

# Extracellular Recording of Chemosensory Neurons in the Tentacles of the Great Pond Snail, *Lymnaea stagnalis*

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## Introduction

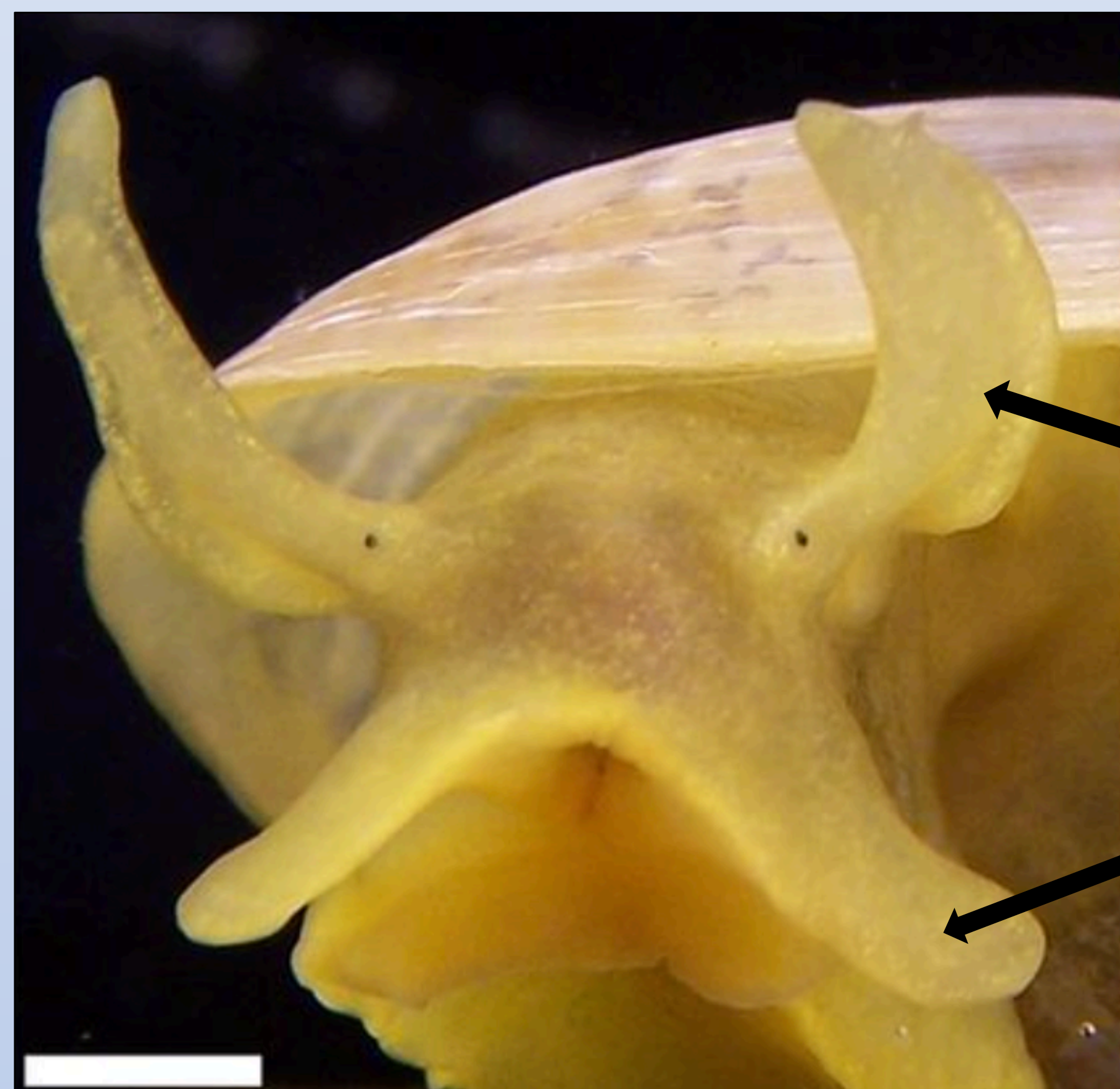
### Organism:

*Lymnaea stagnalis* is an omnivorous gastropod used to investigate both behavior and its neural control.

### Cephalic Sensory Organs:

Most gastropods have two pairs of cephalic sensory organs involved in chemosensation and mechanosensation.

*Lymnaea stagnalis*



Cephalic  
Sensory Organs

Tentacles

Lips

### Evidence for the chemosensory role of tentacles:

- 1) Behavioral  
= Removing gastropod cephalic sensory organs can abolish navigational responses to odor stimuli
- 2) Neuroanatomical studies at the cellular level  
= Staining shows peripheral sensory neurons distributed across the tentacles and lips  
= Morphology of cells consistent with chemosensation

### Objective:

To record from chemosensory neurons in the tentacle nerve as a food odor stimulus is applied to the tentacle.

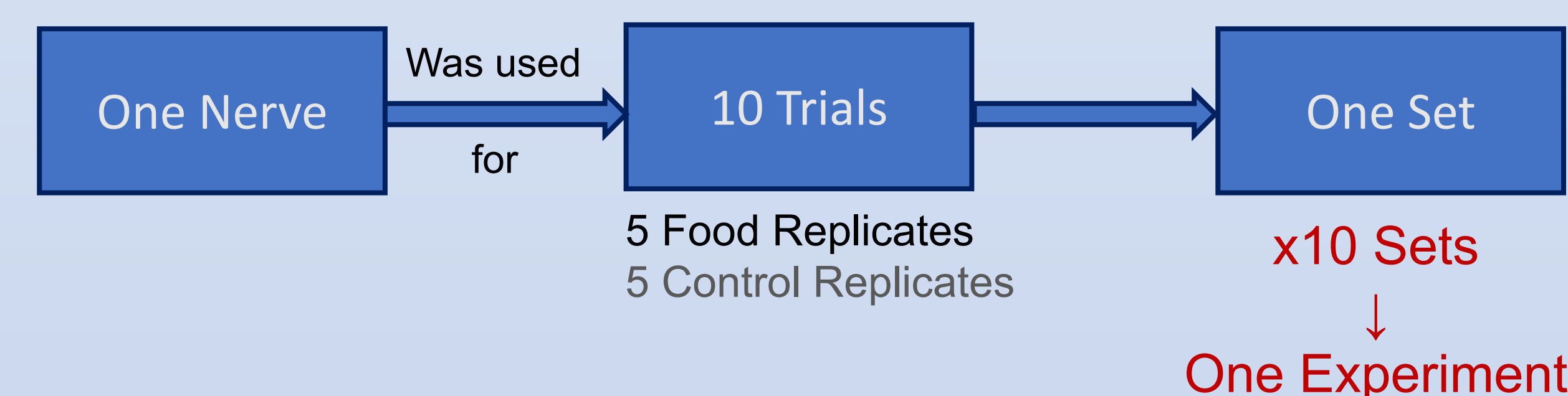
## Hypothesis

Applying food odors to the tentacle will increase the neuronal activity generated in the tentacle nerve.

## Methods

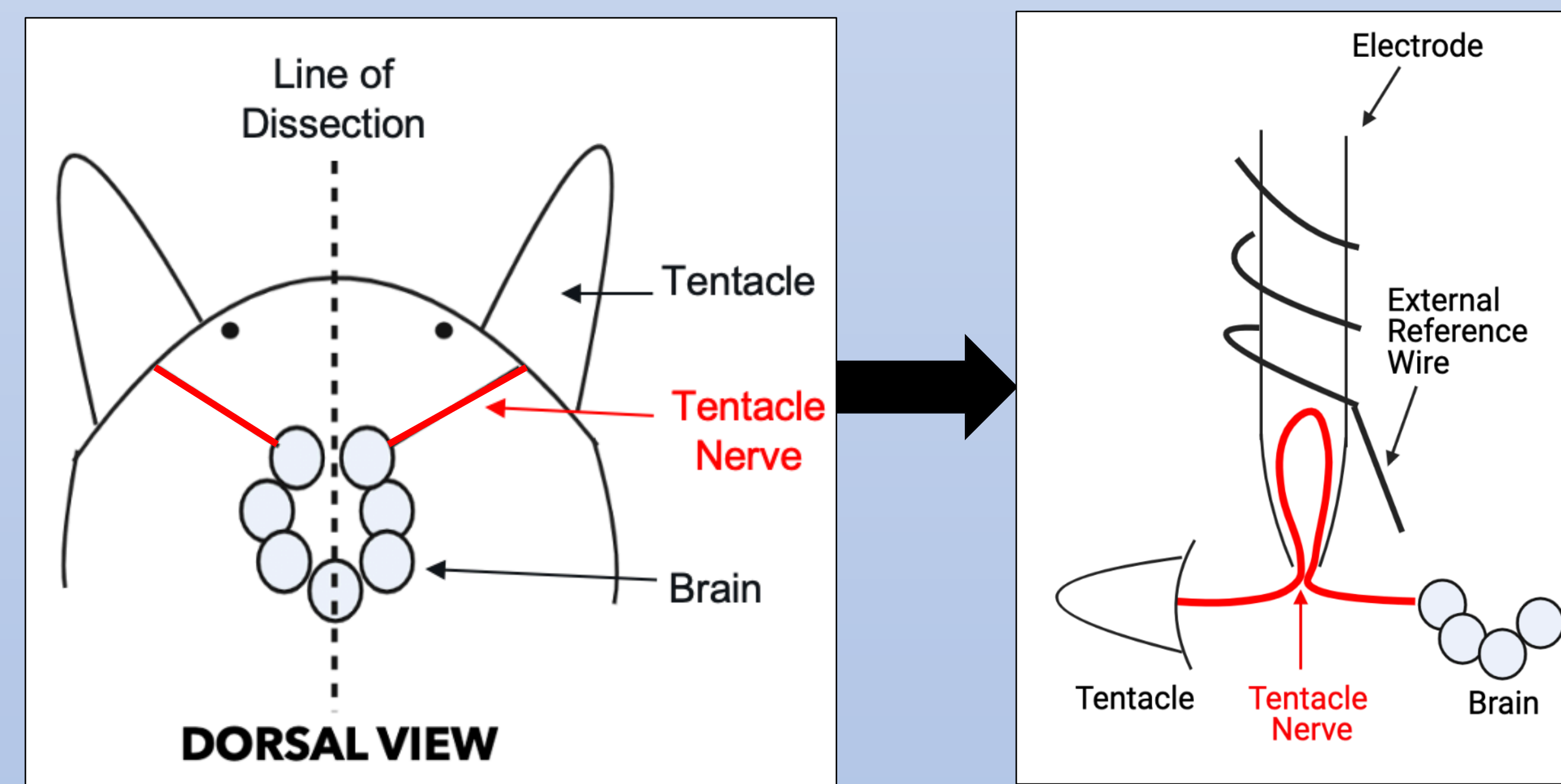
### Experimental Design:

Two experiments with different food odors: **Algae** and **Shrimp**  
Control solution in each experiment: **Saline**



### Basic Procedure:

1. Anaesthetize the snail
2. Dissect and pin to expose the tentacle nerve
3. Suction of exposed nerve into electrode tip



4. Application of odors to tentacle in three intervals:

**Baseline (B)**

No stimulus  
(saline)

**Treatment (T)**

Stimulus  
(food odor in saline  
or control saline)

**Wash (W)**

No stimulus  
(saline)

5. Continuous recording for 60s per interval

## Results

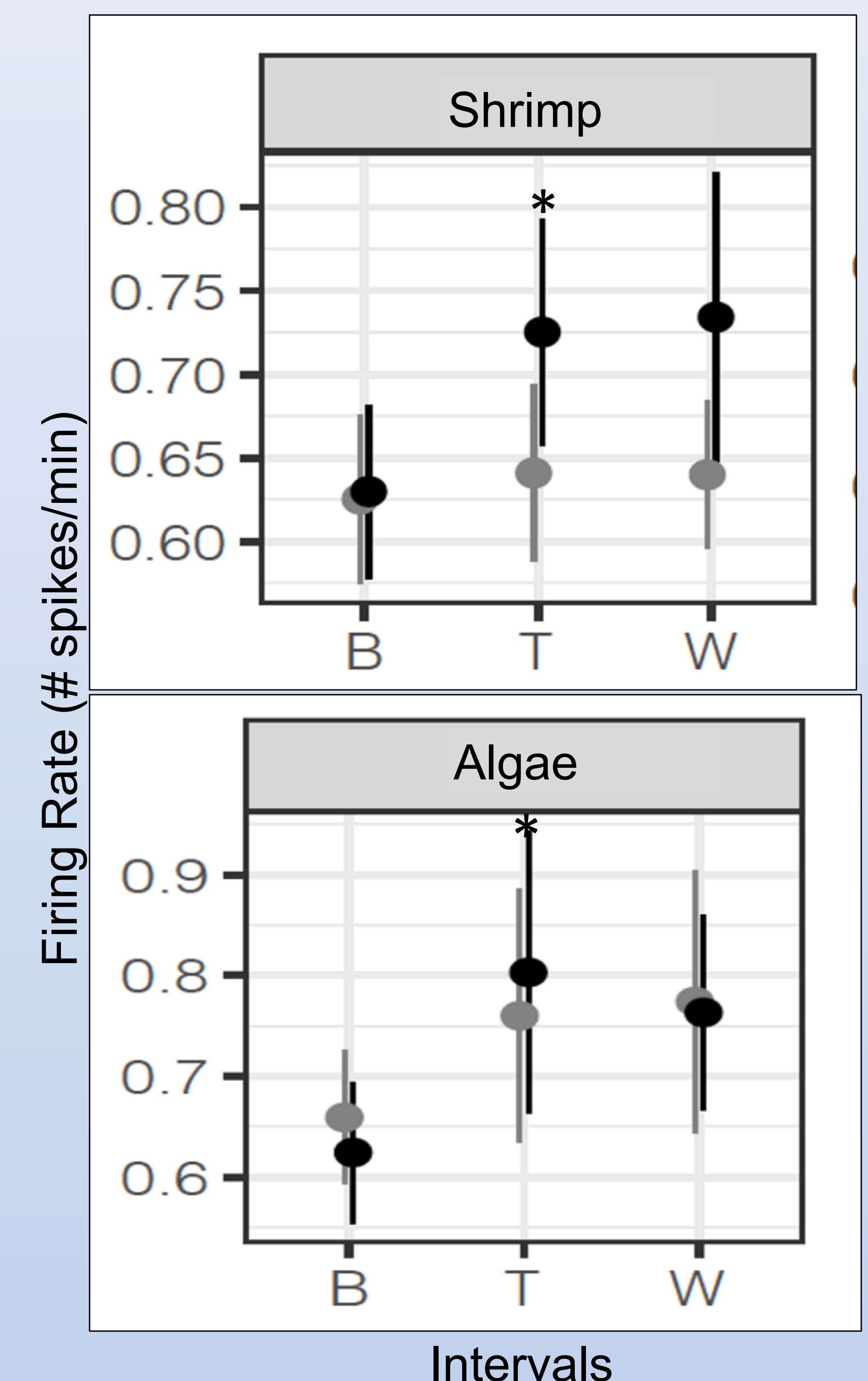
**Significant increases are represented by an asterisks**

In food group:  
↑ T compared to B

In control group:  
Stable firing rate across intervals

### Legend:

- = Food
- = Control



## Conclusions

Successful recording of the chemosensory neurons. We saw an increased firing rate in response to food odors.

### Possible effects of choices in the methods:

- 1) The wash interval remained elevated due to lack of a water turnover system during the trials
- 2) The nerve might be dying or damaged by the suction into the microelectrode tip

### Future Directions:

- 1) Improve the recording and stimulus set up
- 2) Locate the chemosensory neurons within the tentacle
- 3) Study the integration of odor sensory information in the central nervous system