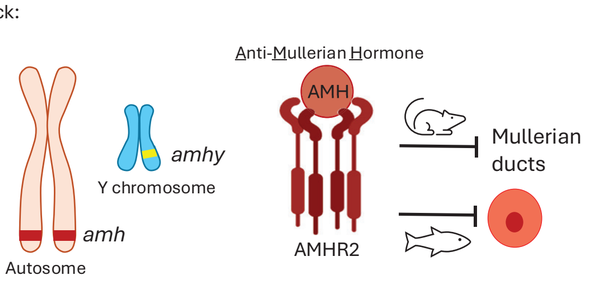


Germ cells are required for ovary establishment and/or maintenance.

Amh is the most common sex determining gene. Of 20 known vertebrate sex determining genes, 8 are related to *amh*. *Amh* has convergently evolved across phylogeny from monotremes to fish.

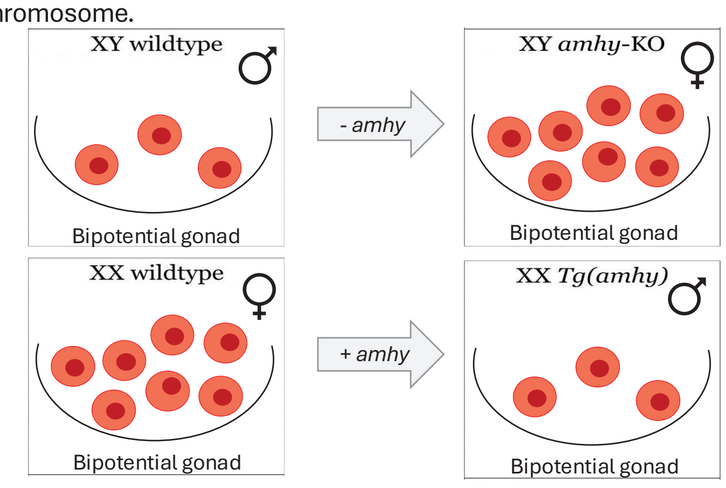
Convergent evolution within stickleback:



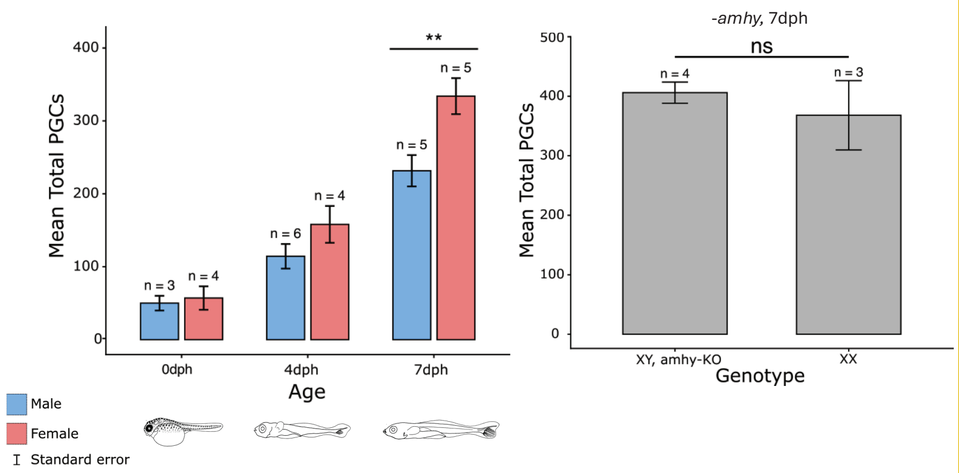


Does the germ cell-inhibiting function of *amh* play a role in its repeatedly evolved sex determination function?

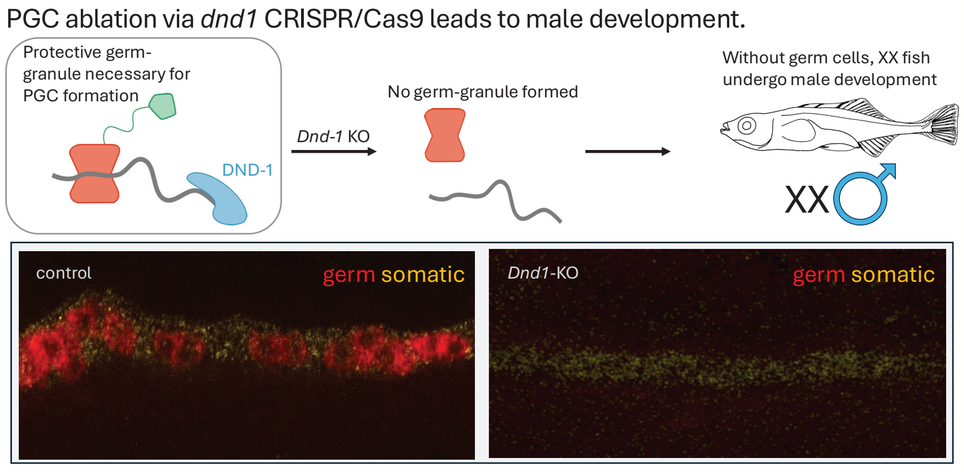
If *amhy* is inhibiting germ cells as a mechanism of initiating male development, I expect females to have more primordial germ cells (PGCs) than males independent of sex chromosome.



Females have more primordial germ cells (PGCs) than males, independent of sex chromosome



PGC ablation via *dnd1* CRISPR/Cas9 leads to male development.



Next, I can identify the genetic contributions of germ cells by comparing gene expression in developing embryos with and without germ cells.

SCHOLAR AWARDS CELEBRATION
250 Years of American Science: Honoring Those Who Advance It

ARCS ADVANCING SCIENCE IN AMERICA®