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Lipid peroxides (LPs) and Glutathione (GSH) in Pooled Liver Microsomes (HLMs) following Exposure to Flavonoids

Abstract:

Oxidative stress can do extensive damage to cell components and cause a variety of diseases. Studies have shown that oxidative stress can decrease the levels of glutathione (GSH) in cells, which can potentially lead to the development of cancer. There is a defense mechanism in cells against oxidative stress through the GSH-Redox system involving GSH-reductase (GSH-R), GSH peroxidase (GSH-Px), and superoxide dismutase (SOD). In this study, cells were cultured to study the effects of the flavonoids; genistein (G), quercetin (Q) and kaempferol (K) on the modulation of lipid peroxides (LPs) and GSH levels in pooled human liver microsomes (HLMs) following exposure for 4, 6, 18 and 24 hr. after the oxidative stress. Our hypothesis was that the flavonoids can decrease LPs through the elevation of intracellular GSH to offset oxidative stress. HLMs were subjected to the Fenton's pathway, using 20 μM Fe^{2+} and 0.1 mM hydrogen peroxide (H_2O_2), and with or without the respective flavonoids at 0, 5, 10, 15, 20 and 25 μM for the said incubation times. The findings of the studies indicate that LPs decreased significantly ($p<0.05$) with increases in flavonoid concentration. Decreases in LPs were also time-dependent with Q being the best followed by G and K respectively. GSH increased in a dose- and time-dependent manner with Q being the highest and significantly ($p<0.05$) different from G and K. The studies indicate that the flavonoids were capable of increasing GSH levels in HLMs and through the GSH-Redox system to lower the oxidative damage. We report here our novel findings on the mechanisms of action of these flavonoids in modulating LPs and GSH levels in HLMs.

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