

**Effects of plasticizer di(2-ethylhexyl) phthalate and neuroprotectant rosmarinic acid on mammalian spinal locomotor activity**  
**Meadow Jennings, 2026**

Plastic pollution, specifically microplastic pollution, is a major environmental threat to many global ecosystems. One chemical additive to plastics that the Díaz-Ríos lab is especially interested in is di(2-ethylhexyl) phthalate (DEHP). Phthalates are a class of chemical plasticizers used in plastic products to give them flexibility and malleability (Rowdhwal & Chen, 2018). DEHP is the most widely produced plasticizer globally and it's commonly found in children's toys, cosmetics, medical equipment, and many other plastic products (Amara et al., 2020). This is concerning because DEHP can leach into water systems and cross the blood-brain barrier, directly affecting the health of the nervous system (Amara et al., 2020).

Plasticizers such as DEHP can affect the body on a cellular level. Acting as an oxidizer, these chemicals generate free radicals known as reactive oxygen species (ROS).

electrophysiology. Furthermore, we investigated the neuroprotective properties of rosmarinic acid (RA), which is a key chemical in the cooking herb *Origanum vulgare*.

activity) ventral roots. The preps were perfused with a control ringer solution (6uM NMDA and 9-12uM serotonin) and recorded for 20 minutes. Then we perfused with 100uM DEHP and ringer for an hour, followed by an hour wash in ringer. For tests with RA, cords were pre-incubated in 100uM RA and ringer for one hour, then 100uM DEHP, 100uM RA, and ringer, and then the wash (with 100uM RA). All conditions were analyzed for peak amplitude, burst duration, and cycle period using Spike 2. We hypothesized that DEHP would decrease peak amplitude, increase burst duration, and increase cycle period, indicating a reduction in excitability and disruptions to the CPG. Furthermore, preincubation with RA would reduce these effects.

Based on our preliminary data we found that the DEHP and wash conditions increased all three parameters for both the L2 and L5 in comparison to the control. There was a statistically significant increase in cycle period and burst duration from the control to the wash ( $p < 0.001$ ). Additionally, DEHP and wash condition showed increased variability in the data in comparison to the control indicating that DEHP does have a disruptive effect on the prep. Preliminary data for 100uM RA and 100uM DEHP showed that RA had a visually stabilizing effect on the extracellular recordings in the DEHP condition but quantitatively showed no statistical significance in preventing the toxic effects seen in the DEHP and wash conditions. Furthermore, the RA preincubation notably increased all three parameters when compared to the control for both L2 and L5. This indicated that 100uM RA concentration may be too high, eliciting an excitotoxic effect. In the future, these problems could be addressed by increasing the length of the DEHP conditions both with and without RA, as well as decreasing the concentration of RA.

We began testing a 50uM concentration of RA in the last week and saw promising trends that indicated a less disruptive effect from RA while maintaining neuroprotective properties in the DEHP condition.

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**References:**

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