



Advancing the Fathead Minnow as an Immunotoxicology Model



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INTRODUCTION



Problem

Chemicals have been shown to disrupt the immune function of fish leading to an increased likelihood of infection and disease. Fathead minnows (FHM) are an emerging model for studying the effects of such chemicals on pathogen resistance; however, its current pathogen pairing, *Yersinia ruckeri*, is not environmentally-relevant for fathead minnows (or the species they represent) and the infection must be induced via intraperitoneal injection.

Goal

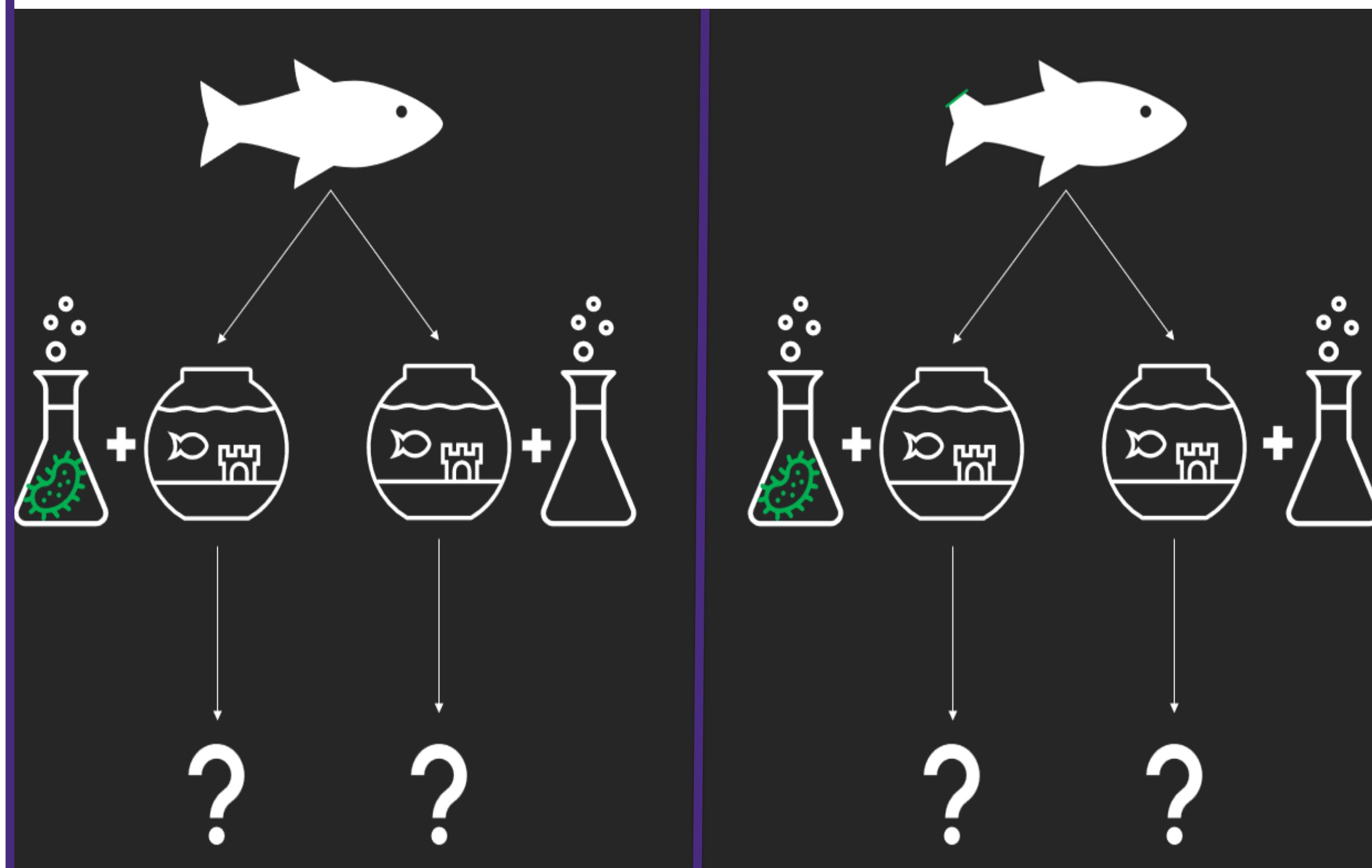
Improve immunotoxic assays in freshwater systems by developing an immersion-based pathogen resistance model.

Objective

To determine if immersion with *Flavobacterium columnare*, *Aeromonas sobria*, or *Aeromonas allosaccharophila* induces infection and mortality in FHMs.

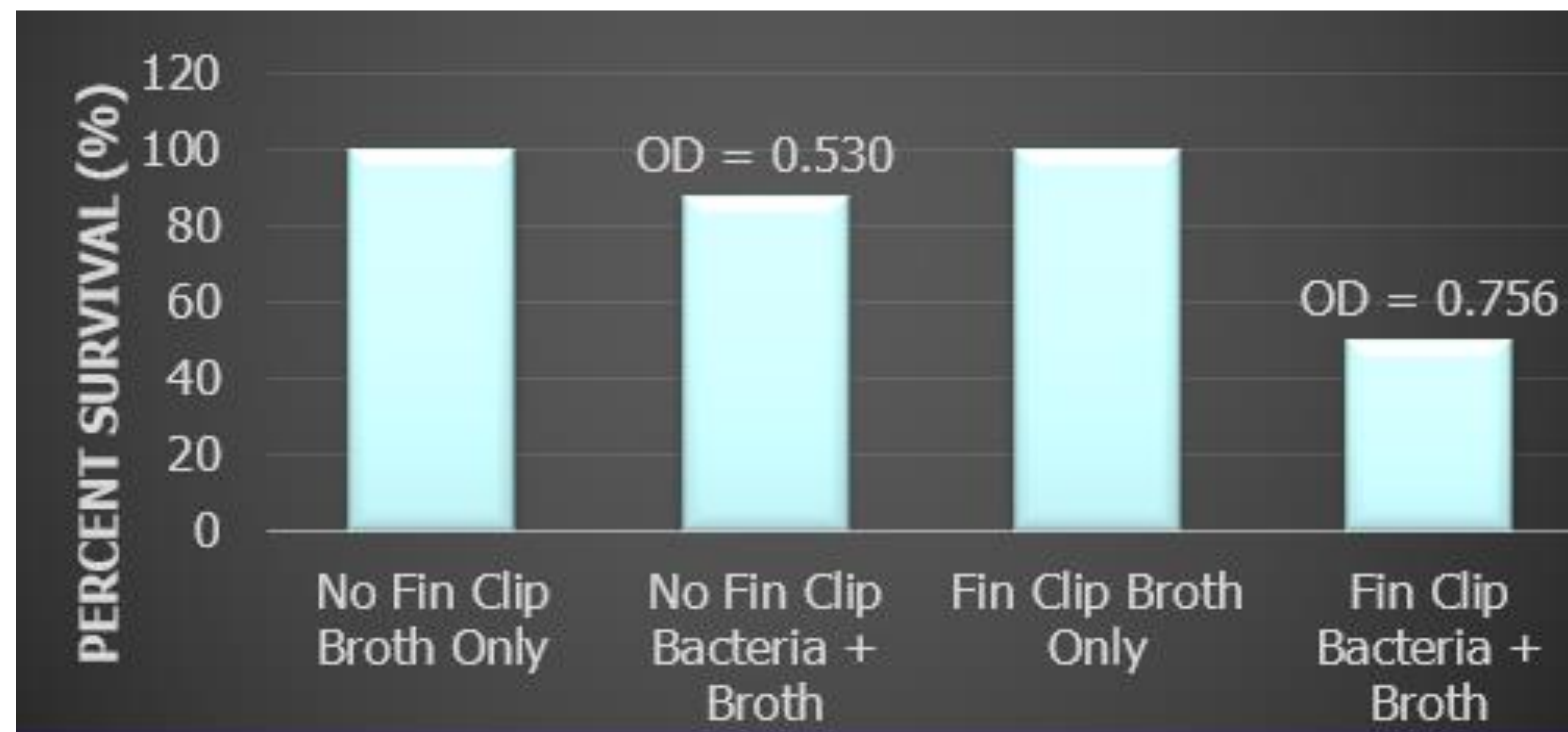
METHODS

The survival of non-fin clipped and fin-clipped FHMs was monitored for 14 days following a 3-hour immersion in water spiked with each of the selected bacteria.

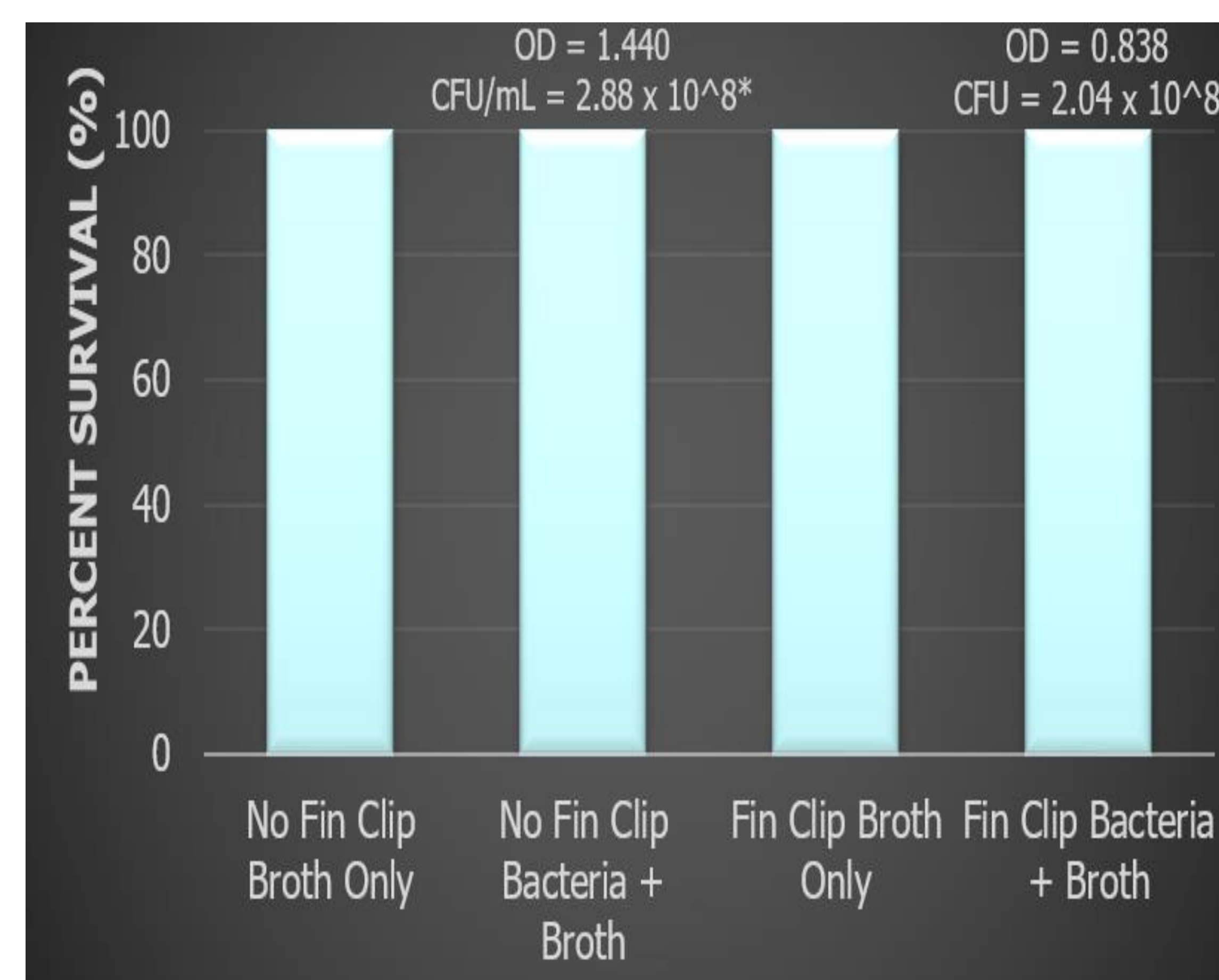


RESULTS

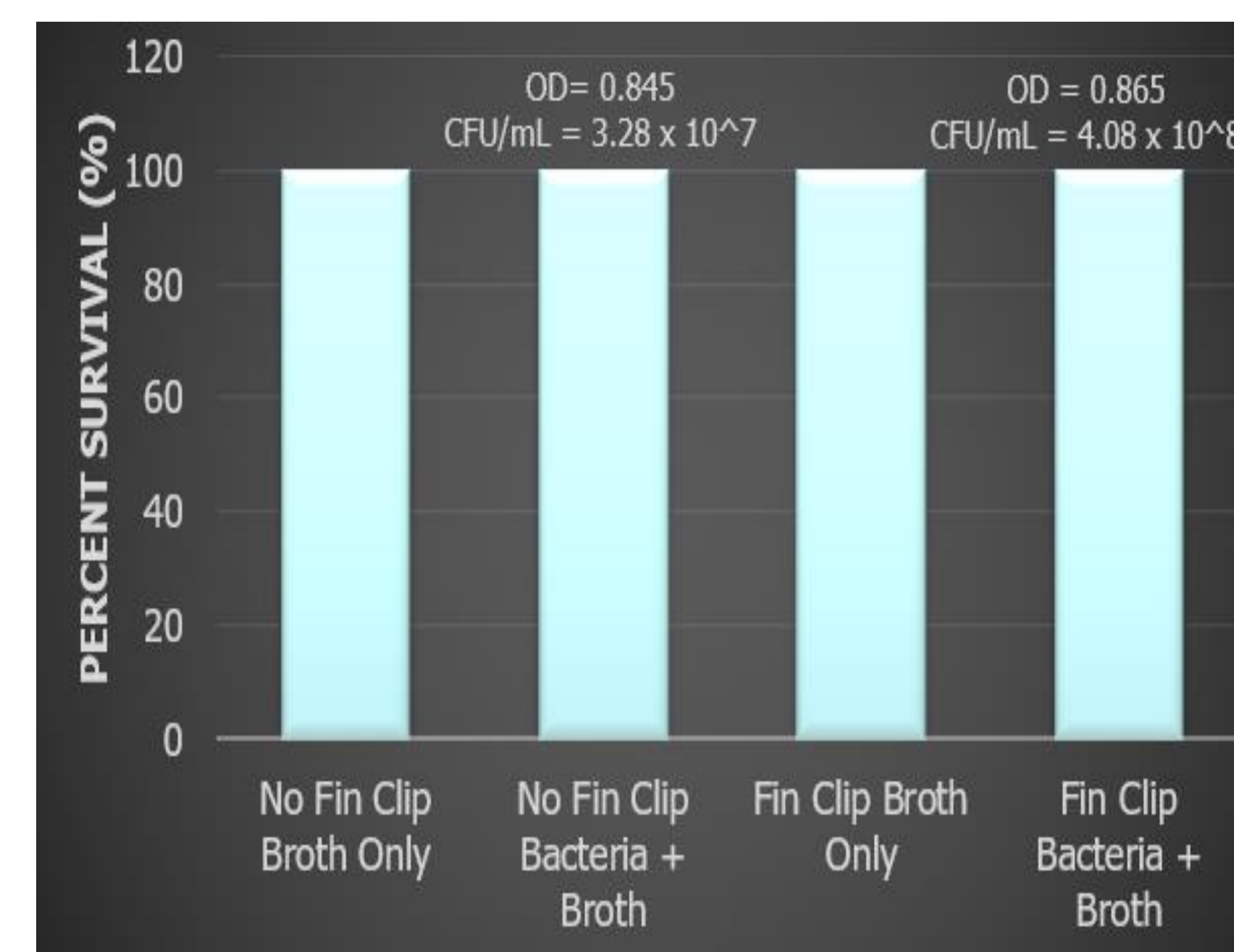
FHM immersion in *Flavobacterium columnare* resulted in mortality for male fathead minnows that had their caudal fins clipped.



FHM immersion in *Aeromonas sobria* did not result in mortality or any visible signs of infection.



FHM immersion in *Aeromonas allosaccharophila* did not result in mortality or any visible signs of infection.



CONCLUSION

Of the bacteria evaluated, only *F. columnare* was effective in inducing infection in FHMs and this only occurred in fin-clipped males.

Flavobacterium columnare



Aeromonas allosaccharophila



Aeromonas sobria



FUTURE DIRECTIONS

- Determine the concentration of *F. columnare* at which 30-50% mortality is induced and utilize this concentration in pathogen resistance trials, which evaluate the impact of chemicals on the ability of FHMs to survive pathogen infection
- Explore why females and males do not respond to *F. columnare* in the same way