

Barreto E, Serra MF, Dos Santos RV, Dos Santos CE, Hickmann J, Cotias AC, Pão CR, Trindade SG, Schimidt V, Giacomelli C, Carvalho VF, Rodrigues E Silva PM, Cordeiro RS, Martins MA. (2015). Local administration of gold nanoparticles prevents pivotal pathological changes in murine models of atopic asthma. *Journal of Biomedical Nanotechnology*, v. 11, p. 1038-1050.

Although gold nanoparticles have been shown to exhibit a range of beneficial biological properties, including anti-inflammatory and anti-oxidant effects, their putative impact on allergic asthma has not been addressed. In this study, we evaluated the potential of nasal-instilled gold nanoparticles to prevent allergen-induced asthma in distinct murine models of this disease. Swiss-Webster (outbred) and A/J (inbred) mice were sensitized with ovalbumin and then treated with intranasal injections of gold nanoparticles (6 and 60 $\mu\text{g}/\text{kg}$), 1 h before ovalbumin challenges. Lung function, leukocyte infiltration, mucus exacerbation, extracellular matrix deposition, cytokine generation and oxidative stress were evaluated 24 h after the last challenge. In both mice strains, gold nanoparticles clearly inhibited (70–100%) allergen-induced accumulation of inflammatory cells as well as the production of both pro-inflammatory cytokines and reactive oxygen species. In A/J mice, recognized as genetic asthma prone animals, instilled gold nanoparticles clearly prevented mucus production, peribronchiolar fibrosis and airway hyper-reactivity triggered by allergen provocation. In conclusion, these findings demonstrate that gold nanoparticles prevented pivotal features of asthma, including airway hyper-reactivity, inflammation and lung remodelling. Such protective effects are accounted for by reduction in lung tissue generation of pro-inflammatory cytokines and chemokines, in a mechanism probably related to down-regulation in the levels of oxidative stress.