

Protection provided by quercetin in cardiomyocyte culture (H9c2) exposure to particulate matter (PM₁₀ and PM_{2.5})

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Due to the worldwide worsening air quality and important diseases incidence, several studies have explored the relation between air pollution and particulate matter (PM) with the organic damages. The analysis of PM turn into an important parameter to evaluate the impact of the air pollution in health issues. The chain of toxic events triggered by PM exposures is closely related to oxidative stress formation, and this condition strongly influences the development of cardiovascular diseases. Oxidative stress occurs from the increase of the reactive oxygen species (ROS) production, starting from the redox reactions and the overcoming the antioxidant defense systems that prevent the neutralization of these reactions. In the present study, the H9c2 cells lineage were exposed to PM₁₀ and PM_{2.5}, and the oxidative stress parameters ROS production, antioxidant defense capacity, lipid damage and the improvement with the use of quercetin (50 µM) were evaluated. PM₁₀ and PM_{2.5} enhanced ROS production and lipid peroxidation and decreased antioxidant capacity in H9c2 cells. The exposure to the PM_{2.5} group (50 %) increased antioxidant capacity against peroxy radicals in pre-exposure to quercetin. Lipid peroxidation was reduced in this same group after the use of quercetin. Cell viability and ROS production were equal to controls when quercetin was administered, except for the PM_{2.5} group (100 %). PM₁₀ (50 %) quercetin administration increased cell viability and decreased lipoperoxidation in both quercetin treatments. ROS levels significantly decreased when quercetin was incubated after exposure to PM₁₀ (50 %). The results of this study suggest that quercetin is an important heart protector against the oxidative stress effects associated with PM.