Tuesday, November 8, 2016 - 15:30 to 17:30
Poster Session: Advanced Materials Applications

Engineered papain nanoparticles by gamma irradiation: Towards safe therapeutic applications

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This article provides an in vitro biological approach of the so called radiation synthesized protein-based nanoparticles as the use of nanoparticles for biomedical purposes requires precise understanding of their properties and effects on the body before clinical may take place. This technique allows proper control of papain nanoparticles with preserved biological activity for drug delivery. Biocompatibility results revealed that papain nanoparticles, of approximately 8-9 nm, were found to be biosafe in PBMC cells at concentrations up to 0.4 mg.ml-1 for up to 72 hours period. The nanoparticles were able to specifically bind to anti-Carica papaya polyclonal antibody with higher intensity than native papain. The stimuli of mouse splenocytes by papain nanoparticles led to the production of high levels of IL2. No significant levels of IL6, IL10 and IFNγ were produced by the stimuli. At nanoparticle concentrations above the cytotoxic limit, the concentration of IL2 was totally suppressed indicating no pro- nor anti-inflammatory response by means of cytokine mediated pathways. These in vitro results suggest that papain nanoparticles crosslinked by gamma irradiation may be safely administered with low nor negligible toxicity, holding strong applications for drug loading.