

## SUSTAINABLE DEVELOPMENT GOALS



E-cigarettes (vapes) are currently the most popular nicotine delivery system among adolescents<sup>1</sup>

Vaping has been linked to:

- **Lung injury<sup>2</sup>** & Respiratory disease
- Cardiovascular disease
- Deficits in **cognition, attention, and mood**
- Potential for **long-term addiction<sup>3</sup>**



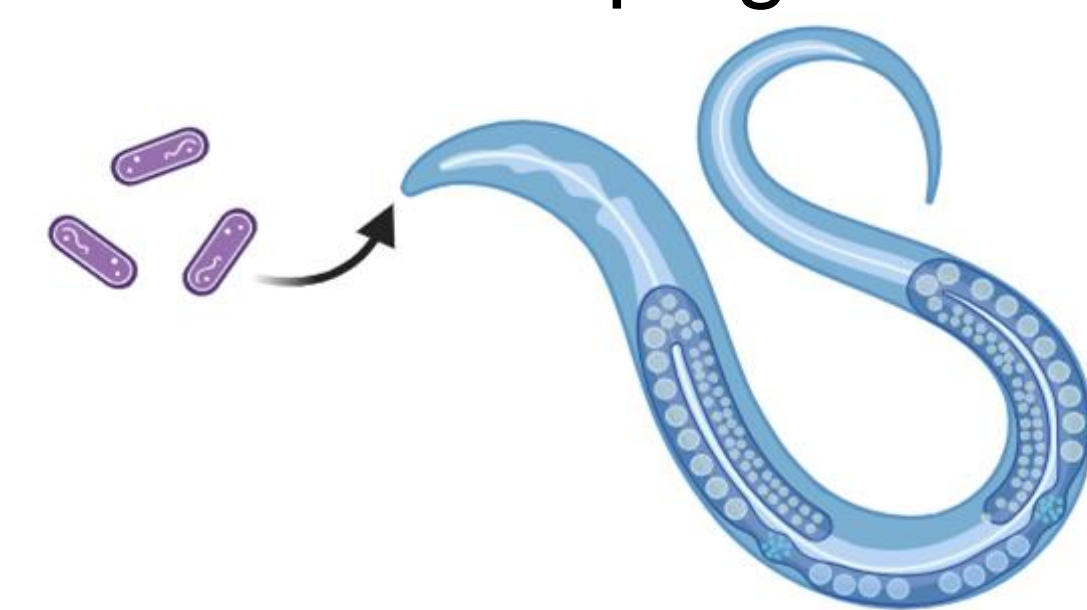
“Strengthen the **prevention** and **treatment** of substance abuse, including narcotic drug abuse and harmful use of alcohol.”

The **goal** of the research is to determine if exposure to vaping liquid changes worm **behavior**

## C. elegans Preparation

*Caenorhabditis elegans* is a microscopic worm used as a model organism used to study the effects of vaping on behavior<sup>4</sup>

Vaping liquid stock created by diluting 20% with LB broth and autoclaved



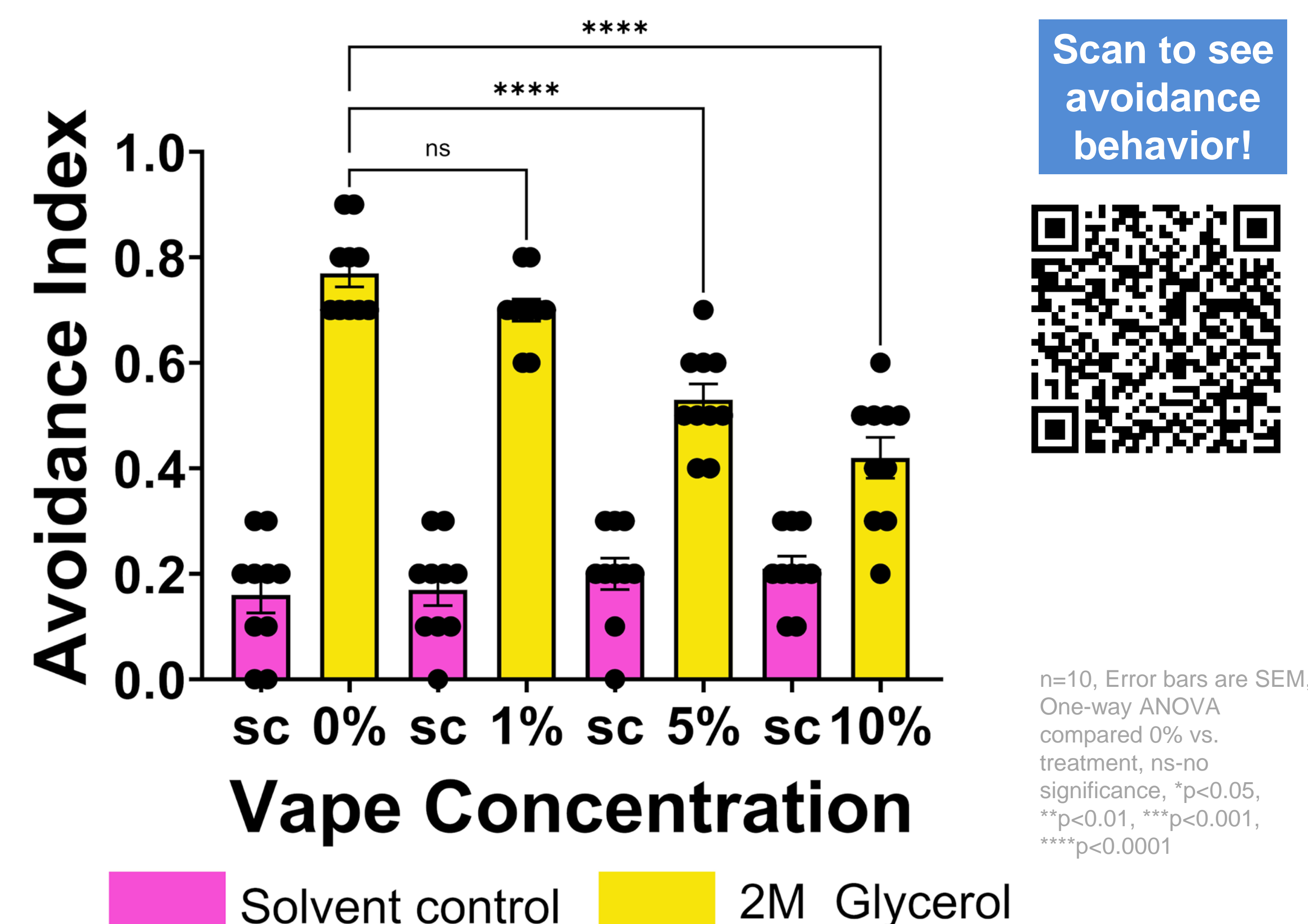
Wild-type worms were raised in 1%, 5%, and 10% vaping liquid stock mixed with OP50 *E. coli* bacteria as their food source

## References

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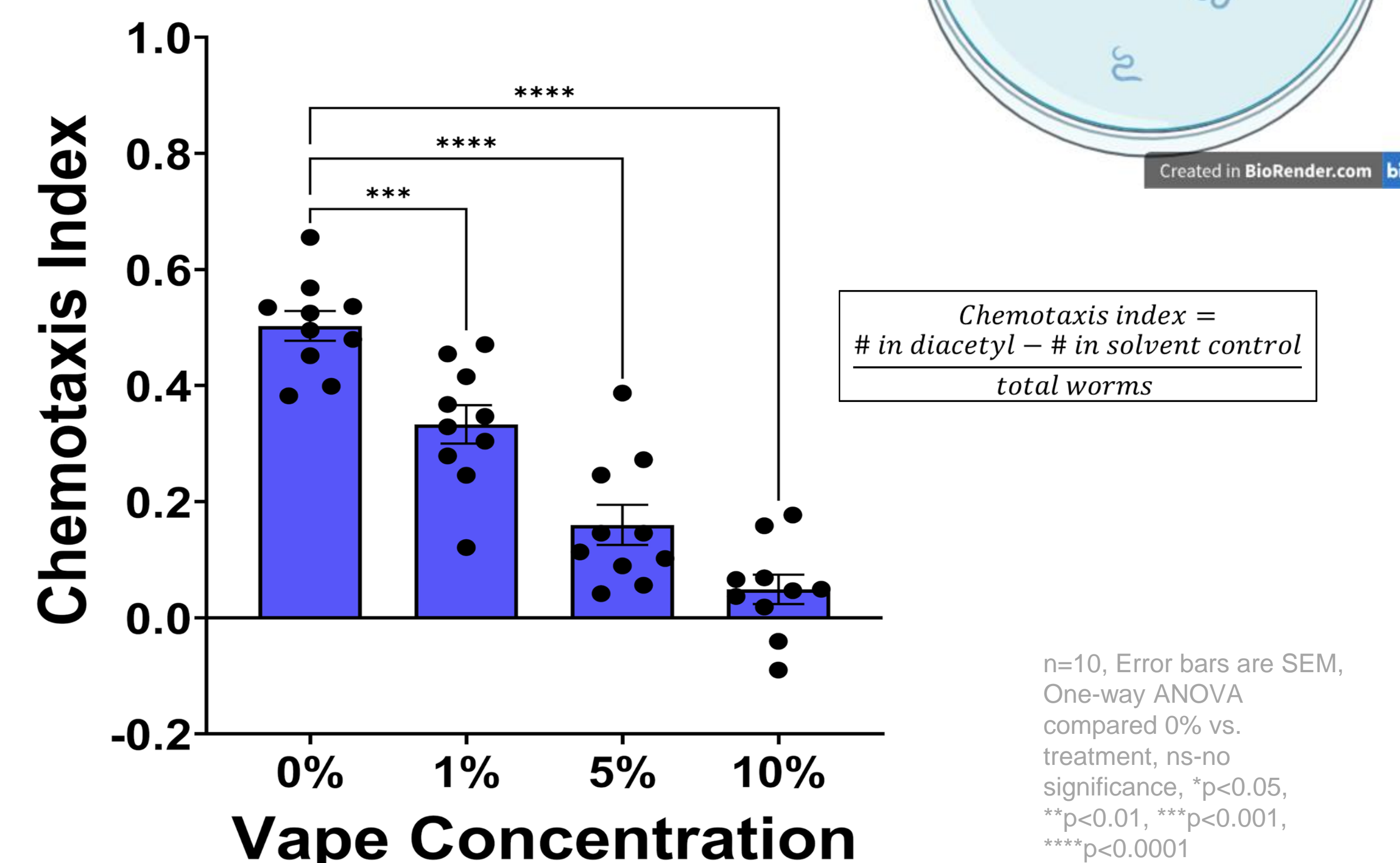
## Avoidance Assay

1. Worms were washed with 1 mL of M9 and distributed onto fresh NGM plates
2. Added one drop of diH<sub>2</sub>O or 2M glycerol to the tail-end of a forward-moving worm and recorded behaviors.



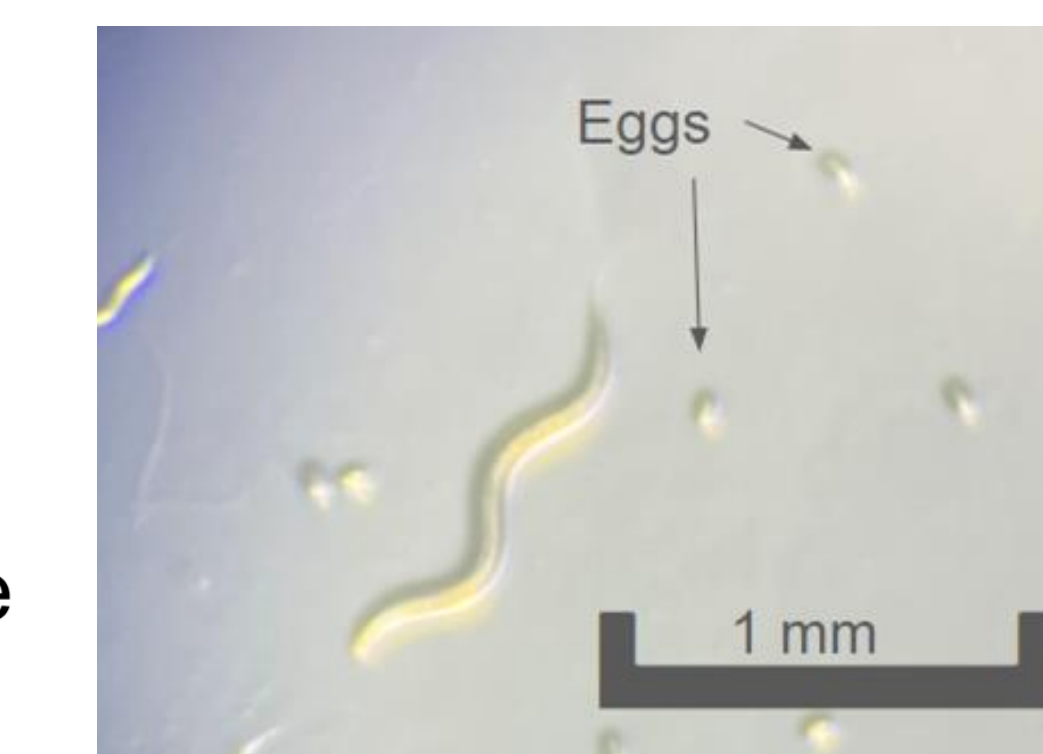
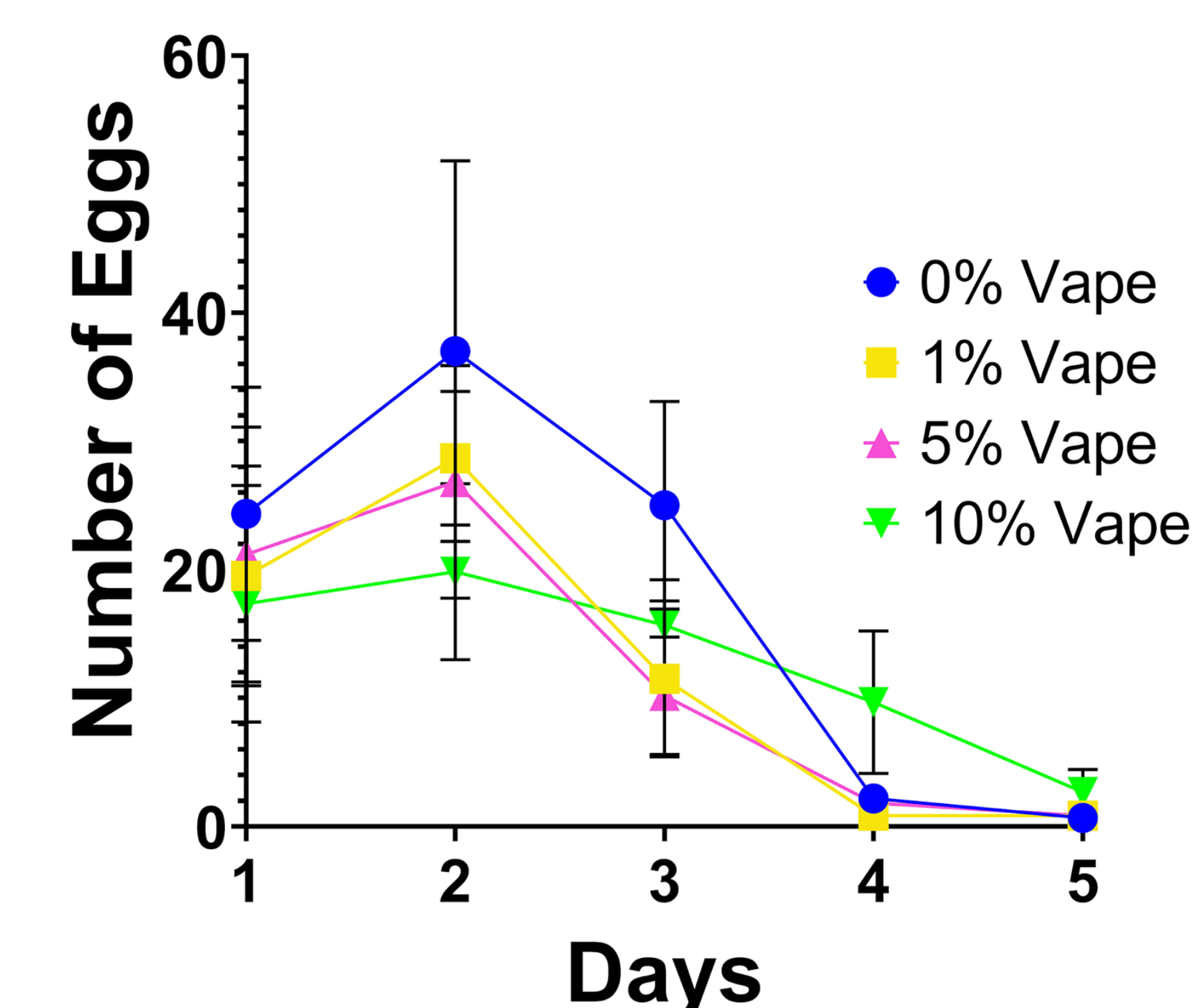
## Chemotaxis Assay

1. Worms were washed with 1 mL of chemotaxis buffer
2. Worms were placed at the center of the chemotaxis plate containing diH<sub>2</sub>O and diacetyl on opposite ends of the plate.
3. Allow worms to move on the plate for one hour.



## Egg-Laying

1. Worms were bleached to isolate embryos and synchronize ages of the worms.
2. One L3 was placed on the Petri dish with OP50 and the vaping liquid dilutions.
3. Number of eggs laid were counted each day for 5 days.



**Conclusion 1:** Changes to worm attraction and avoidance behavior is **concentration-dependent** with worms showing **reduced sensitivity** to known attractants and repellents

**Conclusion 2:** Worms lay **fewer eggs** when exposed to vaping liquid.

## Lesson Plan

Students will conduct similar experiments on *C. elegans* behavior to create a PSA on energy drinks and caffeine addiction.



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