

Antioxidants and Their Effects on Reducing the Adverse Impacts of Diesel Exhaust on Lung Cancer Cells

Garg, Ankit (School: Logan High School)

Diesel Exhaust Particles (DEPs) are a form of air pollution which cause increased production of reactive oxygen species (ROS) in lung cancer cells, which leads to oxidative stress and eventually damage to cell macromolecules. Antioxidants help decrease ROS levels and restore the balance of free radicals inside cells. Two antioxidants, supplement-grade resveratrol, and mesobiliverdin, were tested. Resveratrol is a natural compound found in berries and mesobiliverdin is a compound similar to biliverdin which is present in humans. The effects of antioxidants were tested by culturing lung cancer cells and pre-treating them with antioxidants. The cells were then exposed to DEPs, and the data was analyzed. These results could then be compared to cells not treated with antioxidants to analyze the effects of these antioxidants. The antioxidants, while showing no difference in cell viability, had a significant effect on reducing the oxidative stress caused by DEPs. This decrease of oxidative stress led to increased levels of many cell macromolecules, which is what my data shows. The potential effects of these antioxidants in humans were also investigated by analyzing the extracellular markers. It was discovered that these antioxidants slightly increased inflammatory markers. The antioxidants inhibited the main adverse effects of the DEPs in our tests which partially supports my hypothesis. Increasing the antioxidant intake in our diets is an efficient, low-risk way to reduce the damage that certain aspects of the modern-day environment can place on cells.

Awards Won:

