

**Investigating the Rapid Effects of Testosterone on Olfactory Processes in *Carassius Auratus***  
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Project Summary:

I investigated the role of testosterone on olfactory processing in the common goldfish. Traditionally, steroid hormones like testosterone were believed to work genomically, by moving through cell membranes and affecting gene transcription. However, testosterone can also work rapidly by binding to membrane-bound receptors, which can cause rapid changes in behavior.

These rapid modulations likely come into play naturally in the context of mating, because it is a relatively quick process. In goldfish mating, female goldfish release the pre-ovulatory pheromone 12 hours prior to ovulation. In response, male goldfish produce a spike in testosterone. During ovulation, female

which increase courtship behavior in male goldfish.

Previous research suggests that these rapid increases in testosterone may affect the olfactory processing of a goldfish. Male goldfish spend significantly more time near a pump releasing large volumes of pheromone (Massa, 2014). Additionally, goldfish injected with testosterone just prior to testing spent more time near the source of the pheromone than did fish injected with a vehicle.

This summer, I sought to study

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