

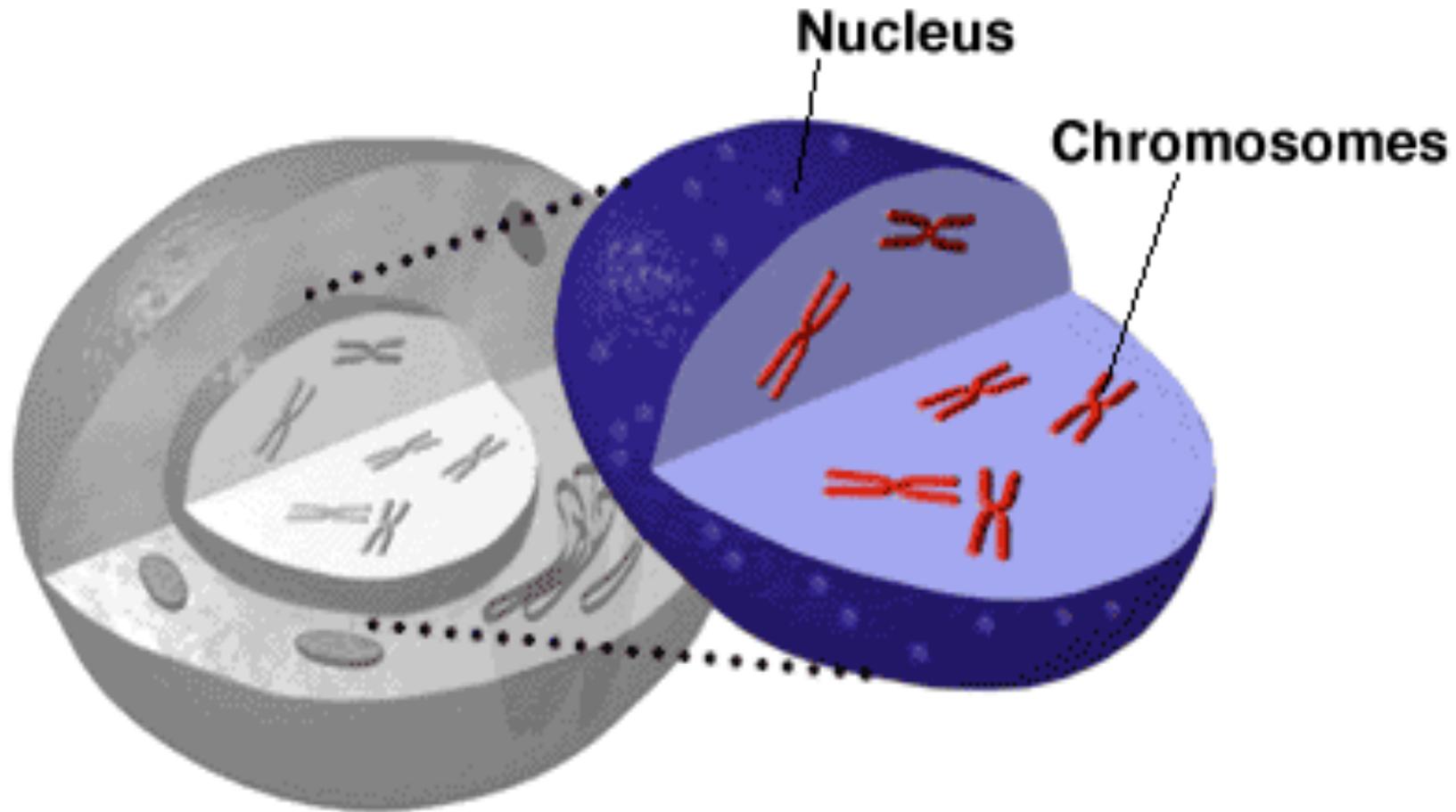
Brain Control of the Sex-Changing Fish Bluehead Wrasse

Kyphuong

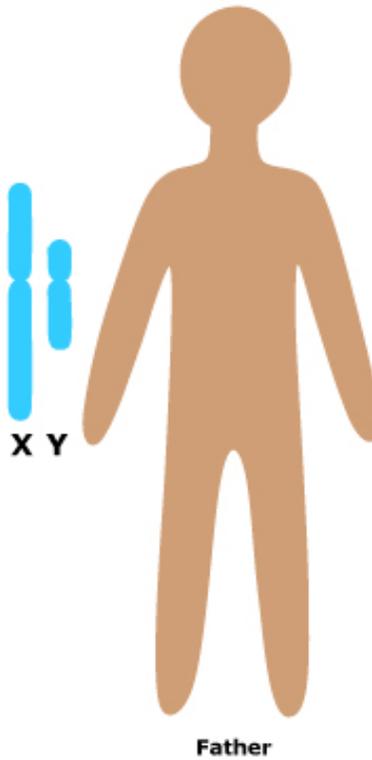
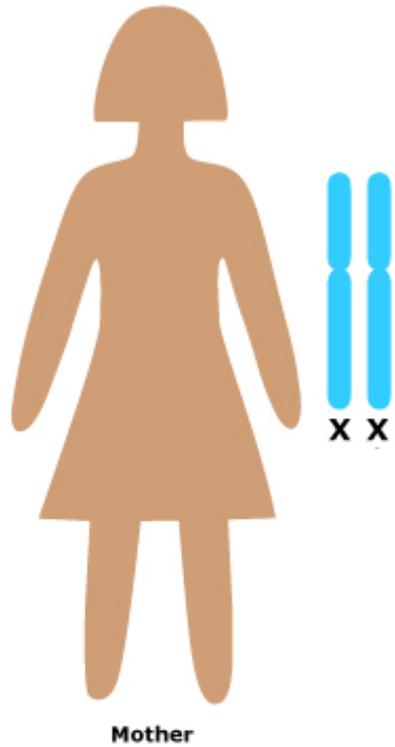
University of Utah



Sex Determination in Humans



Sex Determination in Humans



Bluehead Wrasse

(*Thalassoma Bifasciatum*)



Terminal and Initial Phase



Terminal Phase

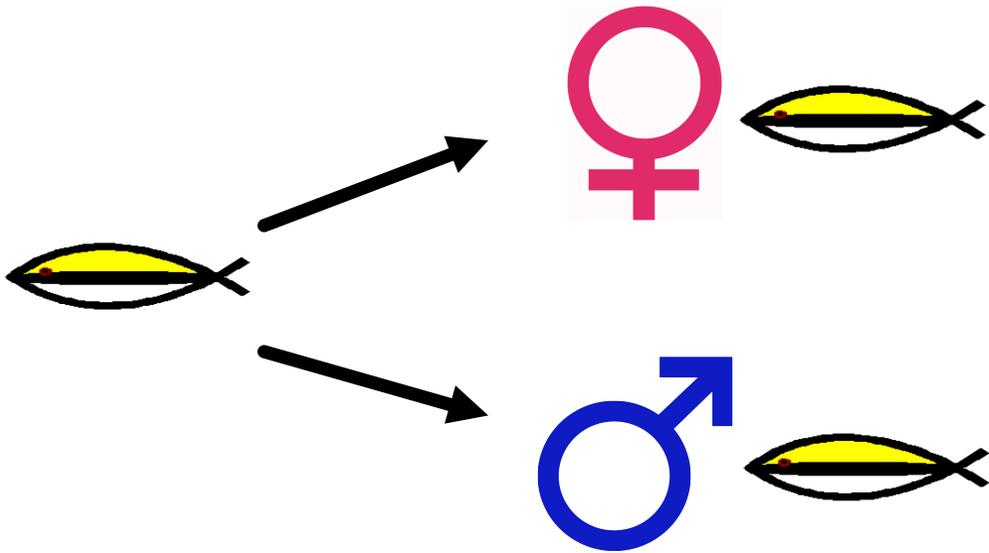


Initial Phase

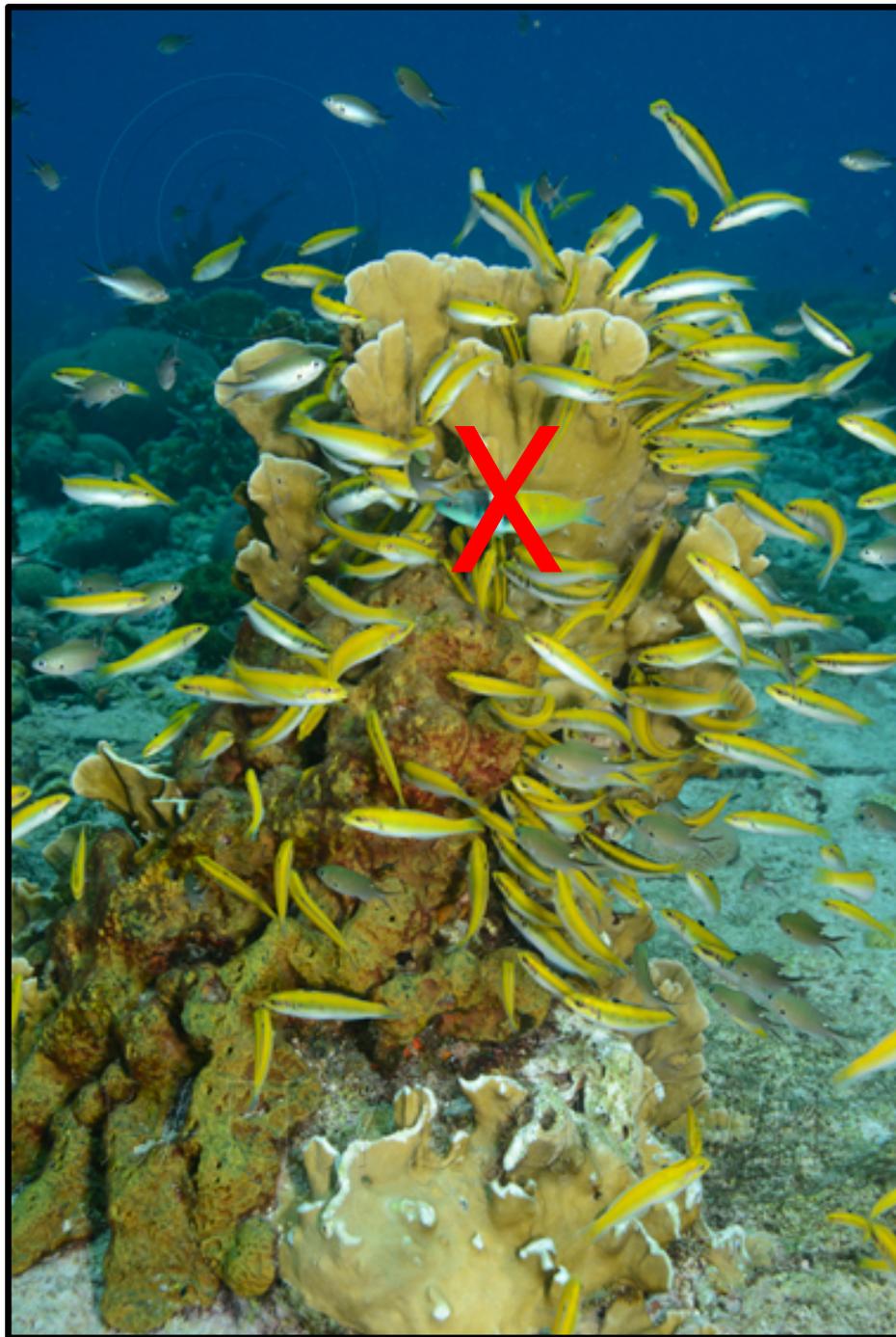
Sexuality in *T. bifasciatum*

Protogynous diandric hermaphrodites

Proto (first); gyno (female)



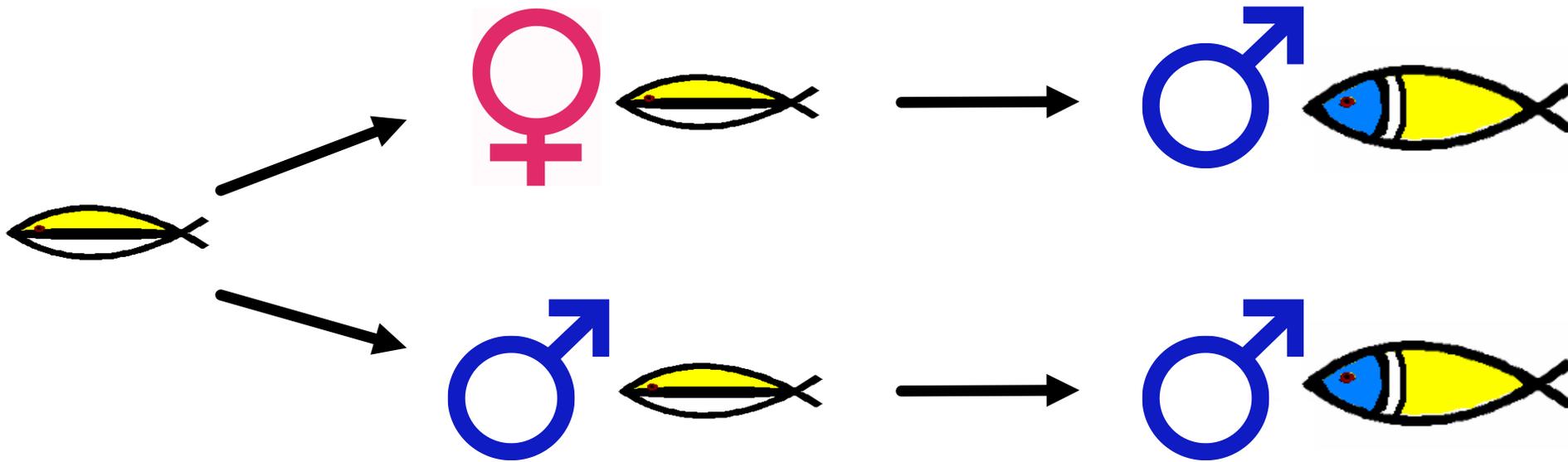
Removal of Terminal Phase Male



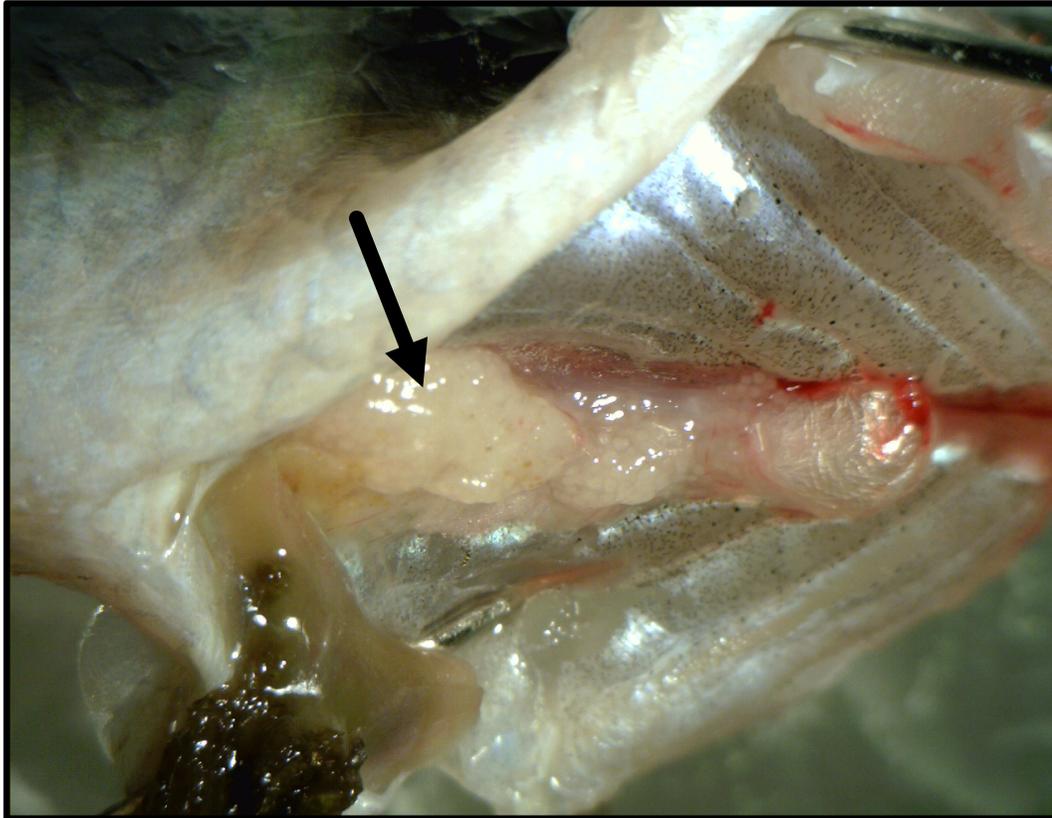
Sexuality in *T. bifasciatum*

Protogynous diandric hermaphrodites

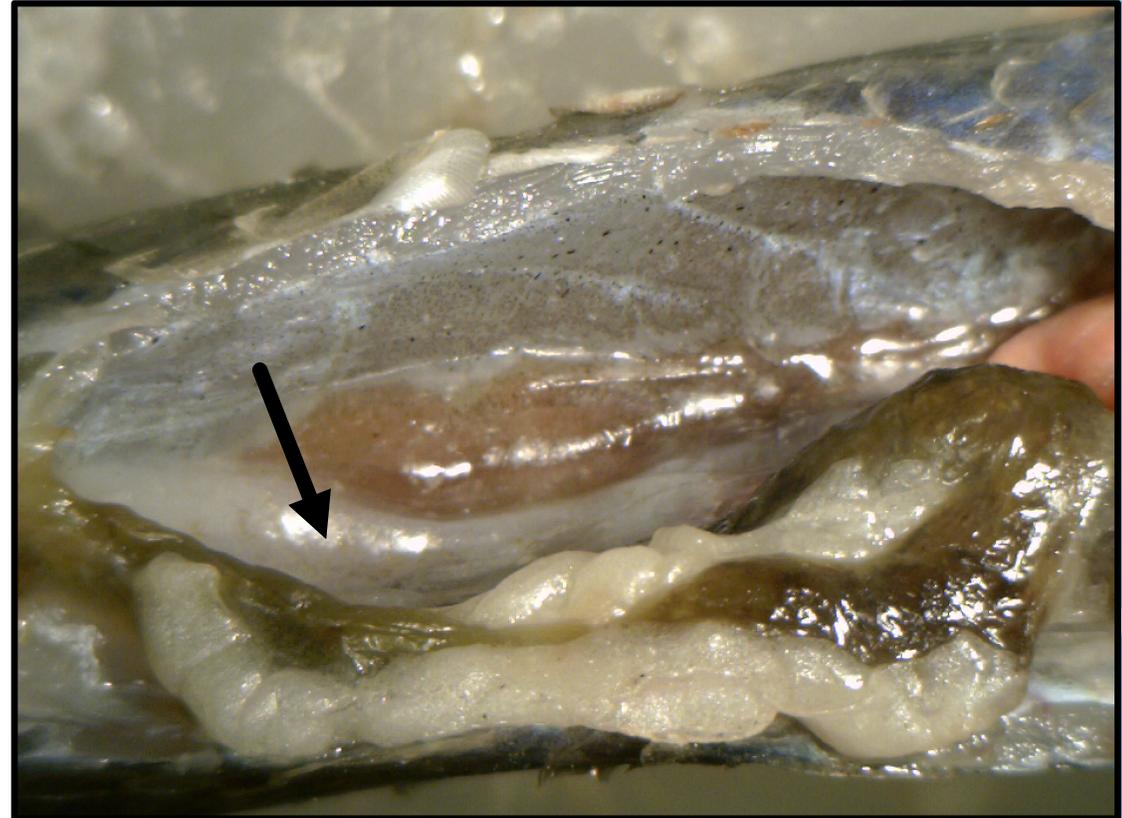
Proto (first); gyno (female)



Fish Reproductive Organs

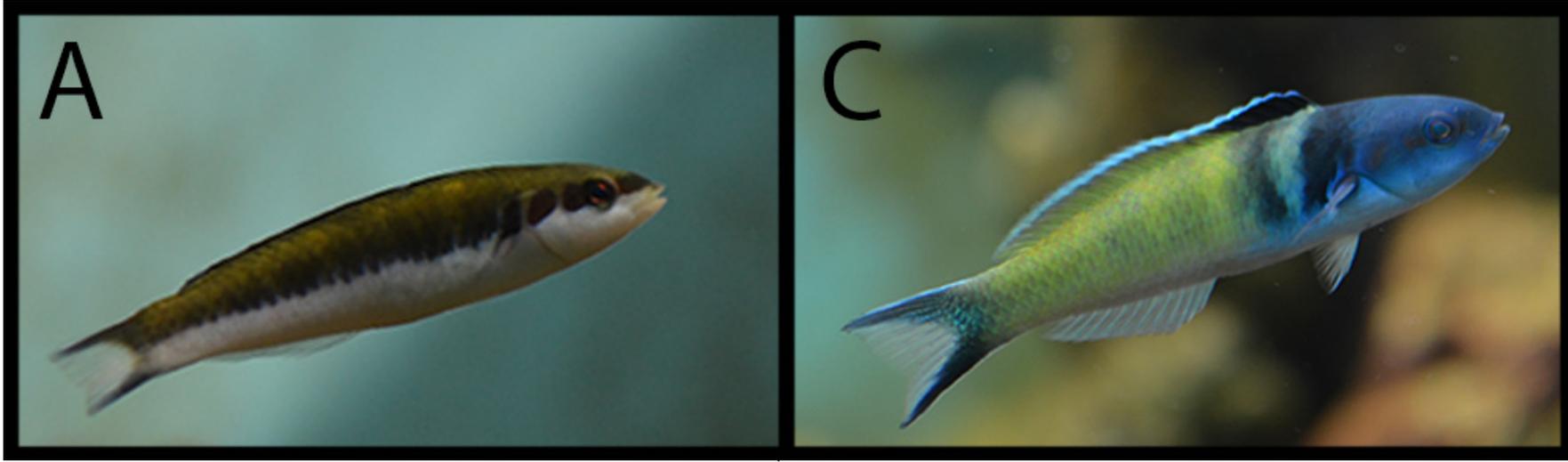


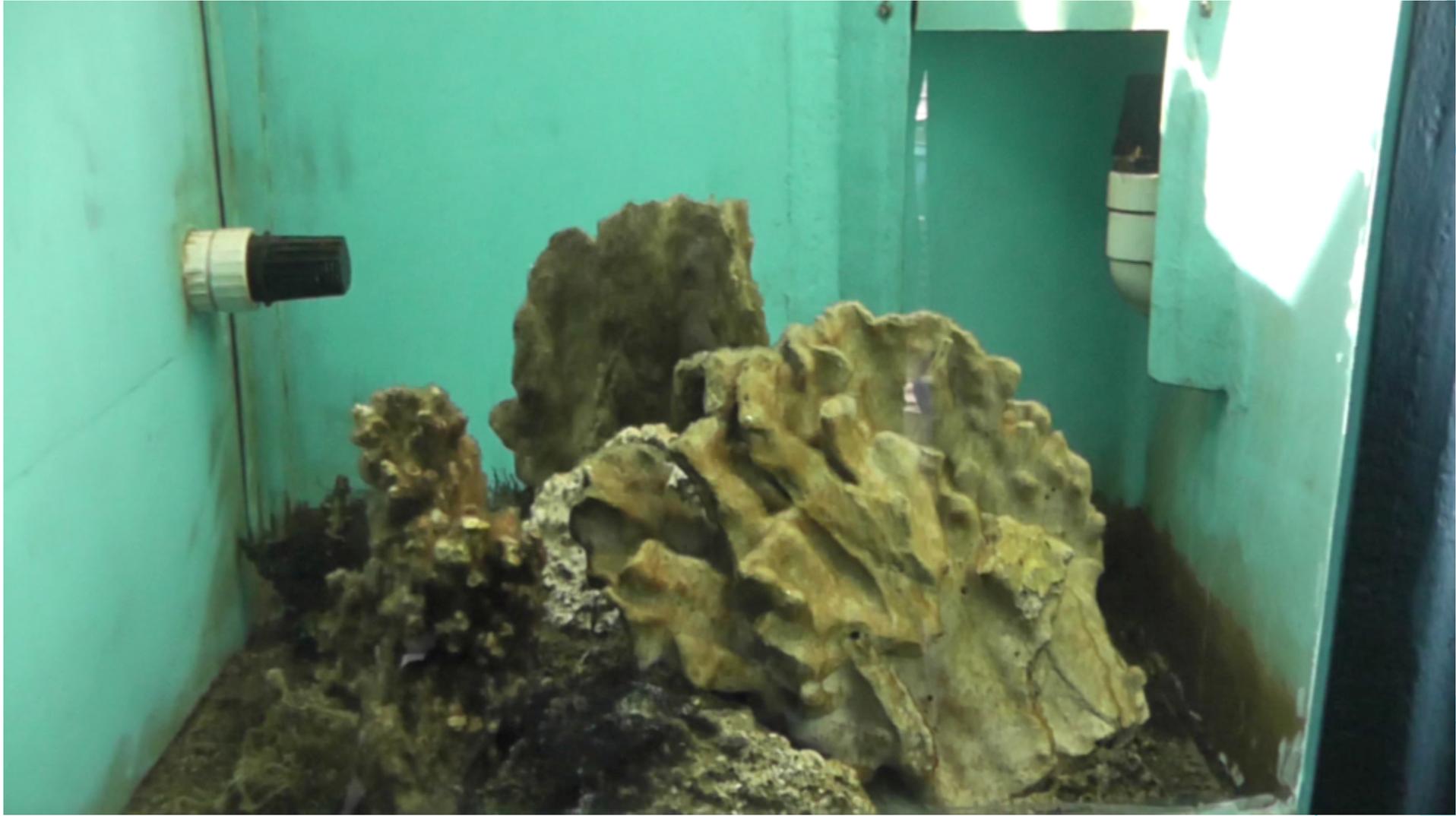
Ovaries (female)



Testes (male)

Color changes





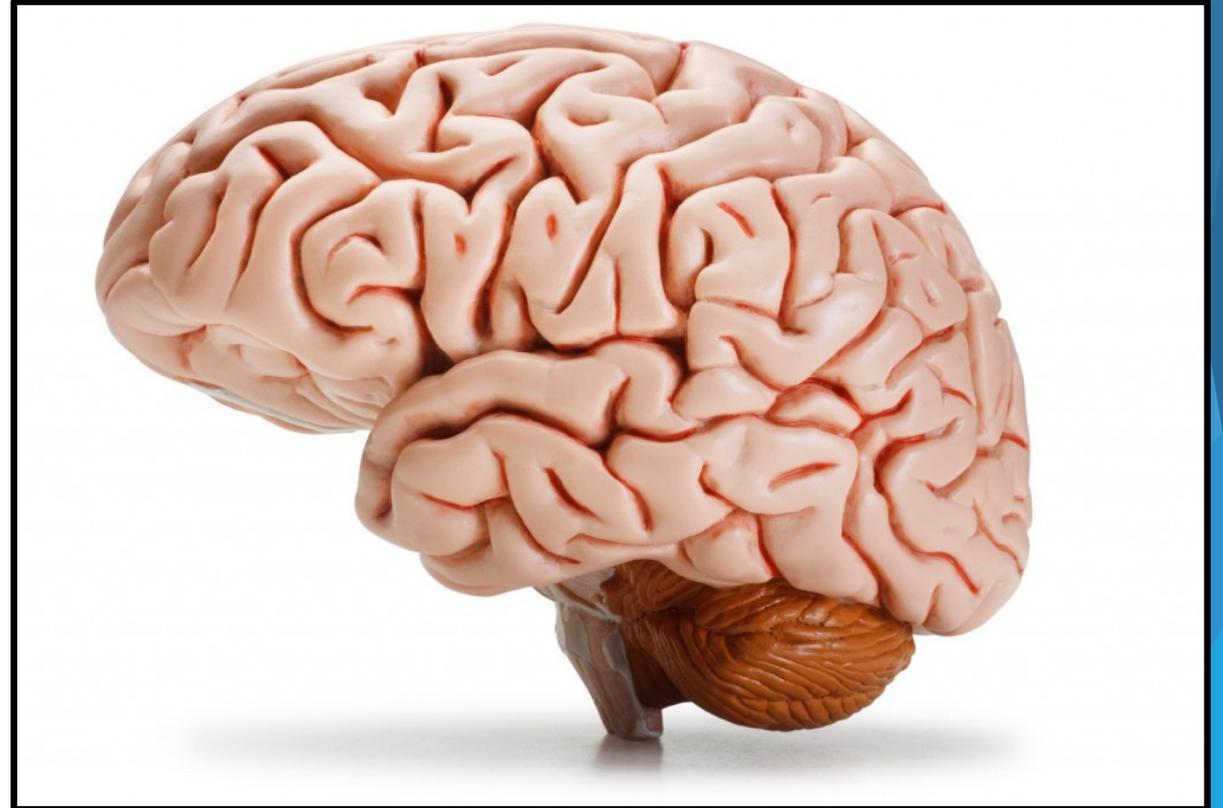
Big Question:

What part of the brain controls courtship?

Big Picture: Why is this important?

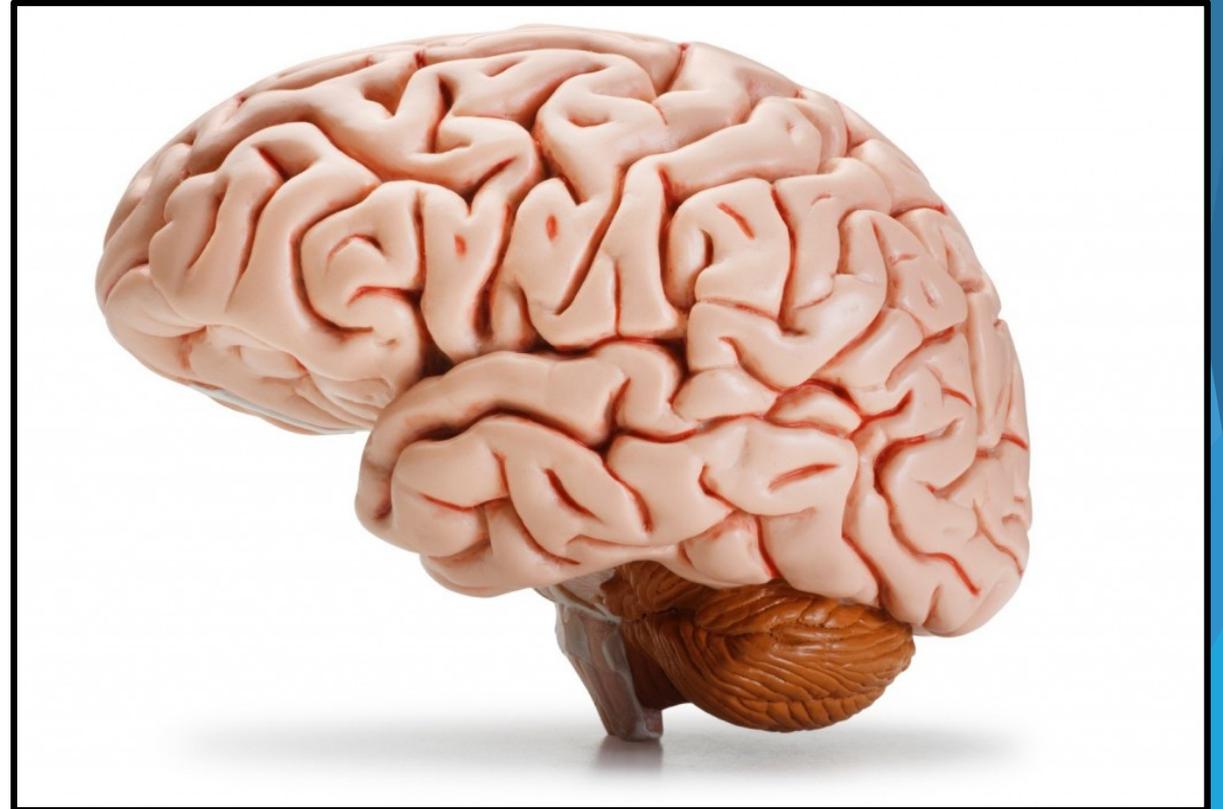
Understand how brain controls behavior because there are similar mechanisms in humans.

Fish Brains



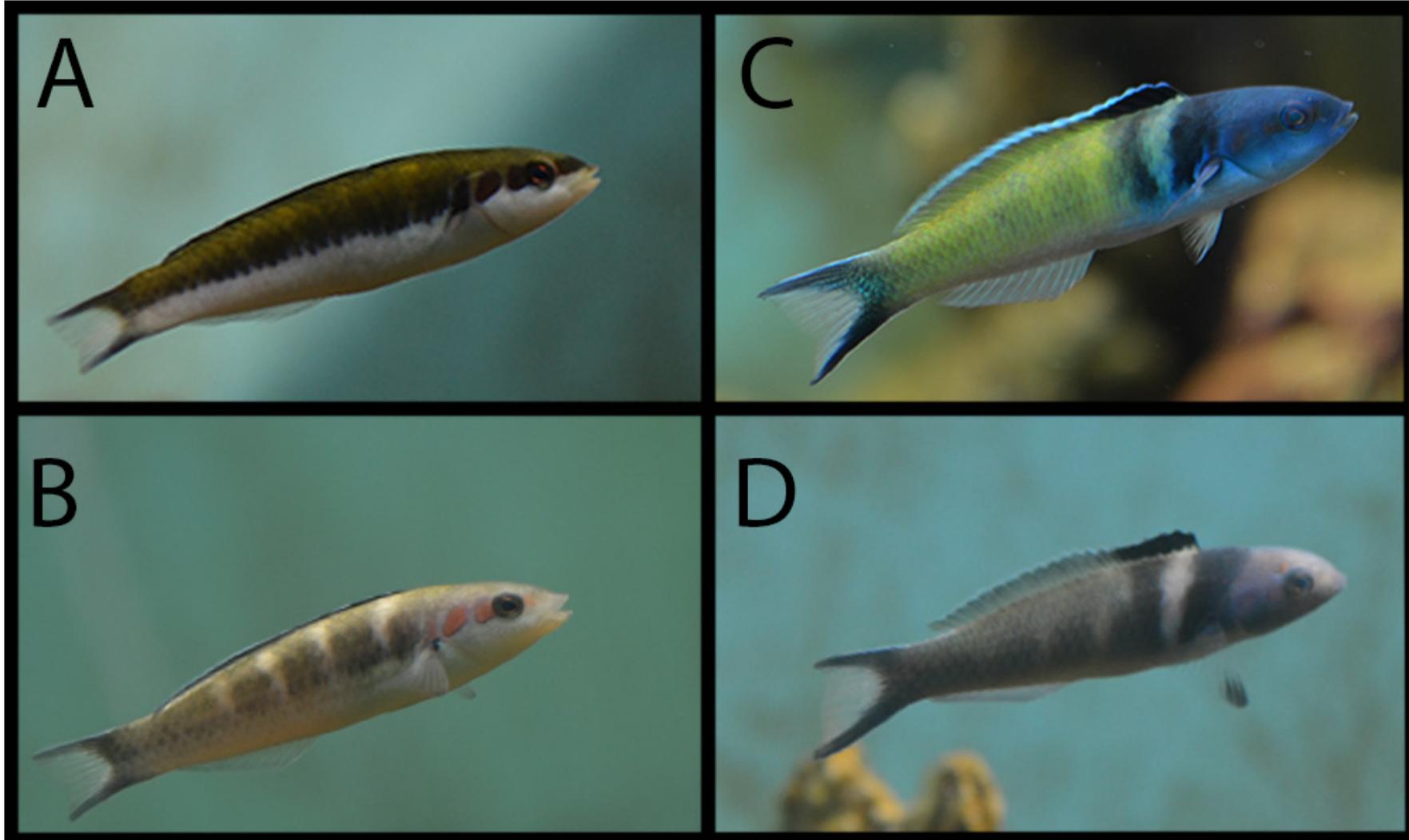
Fish brains are similar to human brains, just a lot smaller

Fish Brains



Fish brains are similar to human brains, just a lot smaller

Comparing Courting and Non-courting fish



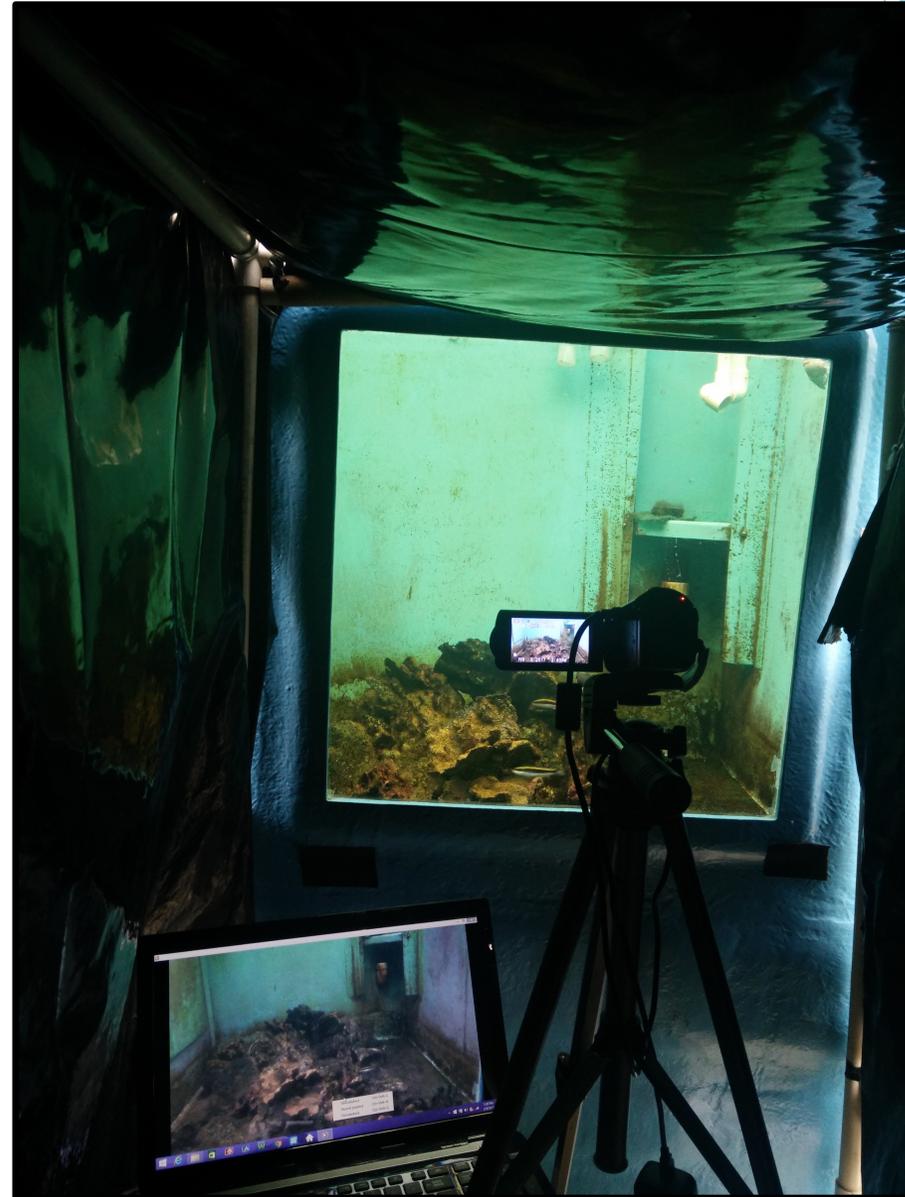
Behavioral Studies



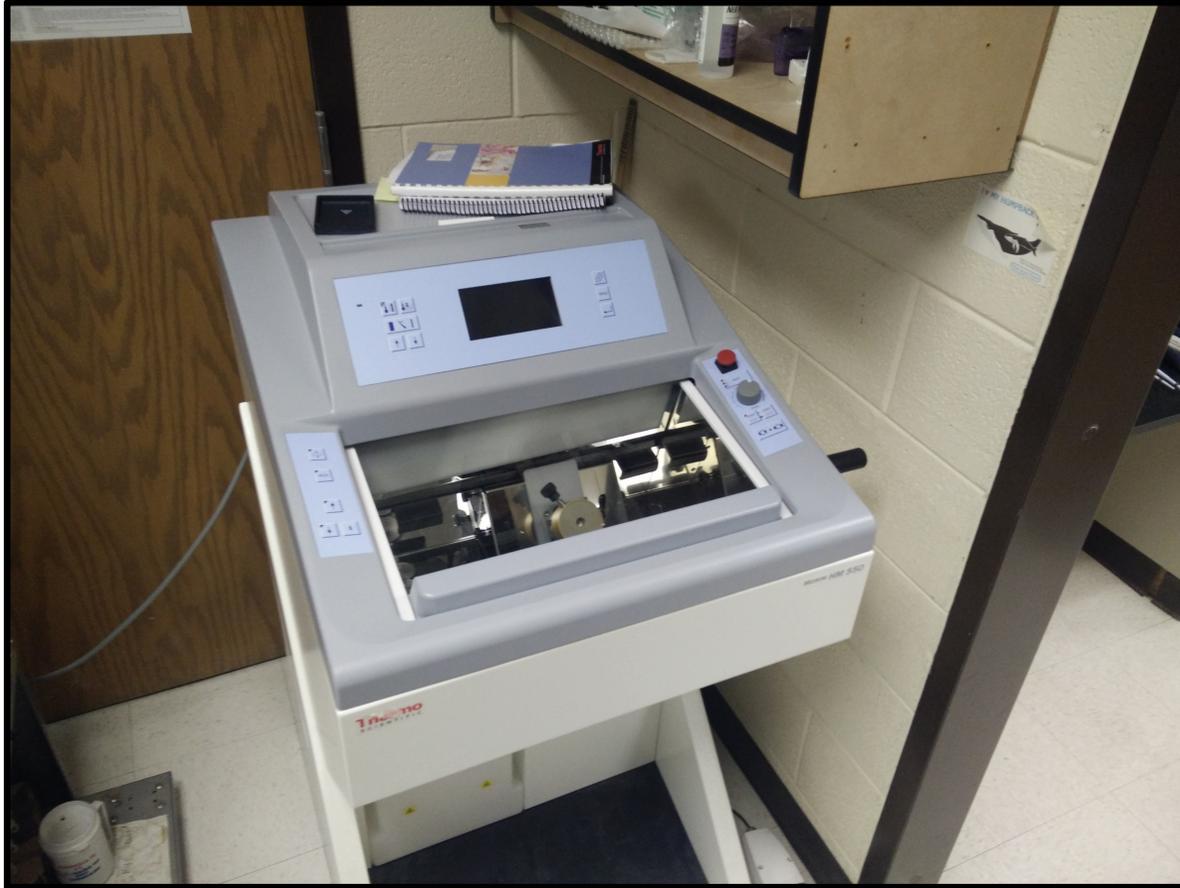
We have two large 800-gallon tanks to house our fish.

Behavior Studies

- ▶ Fish tanks have windows to observe and record behaviors.
- ▶ Catch fish during courtship and extract brains.



Immunohistochemistry



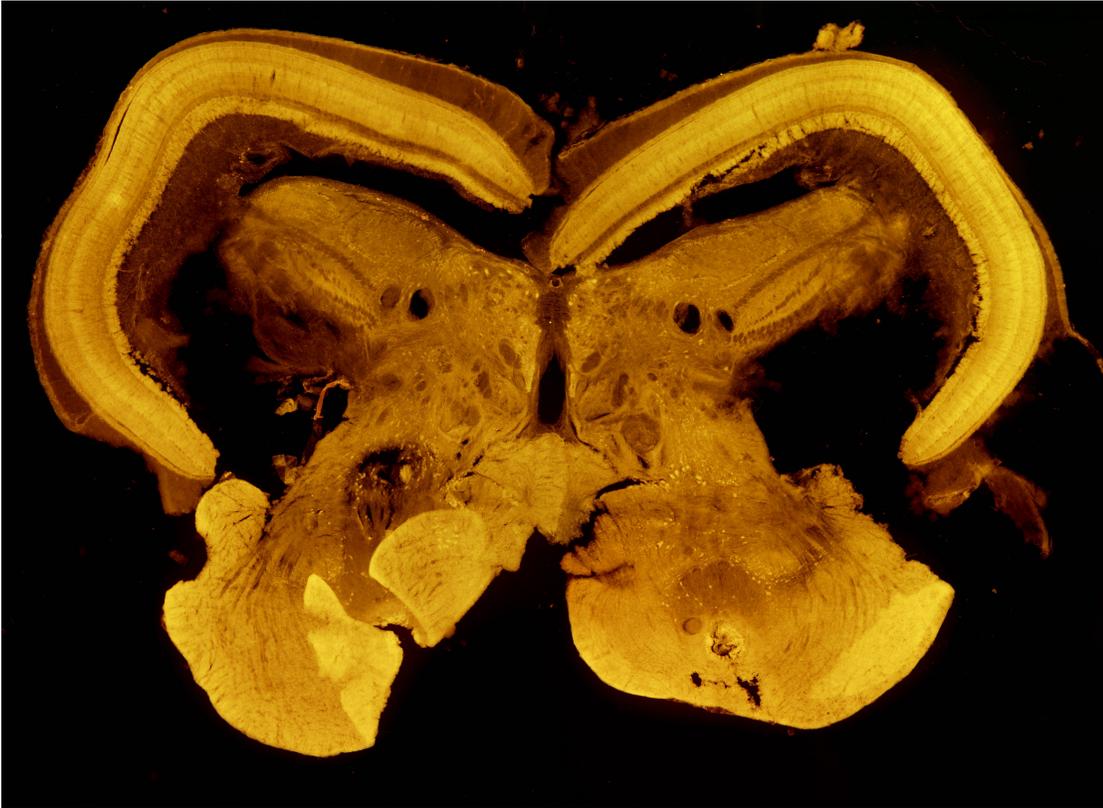
Our cryostat can slice brain slices into very thin sections

Immunohistochemistry

Brain slices treated with special chemicals to make active brain cells (neurons) glow

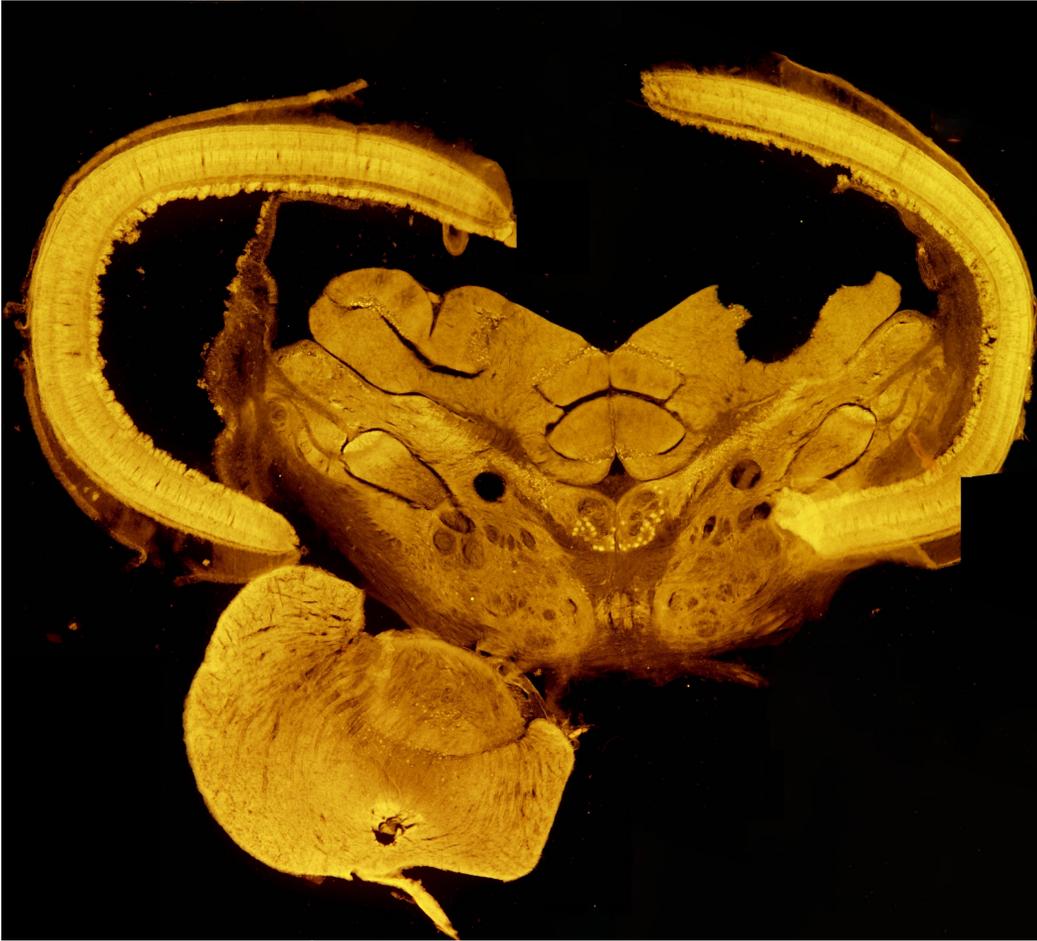


Results



Brain slices treated with special chemicals to make active brain cells glow

Results

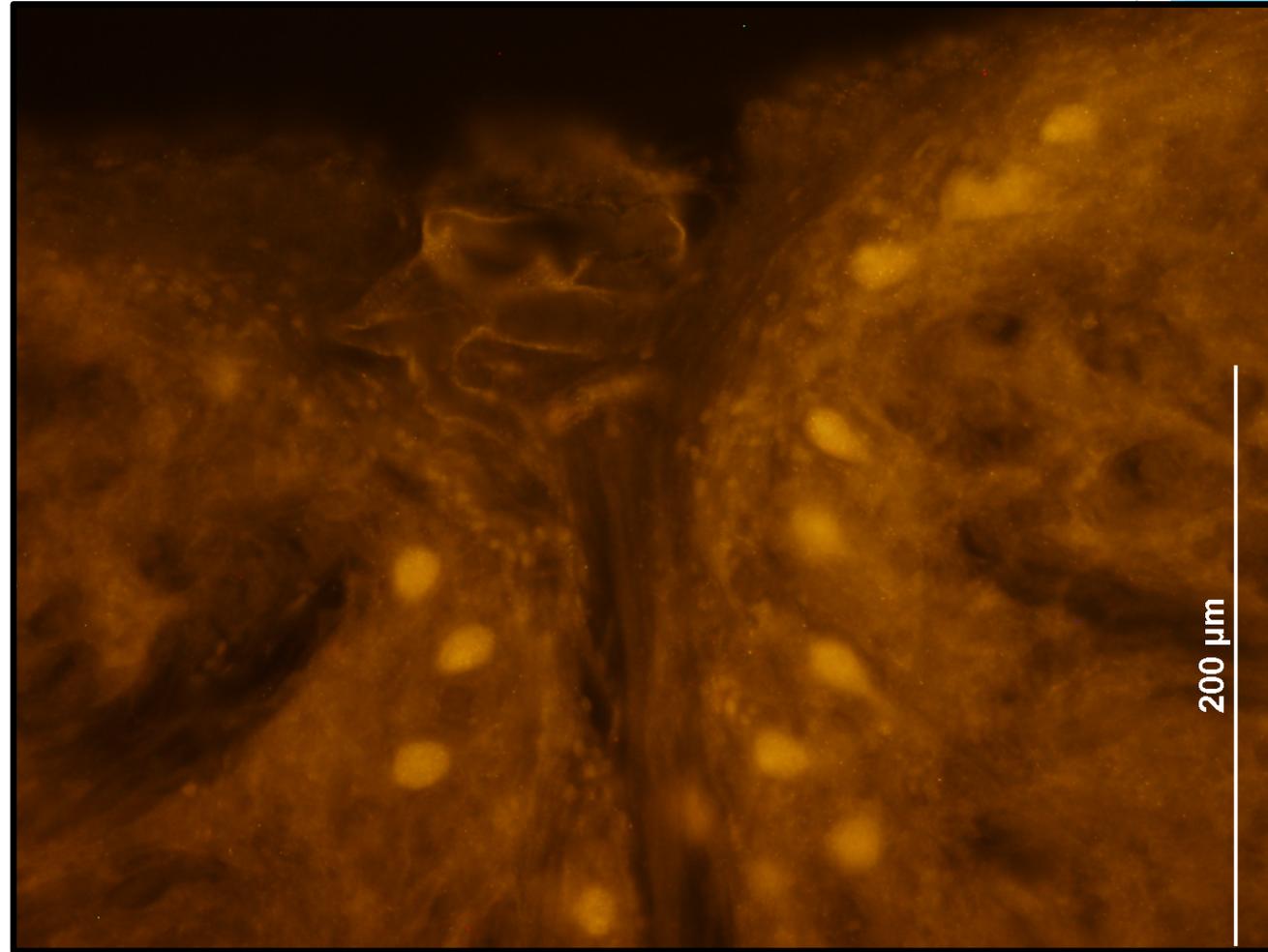


Each fish brain has over 150 slices.

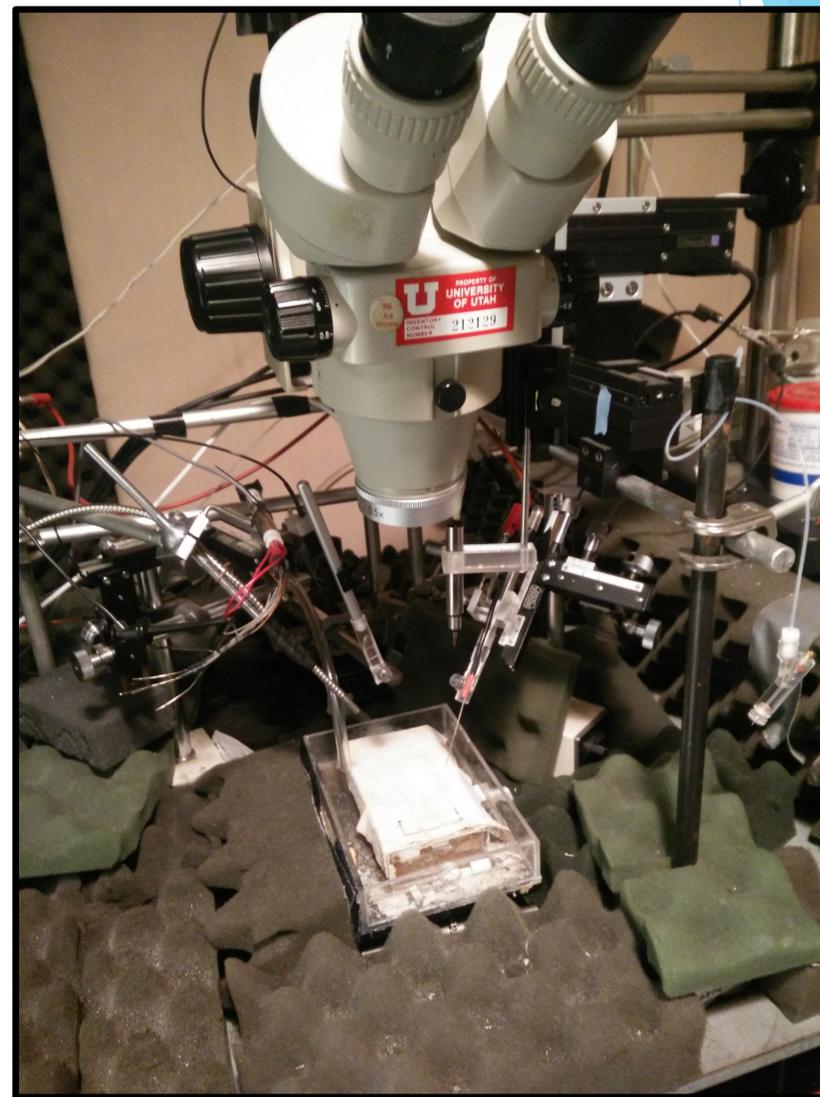
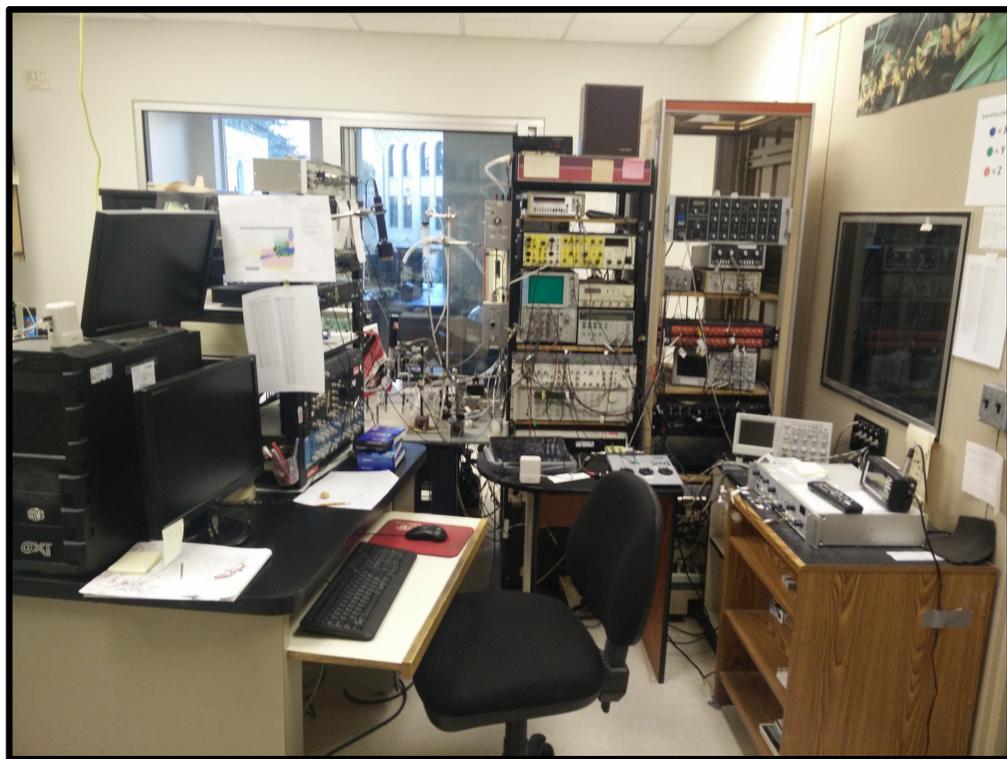
Results

Each individual glowing dot
and an active brain cell.

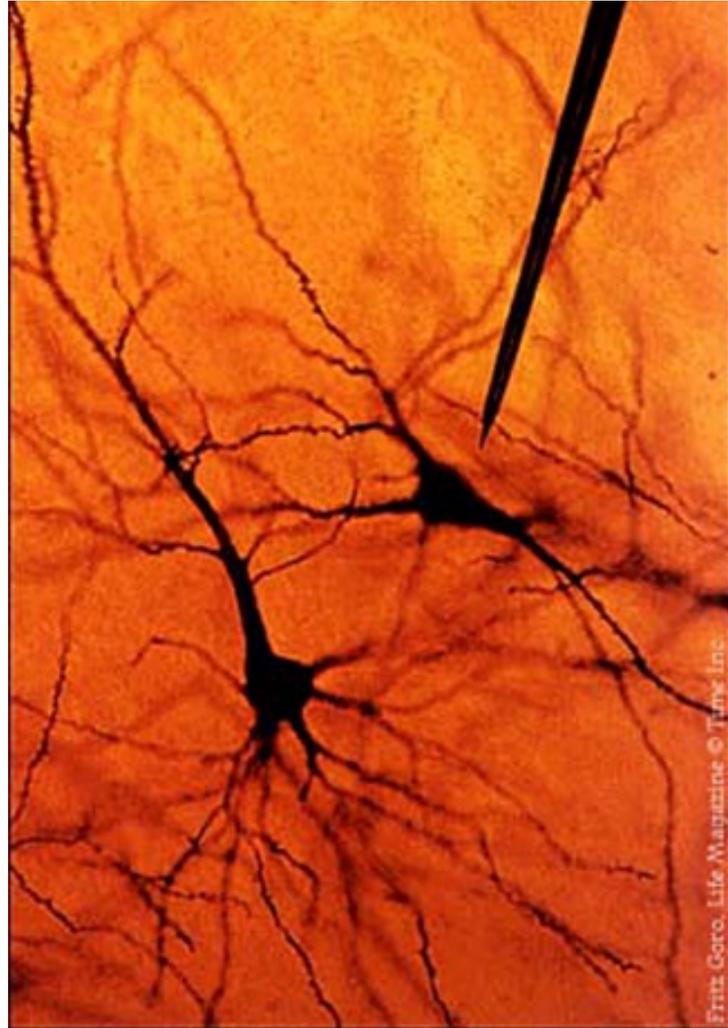
We can compare brains from
courting fish vs. non-courting
fish to see what areas are
active during courtship.



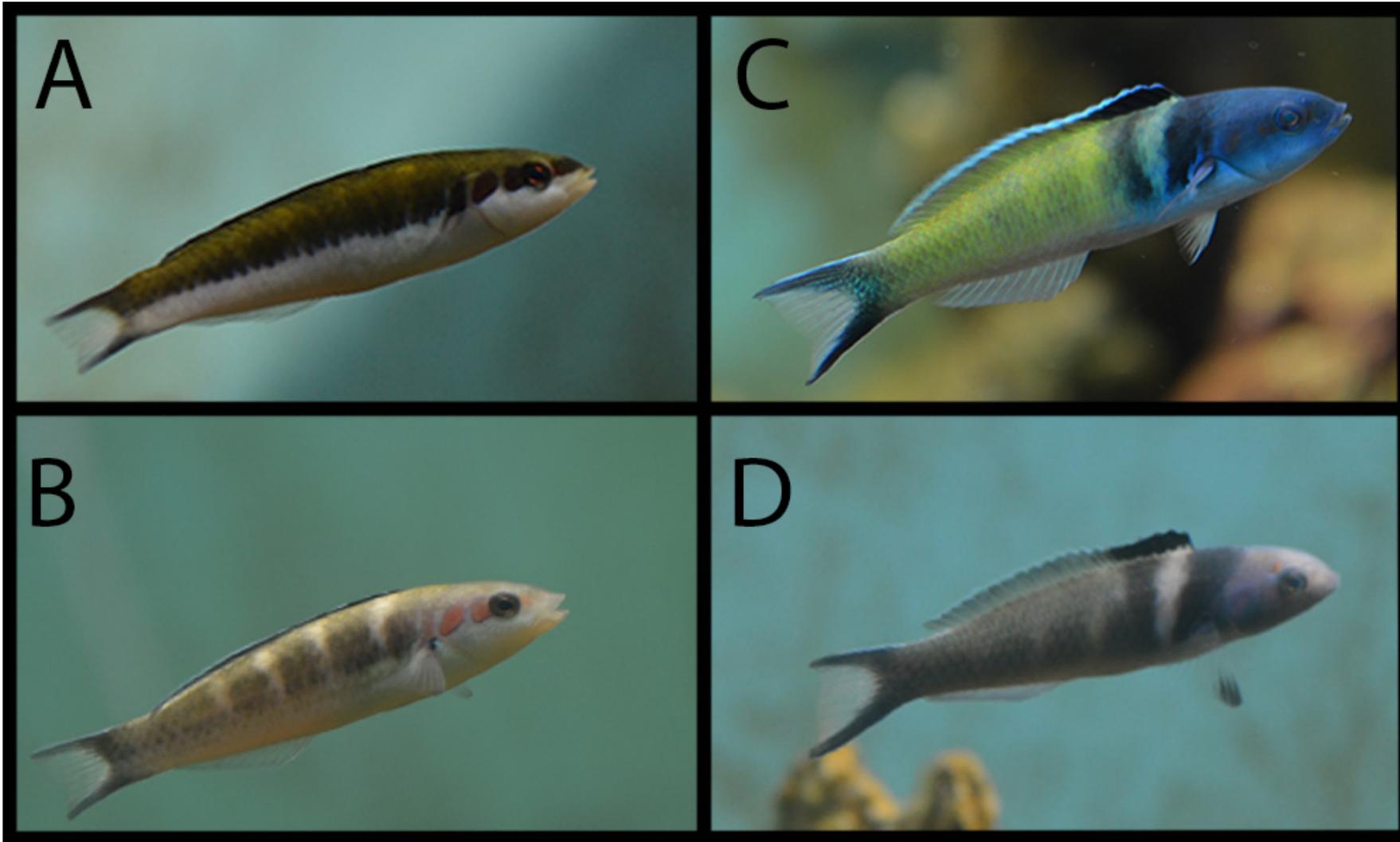
Next Experiment



Stimulate Active Brain Areas



Stimulate fish brain to make it change colors



My Pathway to Science

Grew up in Salt Lake City
First generation immigrant
Grew up really poor

Moved to California when I was 15 years old
Graduated from a low income public school

Went to college with no idea what to do



Special Thanks

- ▶ My mentor Dr. Rose
- ▶ Maddie and Rishi for taking care of the animals.

