

AMARIS JALIL and CAROL Z. PLAUTZ, Dept of Biology, Shepherd University, Shepherdstown, WV 25443. Diquat Dibromide-induced cellular and developmental abnormalities in the pond snail *Lymnaea palustris*: Analysis of calcium dysregulation and cytoskeletal targets.

Diquat dibromide (DD), an active ingredient in the herbicide Roundup, is known to elicit oxidative stress in plant tissues leading to lipoperoxidation and apoptotic cell death. While exposure to DD has been demonstrated to cause ROS formation in animal tissues as well, its dose-dependent effects have been minimally characterized. Using embryos of the model organism *Lymnaea palustris*, we observe and quantify DD-induced effects including increased mortality, abnormal motility, heartrate arrhythmias, impaired shell formation in juvenile snails, and cellular dissociation using real-time imaging, heartrate assessment, and immunohistochemistry of cytoskeletal proteins. We have also demonstrated that calcium regulation is compromised in the presence of DD, causing a myriad of developmental and cytoskeletal defects, some of which are lessened by antioxidants. We suspect that the observed calcium dysregulation induced by high concentrations of DD ( $\geq 44.4 \mu\text{g/L}$ ) may be one of the initial steps leading to the establishment of an intracellular positive feedback loop of ROS formation in the mitochondria and calcium release from the SER, leading to calcium efflux and apoptotic cell death. At low concentrations of DD ( $\leq 28 \mu\text{g/L}$ ), however, apoptotic cell death does not occur, though cytoskeletal elements and calcium regulation are clearly impaired, suggesting that ROS formation may not occur at low DD concentrations and that the observed phenotypes result from ion dysregulation and disruption of cytoskeletal elements which negatively affect motility and heartrate. Ongoing research is being conducted to delineate the effects of DD on embryonic cytoskeletal elements.