# INVESTIGATING THE EFFECTS OF BISPHENOL-A ON PLANARIA PHOTOTAXIS AND SURVIVAL

**Reyna Dolcine, Alexis Galindez, & Cassandra S. Korte, PhD**
Lynn University, Boca Raton, FL

## Introduction

- Bisphenol A (BPA) is a widely used chemical found in many consumer products. While BPA's role as a building block in polycarbonate plastics makes it common in everything from food containers to baby bottles (Inadera, 2015), research suggests it may have negative consequences for the nervous system.

- Studies have linked BPA exposure to neurological effects like anxiety, aggression, and cognitive problems. These impacts may even extend to developmental issues, potentially affecting memory, learning, and nerve tissue formation (Li et al., 2023).

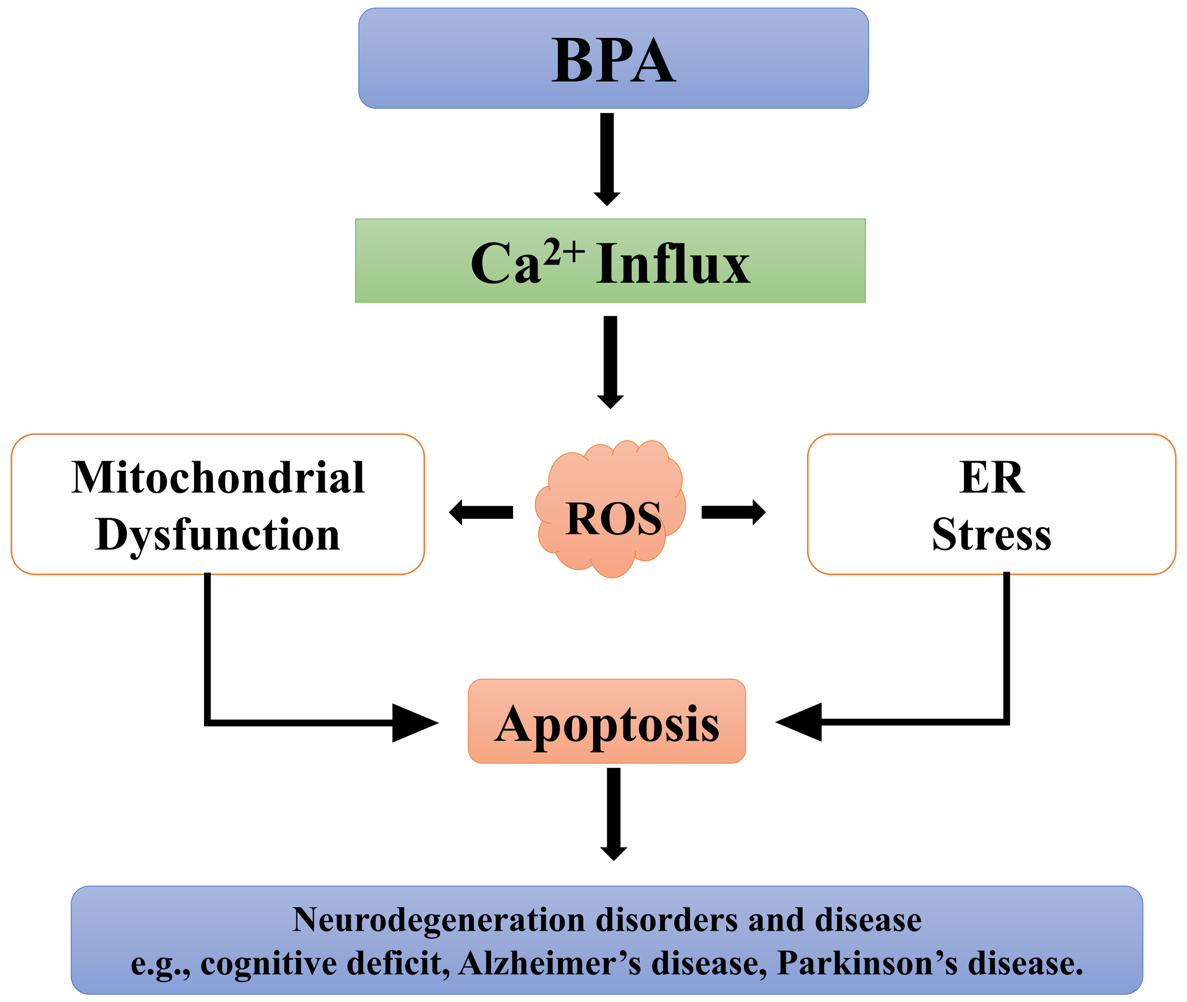


**Figure 1**: Adapted from Wang et. Al, 2019. BPA actions within the nervous system leading to cell death.

- To better understand how BPA might influence the nervous system, researchers are turning to model organisms like Flatworms such as *Girardia dorotocephala.* Their remarkable regenerative abilities and well-characterized nervous systems make them ideal tools for toxicological research.

- The present study investigates the effects of BPA on a fundamental planarian behavior – phototaxis, the organism's movement in response to light.

- *Girardia dorotocephala*, shows distinct preferences or aversions to different light wavelengths, making it an ideal model for such research (Paskin et al., 2014). By examining how BPA disrupts this behavior, we hope to gain insights into how this chemical might impact the nervous system and nervous system-mediated behaviors.

## Methods

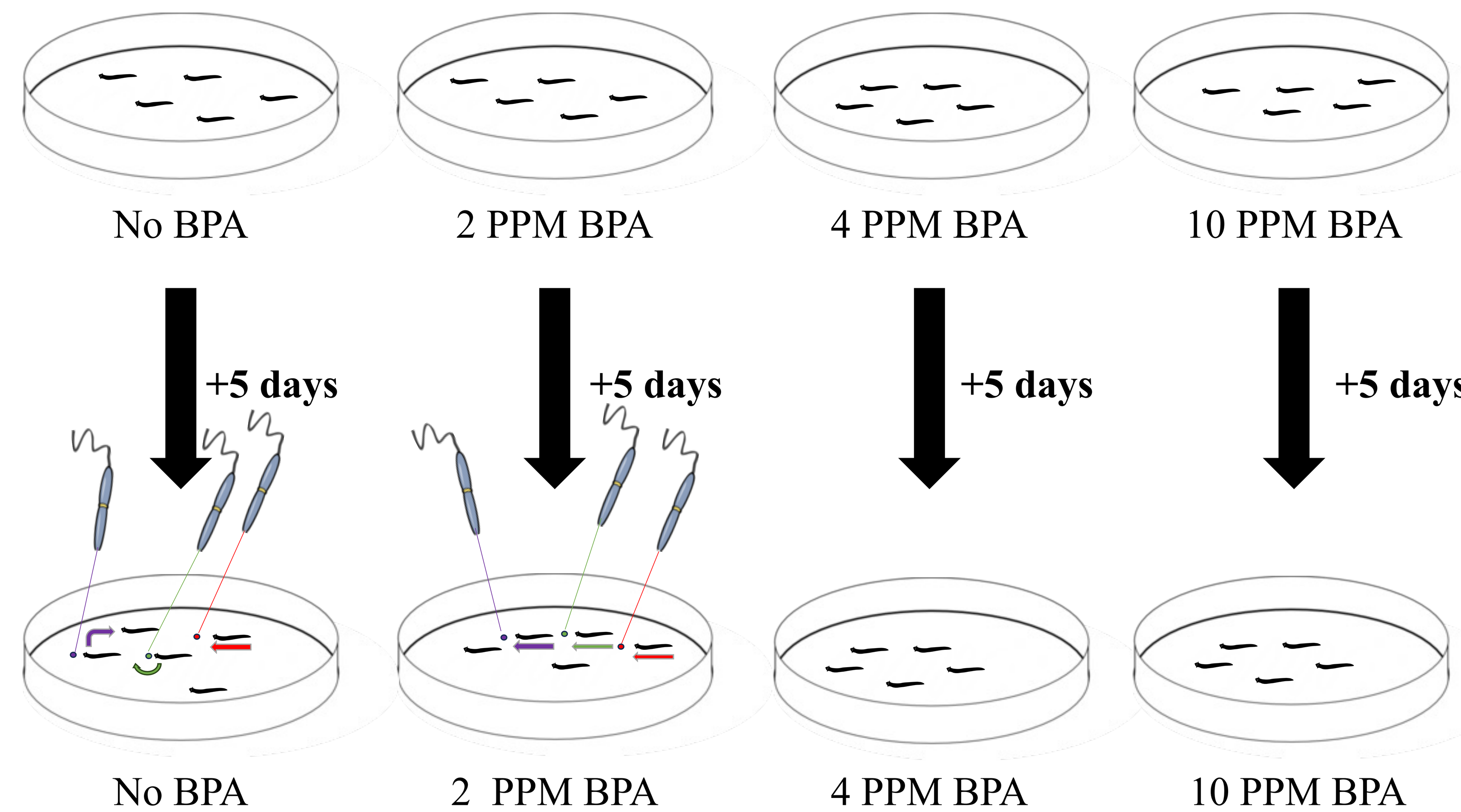


**Figure 2**: Experimental Design. Planaria will undergo exposure to different BPA concentration for five days to test phototaxis behavior.

## Results

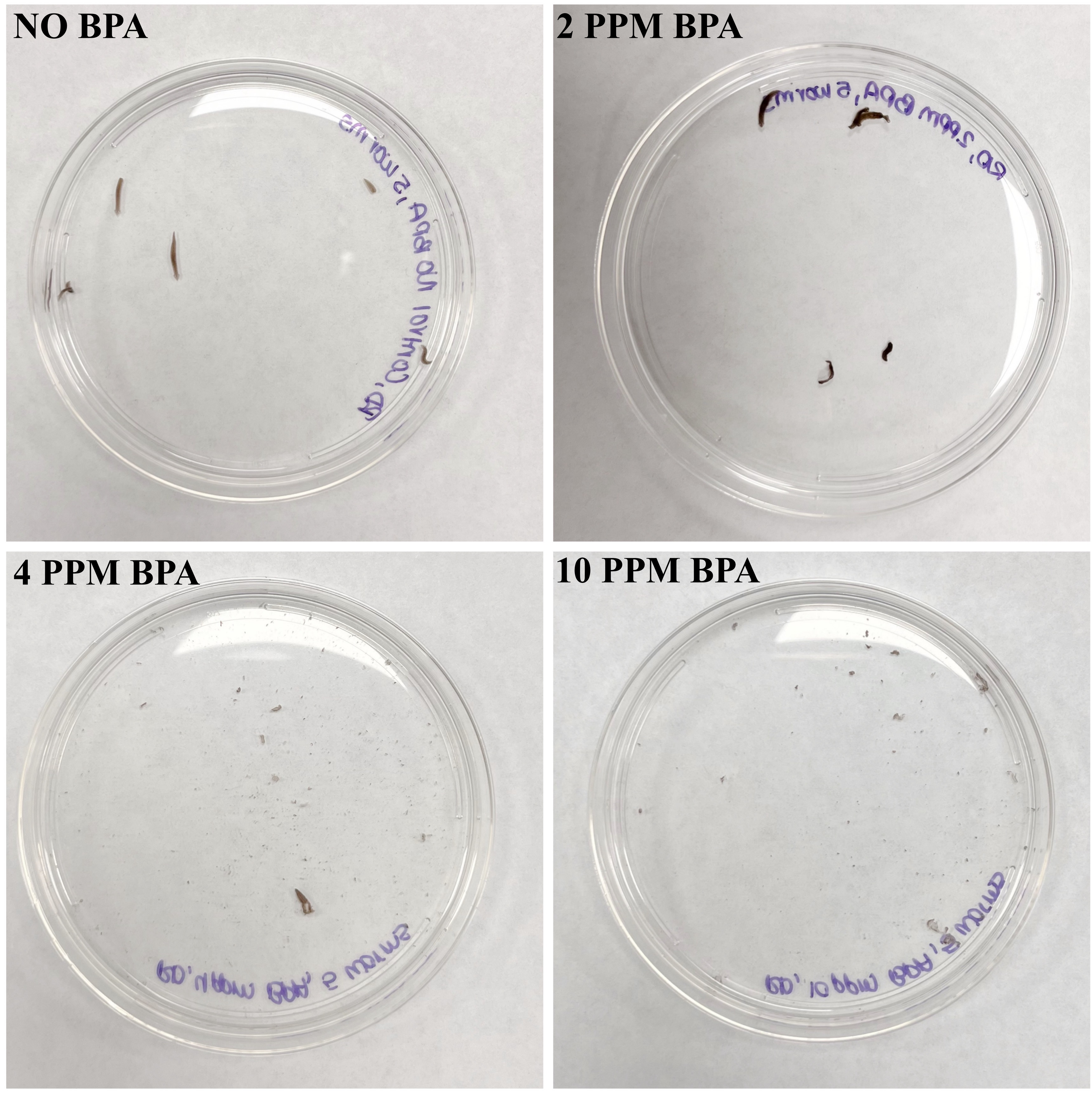


**Figure 3**: Impacts of the different BPA concentration on the survival of planaria.

## Discussion

| Concentration | % Survival | Observations |
|---|---|---|
| No BPA | 100% | All healthy |
| 2 PPM | 40% | Decreased movement |
| 4 PPM | 0% | |
| 10 PPM | 0% | |

**Table 1**: Survival of planaria following exposure to BPA for 5 days.

- Determining the sublethal dose is crucial before continuing with the phototaxis study. We plan to expose the flatworms to varying concentration (much lower than what was attempted before), to determine a "safe" dose to continue with the study. The safe doses we want to determine must not display any death or physical distress to the flatworms.

- Next, preliminary research will be conducted to test phototaxis behavior when different wavelengths of light are placed along the path of the flatworms.

- The phototaxis study will begin with exposing the worms to a safe concentration of BPA for five days. Afterwards, we will document their behavior when encountering red, green, and purple laser pointers along their path at each BPA concentration.

- We will compare our observations to the phototaxis behaviors reported by Paskin et. al (2014). In their study, they observed different phototactic behaviors in their worm's following exposure to different wavelengths of light. On this basis, we will then determine if this behavior differ after being exposed BPA.

## References

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Paskin, T. R., Jellies, J., Bacher, J., & Beane, W. S. (2014). Planarian Phototactic Assay Reveals Differential Behavioral Responses Based on Wavelength. *PloS One*, *9*(12), e114708. https://doi.org/10.1371/journal.pone.0114708

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