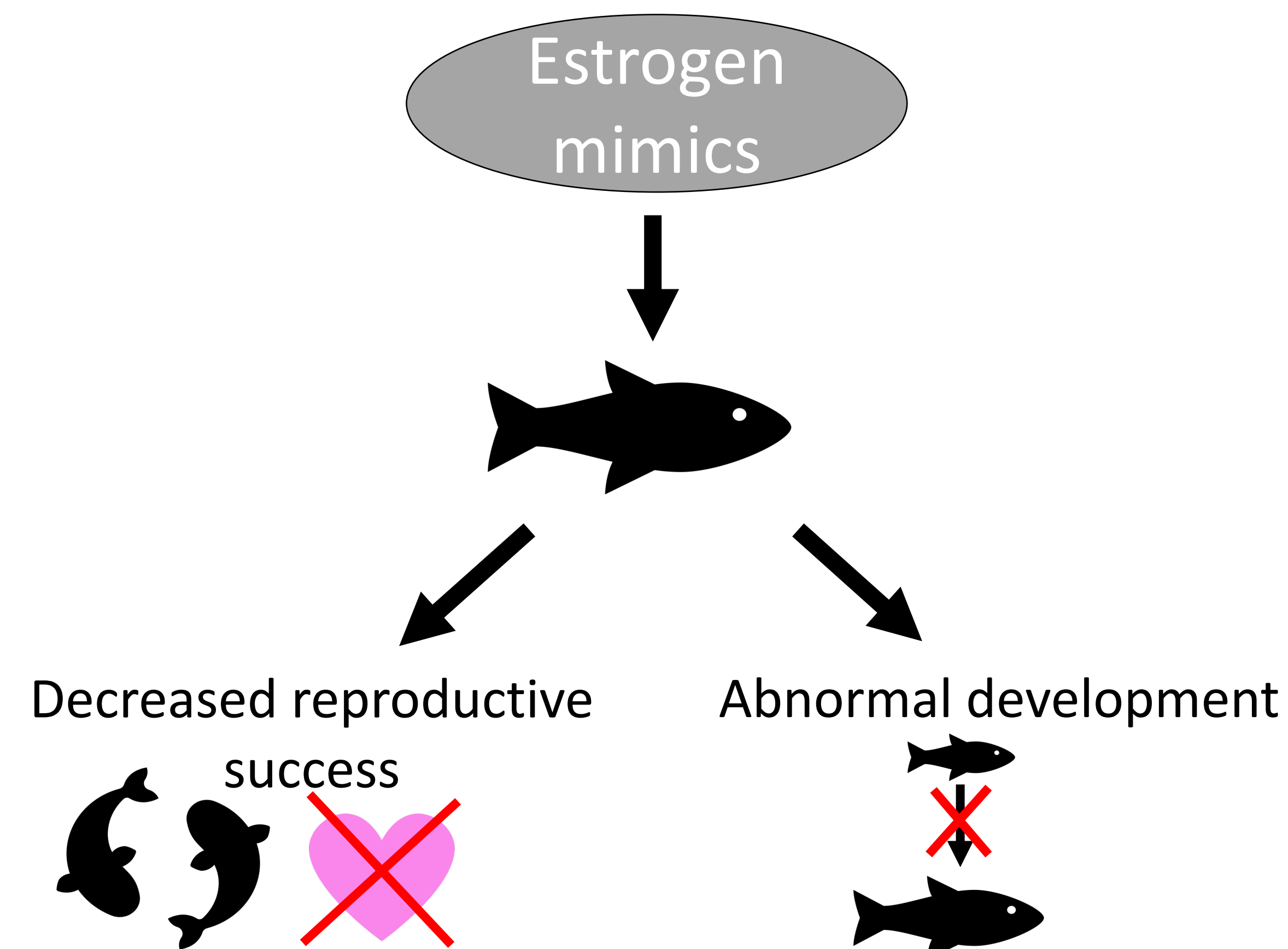


Fluorescing Fish: Use of Transgenic Medaka in Estrogen Detection

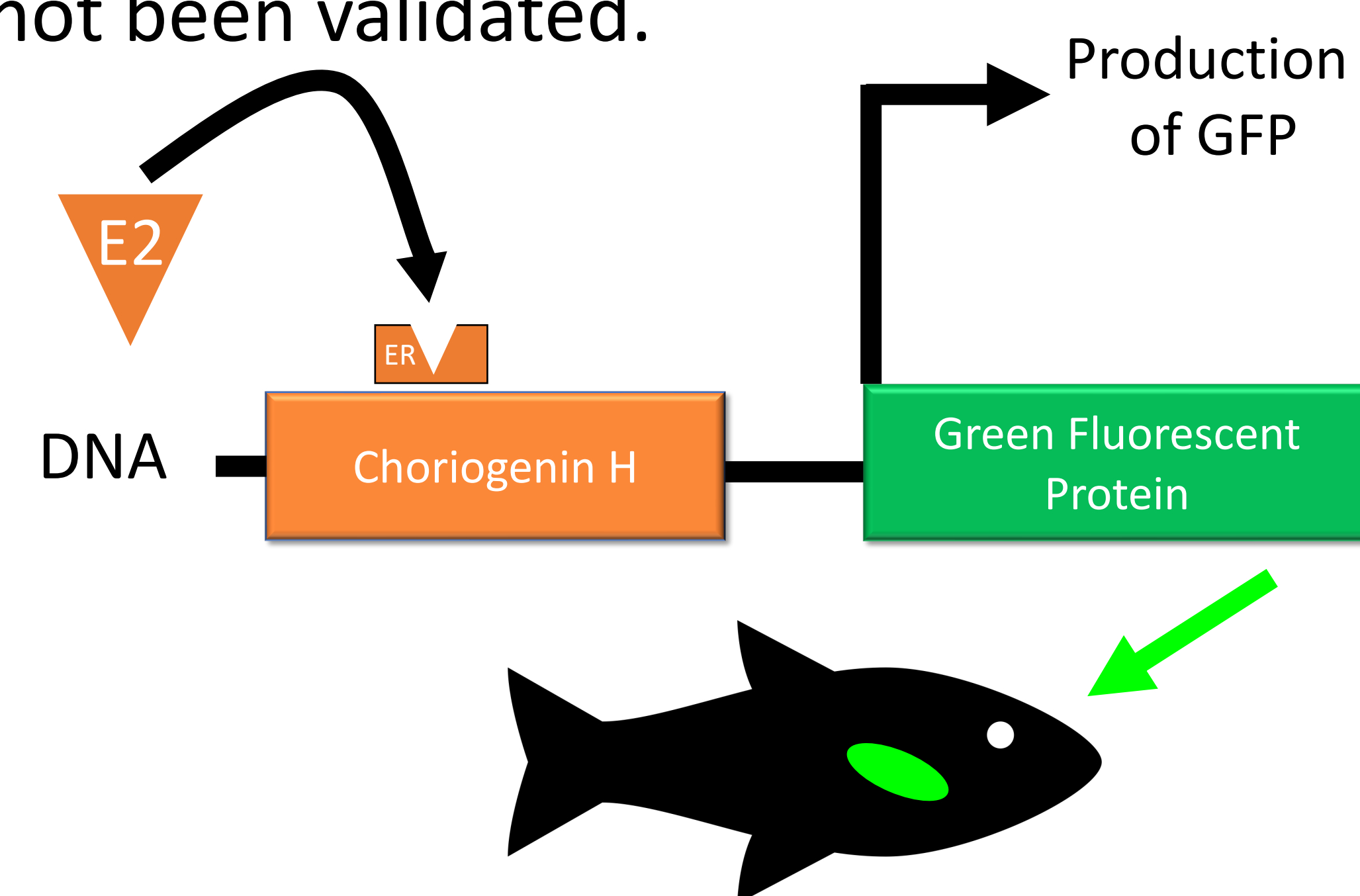
Evan Burchfiel, Dalton Allen, Catherine Wise, Zach Aldrete, Katie Solomons, and Marlo Jeffries • TCU Biology Department

Introduction

- Due to increasing industrialization and pollution, there are concerns regarding the presence and impacts of estrogen mimics – chemicals that mimic the activity of estrogen.



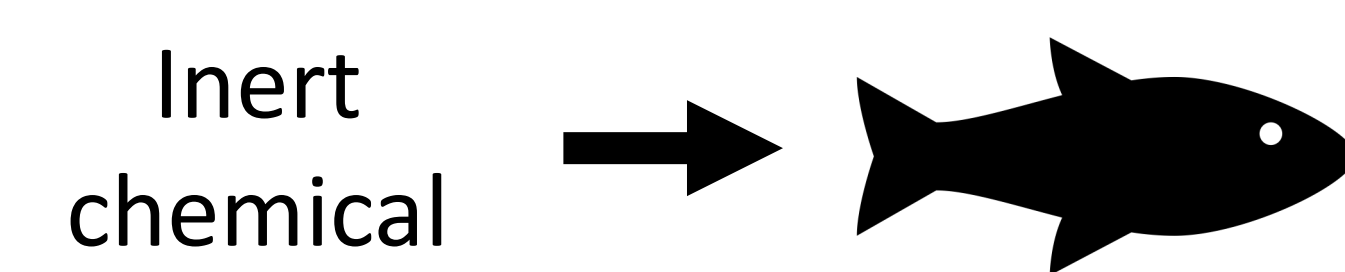
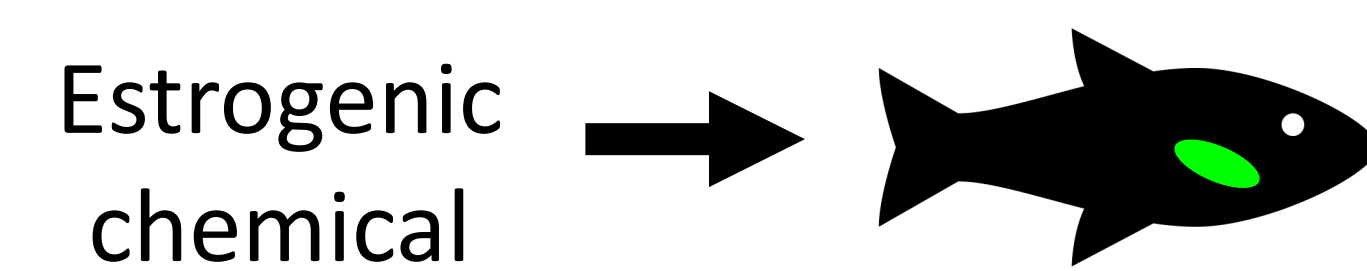
- International regulations require testing for these chemicals, but current methods are too cost-, time-, and labor-intensive.
- Thus, there is a need for a new assay that is more cost- and time-effective.
- A new assay, called the Rapid Estrogen Activity *In Vivo* (REACTIV) assay, featuring transgenic medaka has been developed to meet this need; however, its performance has not been validated.



Objective

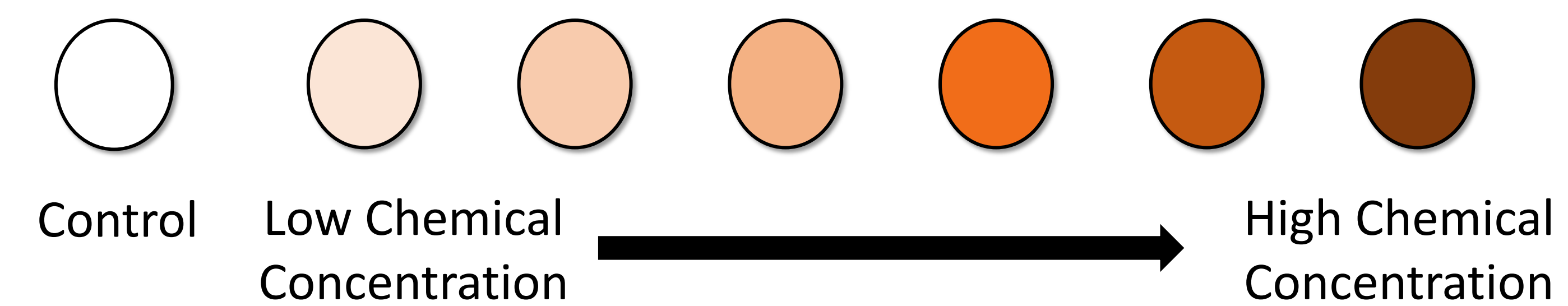
To validate the REACTIV assay by demonstrating that it:

- reliably detects chemicals that bind to estrogen receptors
- does not produce false positives in response to inert chemicals.

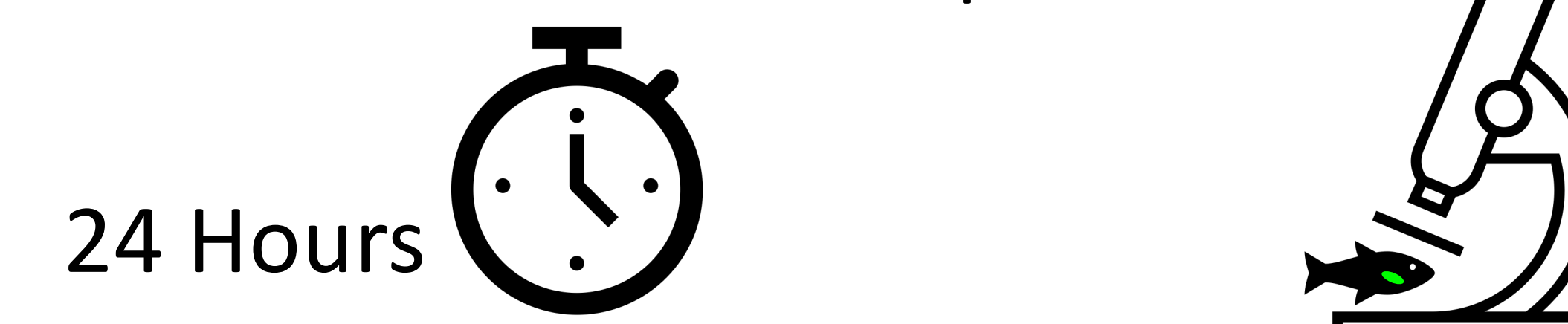


Experimental Design

- Newly-hatched medaka are exposed to increasing concentrations of the chemical of interest



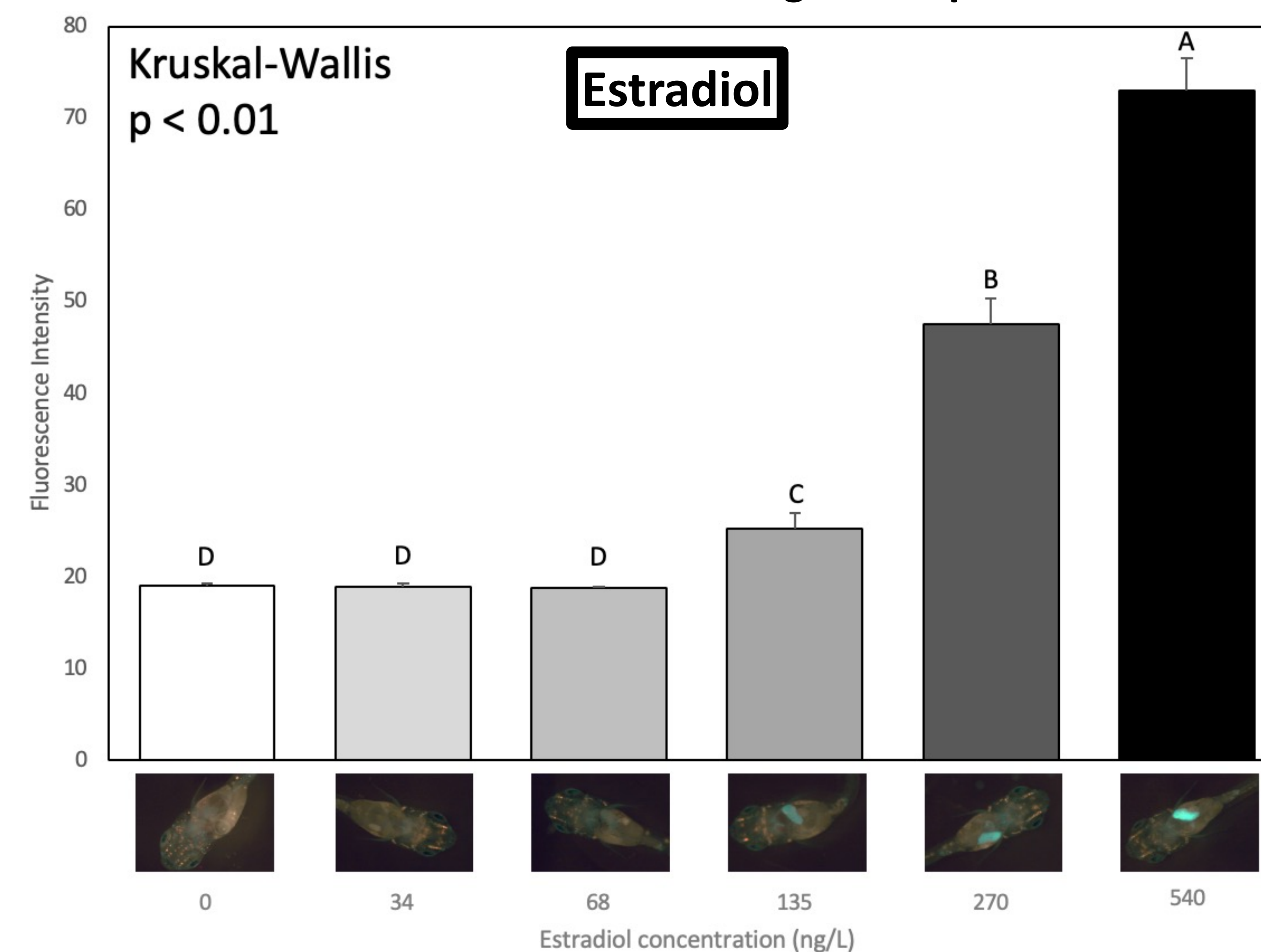
- After 24 hours, medaka are visualized under a fluorescent microscope



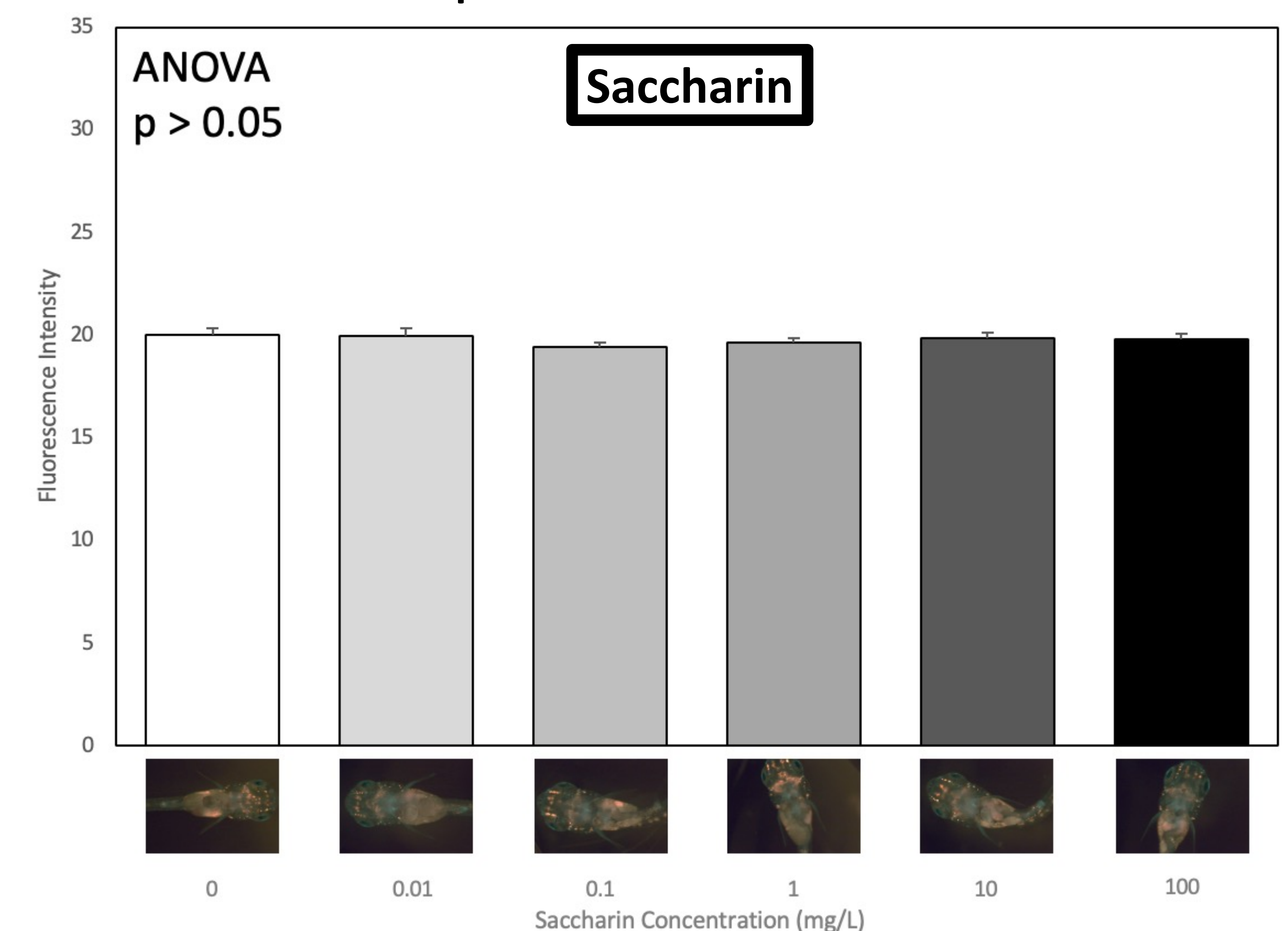
Test Chemical	Classification
Testosterone	Pro-estrogenic
Bisphenol A	Pro-estrogenic
Dutasteride	Pro-estrogenic
Estradiol	Pro-estrogenic
Cefuroxime	Inert
Saccharin	Inert
Atenolol	Inert
Arabinose	inert

Results and Discussion

The REACTIV assay was successful in detecting dose-dependent increases in fluorescence intensity for estradiol, testosterone, bisphenol A, and dutasteride. **The REACTIV assay reliably detects chemicals that bind to estrogen receptors.**



The REACTIV assay did not produce dose-dependent increases in fluorescence intensity for cefuroxime, saccharin, atenolol, or arabinose. **The REACTIV assay do not produce false positives in response to inert chemicals.**



Conclusion



The REACTIV assay is a cost- and time-effective method of screening for estrogenic chemicals. The results of this study are currently being evaluated by the Office of Economic Cooperation and Development as part of an effort to standardize this assay for international regulatory purposes.