



# Matthew Treaster

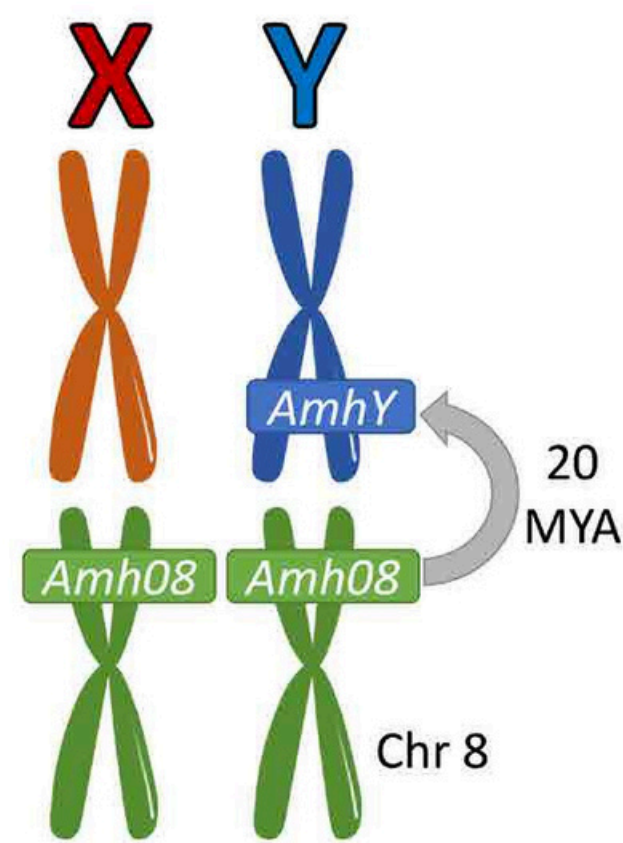
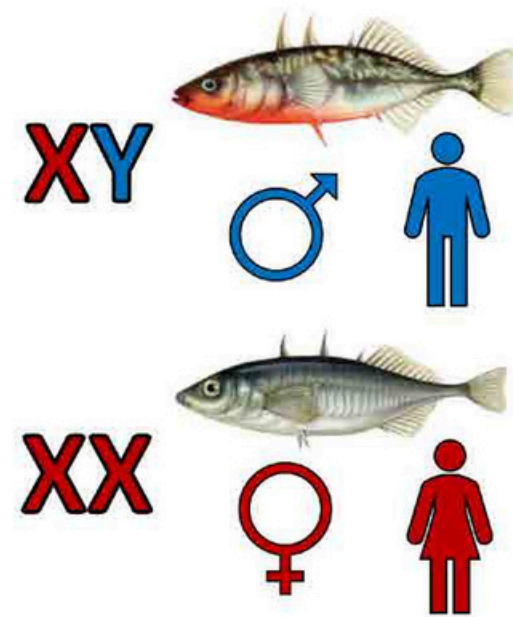
Ph.D. Candidate, Genetics  
Second Year ARCS Scholar  
Dick Award



UNIVERSITY OF  
GEORGIA

## Functional analysis of the candidate master sex determination gene in threespine stickleback fish

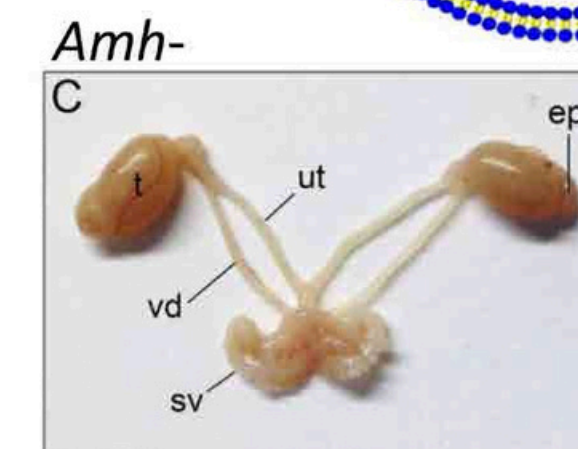
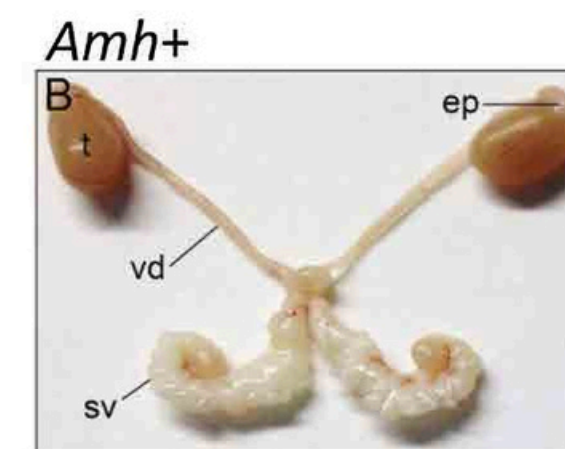
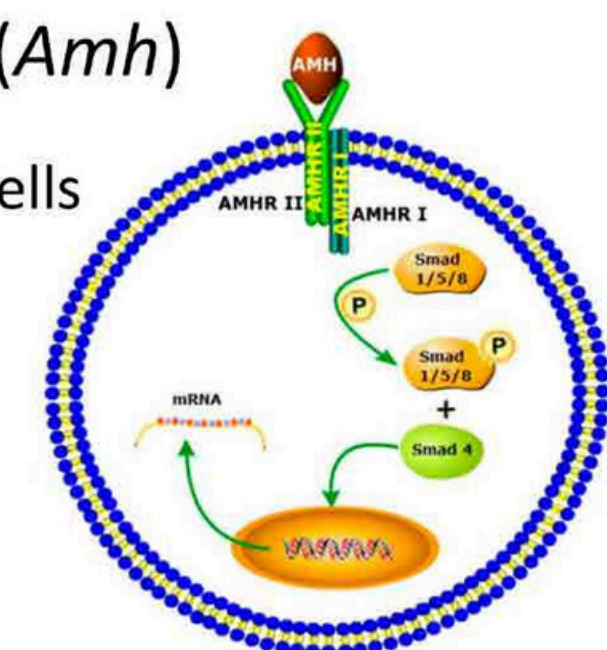
The Y chromosome of threespine stickleback has an additional copy of the gene *Amh* which we predict is the master sex determination gene in this species. I am using functional genetics tools to test this hypothesis and characterize how *Amh* controls gonadal development and differentiation at a molecular level.



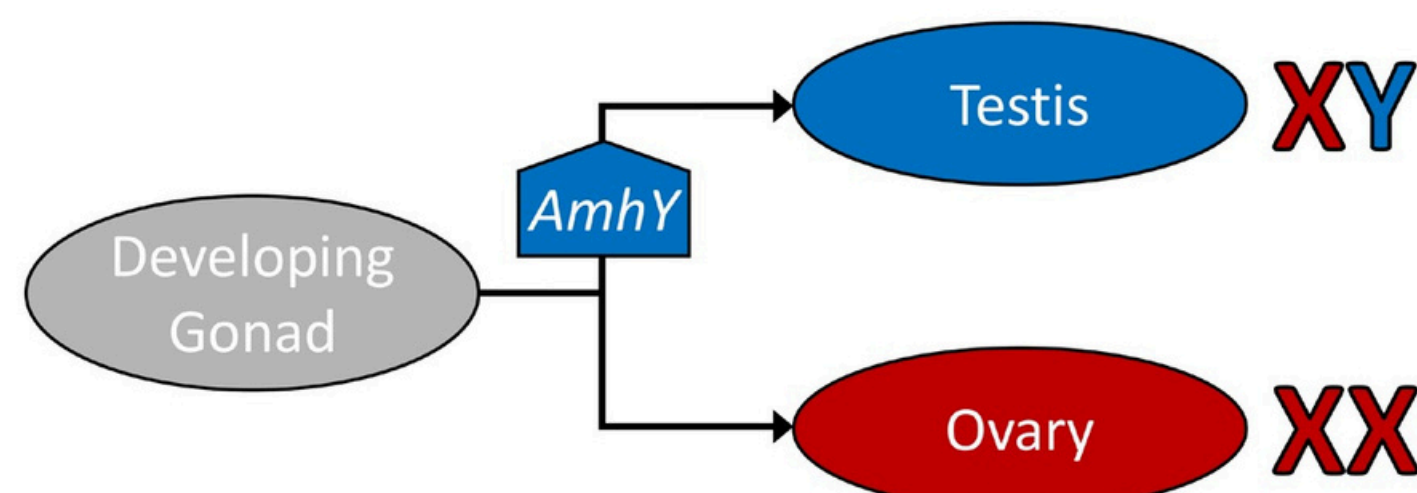
Anti-Müllerian Hormone  
on the Y Chromosome

### Anti-müllerian hormone (*Amh*)

Secreted by somatic gonadal cells  
Upregulated in males  
Regulates reproductive tract  
development and germ cell  
growth

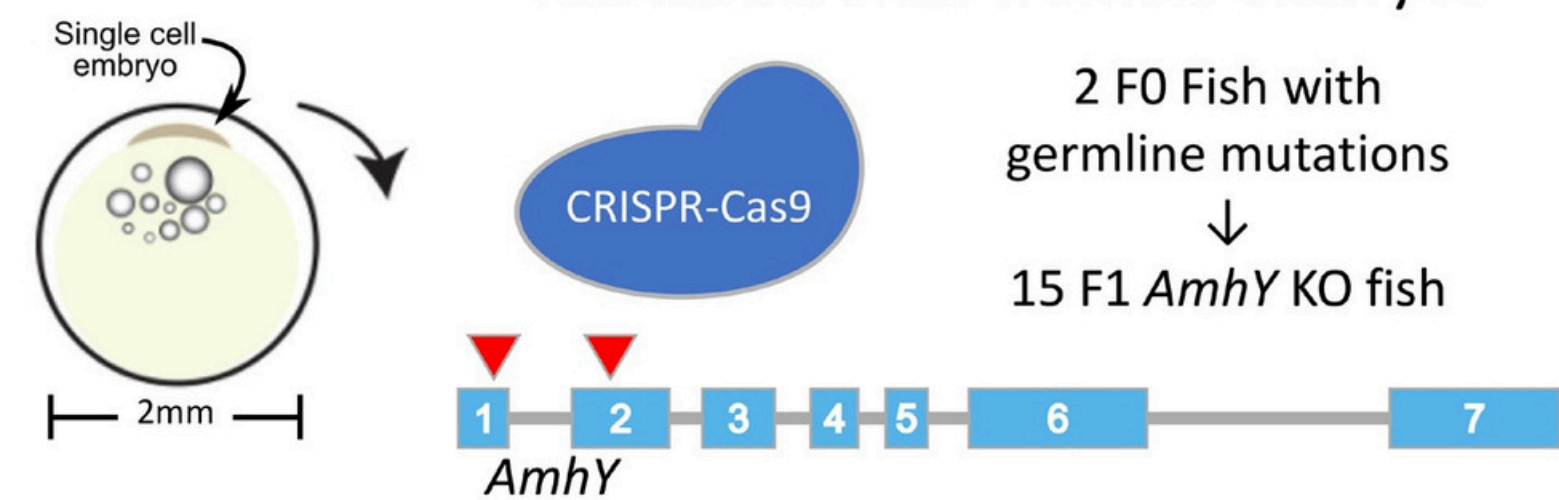


### Hypothesis: *AmhY* is the male sex determination gene in threespine stickleback fish

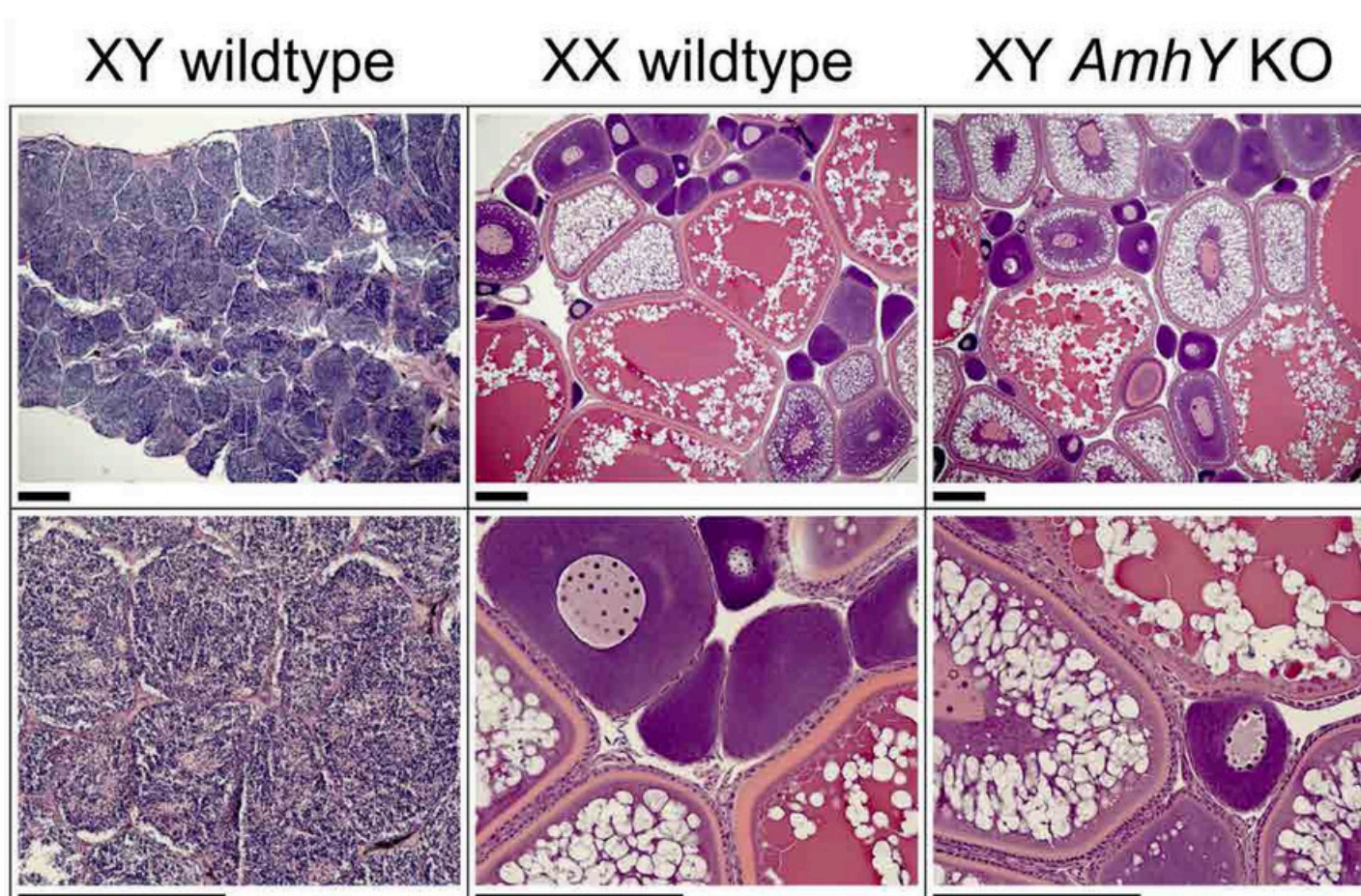
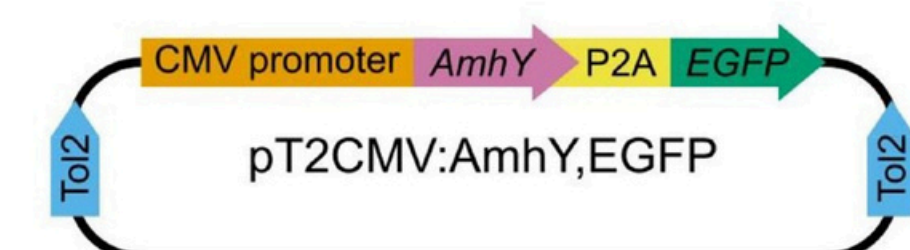


Remove *AmhY* from XY fish → Male to female sex reversal  
Add *AmhY* to XX fish → Female to male sex reversal

### Knockout *AmhY* from XY embryos



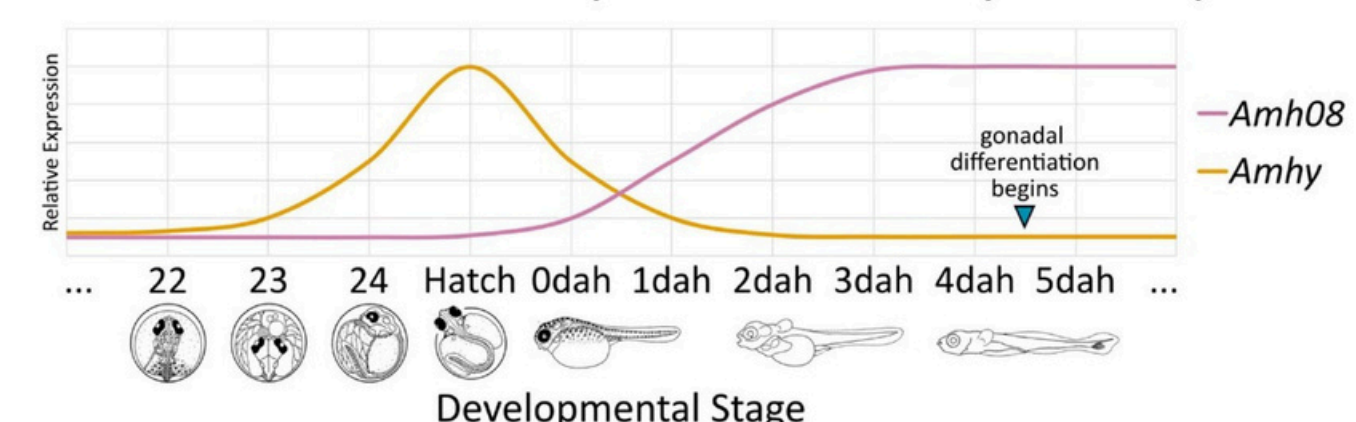
### Transgenesis of *AmhY* into XX embryos



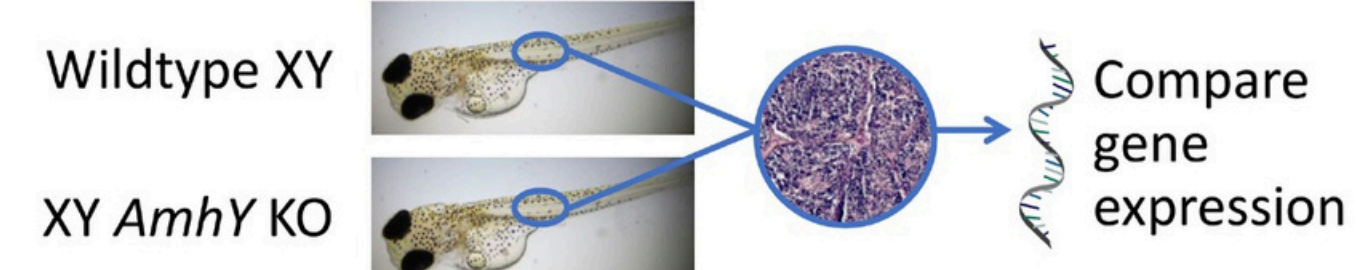
Scale bar = 200 um. **P** Primary oocyte, **C** Cortical alveolus stage, **V** Vitellogenic stage, **M** Mature oocyte, **G** Granulosa cells, **T** Theca cells.

### Future Directions

#### Characterize *AmhY* expression in early development



#### Identify cellular mechanisms of *AmhY* signaling



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Scholar Awards Celebration  
November 15, 2023



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Innovation  
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