Exposure of *Daphnia magna* to Bisphenol A or BPA

Eleanor Press, Cecilia Sweeney, and Dr. Peter Faletra
Crossroads Academy, Lyme, NH
New Hampshire Academy of Science - 2017

Bisphenol A is a chemical that has been used to make plastics and resins since the 1960s. BPA has been shown to mimic estrogen hormones, allowing it to interact with estrogen receptors affecting estrogen functions. Other animal-based research shows that BPA has effects on the brain, behavior, and reproductive organs in humans. There are also possible links between BPA and cancer, heart problems, and high blood pressure. This investigation explored the toxicity of BPA on *Daphnia magna*. *D. magna* are aquatic invertebrate organisms often used for research because they are easy to cultivate and sensitive to toxins. We tested the effects of BPA on death rates by exposing *D. magna* to aqueous solutions of BPA at concentrations ranging from 0.1% to 0.00001% over a period of 180 minutes as compared to controls. The results show that *D. magna* exposed to higher concentrations of BPA died much faster than the *D. magna* exposed to lower concentrations. Those exposed to 0.1% and 0.01% BPA died after <10 minutes, and those exposed to 0.001% BPA died after 10-20 minutes. Groups exposed to 0.0001% BPA died after 30-40 minutes, and the groups exposed to 0.00001% BPA died between 150-180 minutes. Our results confirm the toxicity of BPA as shown in other systems, which increases in proportion to the concentration. The lowest concentration used in this study is comparable to the highest BPA concentration found in food products, with most packed food items containing significantly less concentrations of BPA. While our results cannot easily be extrapolated to humans and individual food items may indeed not pose a significant safety risk, the widespread use of BPA in packing materials may potentially result in higher concentrations being accumulated over short time periods. In this context, the direct link between BPA concentration and toxicity established in this study points to a potential public safety concern which warrants further investigation.