



## Introduction:

- Plastic pollutants break down due to water erosion, physical damage and UV radiation. This forms microplastics
- Humans can consume up to 4,000 pieces of microplastic in a year
- When they break down plasticizers leach out and build up in the environment resulting in concentrations ranging from 0.4µg/ L – 97.8µg/L
- Human phthalate consumption had risen to 196,000 tons in 2011
- Phthalates are common plasticizers used in children's toys, garden hoses, and medical tubing
- Phthalates have been linked to reproductive and endocrine system defects in fully grown organisms
- DPHP is a commonly used phthalate in the plastic industry, and was used to replace DEHP
- **Toxicity of DPHP is unknown**
- Zebrafish are model organisms, and can be used to study toxicity

Hypothesis : With increasing concentrations of plasticizer we expect to see an increase in heart rate, and a decrease in body length, survivorship, and locomotion.

Acknowledgements: I would like to thank Dr. Boehmler for her continued support and guidance throughout the research process, and to York College for providing the resources to complete this research project. All research activities in this study were approved by the York College of Pennsylvania Institutional Animal Care and Use Committee (IACUC).

### **Sources**:

- Retrieved from <a href="https://www.ncbi.nlm.nih.gov/pubmed/25268316">https://www.ncbi.nlm.nih.gov/pubmed/25268316</a>
- www.sciencedirect.com/science/article/pii/S0166445X17302680?via=ihub.
- Pu, Shi-Ya, et al. "Effects of Phthalate Acid Esters on Zebrafish Larvae: Development and Skeletal Morphogenesis." Chemosphere, Pergamon, 31 Dec. 2019, www.sciencedirect.com/science/article/pii/S0045653519330498?via=ihub.

# The Effects of Di(2-propylheptyl) phthalate (DPHP) on developing Zebrafish (Danio rerio) Embryos Ana Chew\*, Dr. Wendy Boehmler Department of Biological Sciences, York college of Pennsylvania

Methods:

Clutch (n=7)

Low I.8µM

Heart rate, body length, survivorship Measured at: 24 hours post exposure (hpe),48hpe, 72hpe, 96hpe Locomotion measured at: 96hpe • Frequency of touching center line in 2 min observation period after 5 min acclimation

**Results:** 

High 3.6µM

- DPHP decreases average body length in treatment groups
- DPHP decreases locomotion in treatment groups
- DPHP increases the average heart rate in treatment groups
- Survivorship was not affected

Kumar, N., Srivastava, S., & Roy, P. (2015, May 01). Impact of low molecular weight phthalates in inducing reproductive malfunctions in male mice: Special emphasis on Sertoli cell functions.

Sun, Guijin, and Kechun Liu. "Developmental Toxicity and Cardiac Effects of Butyl Benzyl Phthalate in Zebrafish Embryos." Aquatic Toxicology, Elsevier, 22 Sept. 2017,





Figure 1: Average body length for 3 treatment groups, control, low dose, and high dose, of zebrafish (Danio rerio) embryos chronically exposed to DPHP (n=5). Embryos were randomly selected for measurement. Measurments were taken across all time points using the MotiConnect program. Error bars represent 95% confidence intervals. A 2-way ANOVA test was run on the data, that suggests results become signifigant over time (p-value = 0.013).



## **Conclusions:**

- model organism; Stunting of proper growth can indicate toxicity
- Might not be a safe alternative to DEHP





• Concentrations of DPHP tested cause developmental abnormalities in a

Future studies should investigate the potential mechanisms that account for the developmental abnormalities caused by exposure to DPHP