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Oxidative stress alters cell morphology and cell death indices in immortalized astrocytes

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Menadione, usually known as vitamin K3, also serves as a trigger for oxidative stress, delivering reactive oxygen species (ROS) upon entering the cells. Astrocytes are glial cells that are found in the brain and are extremely important in providing nourishment to cells in the brain, especially neurons. Oxidative stress may cause damage to astrocytes and alter their function. Increase in oxidative stress is the underlying cause for many neurodegenerative diseases like Alzheimer's disease and stroke. In this study, we used menadione as an oxidant compound to study effects of oxidative stress on cell morphology and viability in an immortalized astrocyte cell line (DITNC). Menadione causes cytoskeletal rearrangement and stress fiber protrusions in astrocytes. This event is accomplished by an increase in LDH release and a decrease in MTT release, suggesting loss of cell viability. Resveratrol (enriched in grape) and curcumin (from turmeric), polyphenolic antioxidants, have been shown to inhibit damage caused by ROS. In this study, we also used these botanical compounds to demonstrate their inhibitory properties against menadione-mediated morphological changes and cell damage in DITNC cells.