CHEMICAL SYNTHESIS AND FUNCTIONAL CHARACTERIZATION OF VASOACTIVE INTESTINAL PEPTIDE (VIP) SILVER-PROTECTED NANOPARTICLES

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An important limitation to the therapeutic use of endogenic peptides is their short half-life due to the attack of endopeptidases or the lack of smart-delivery options [1]. An efficient way of protecting peptides of biomedical interest from endopeptidases consists in their covalent binding to nanoparticles. In spite of VIP interest in therapeutic applications few examples are known that improve its administration by means of nanoparticle functionalization, and to the best of our knowledge none of these examples correspond to metal nanoparticles. The aim of the current study was to functionalize silver nanoparticles with VIP and investigate their function as an anti-inflammatory agent. In this case, we report in here the IL-6, IL-10, and TNF-α regulation mediated by different VIP-nanoparticles as well as their effects on LDH release as a readout of cellular viability. In conclusion, we have prepared for the first time silver nanoparticles with a narrow size distribution, protected with a monolayer of adsorbed tiopronin, derivatized with poly(ethylene glycol)bis(3-aminopropyl) terminated (PEG) and functionalized with Vasoactive Intestinal Peptide (VIP). This will open new avenues for smart design of VIP-based immunotherapies in chronic and/or autoimmunity diorders.

References:

1 Pozo, D. and Delgado, M. (2004) The many faces of VIP in neuroimmunology: a cytokine rather a neuropeptide? FASEB J. **18**, 1325-1334

Figures

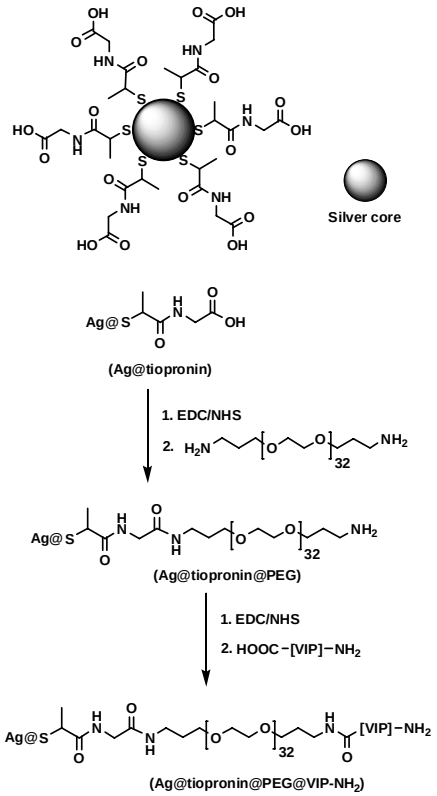

Fig. 1. Top. Schematic representation of Ag@tiopronin@PEG@VIP-NH_2 preparation (Figure not at scale) (Patent P2008-00451). Bottom. C57 mice microgial cultures treated with VIP-based nanoparticles in the presence or absence of LPS.