

Poster 41

Exploring quercetin's potential to counteract intestinal pro-inflammatory effects induced by silver nanoparticles

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Abstract

Background: Silver nanoparticles (AgNP) elicit an intestinal response characterized by vascular and cellular changes, alongside the release of cytokines linked to the activation of the nuclear factor- κ B (NF- κ B) pathway. Consequently, a search was conducted for a compound capable of counteracting the primary pro-inflammatory effects induced by these nanoparticles [1]. Given the reported anti-inflammatory properties of quercetin and its prevalence in the human diet, the use of this compound could be considered a potential strategy for safeguarding the body against the harmful effects of AgNP [2]. **Objective:** Evaluate the potential protective role of quercetin against the pro-inflammatory effects induced by 5 nm polyvinylpyrrolidone (PVP)-AgNP in C57BL/6J mice. **Methods:** Two subacute doses of 5 nm PVP-AgNP were orally administered once daily for 14 days using a novel dosing technology (HaPILLness), facilitating stress-free, precise oral dosing. Quercetin (1 mg/kg bw) was concurrently administered via intraperitoneal injection once daily for the same 14-day period. **Results:** Our findings revealed that quercetin effectively reduced the intestinal inflammatory response caused by AgNP, through a reduction of the vascular and cellular alterations and also a tight regulation of the major NF- κ B inflammatory pathway, leading to a notable decrease in cytokine production. **Conclusions:** This study provides novel insights into the potential role of quercetin in alleviating the intestinal pro-inflammatory effects induced by 5 nm PVP-AgNP.

Keywords: silver nanoparticles; inflammation; quercetin, intestine

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