Synthesis and in vivo evaluation of MUC1-carbon dot conjugates as cancer vaccines

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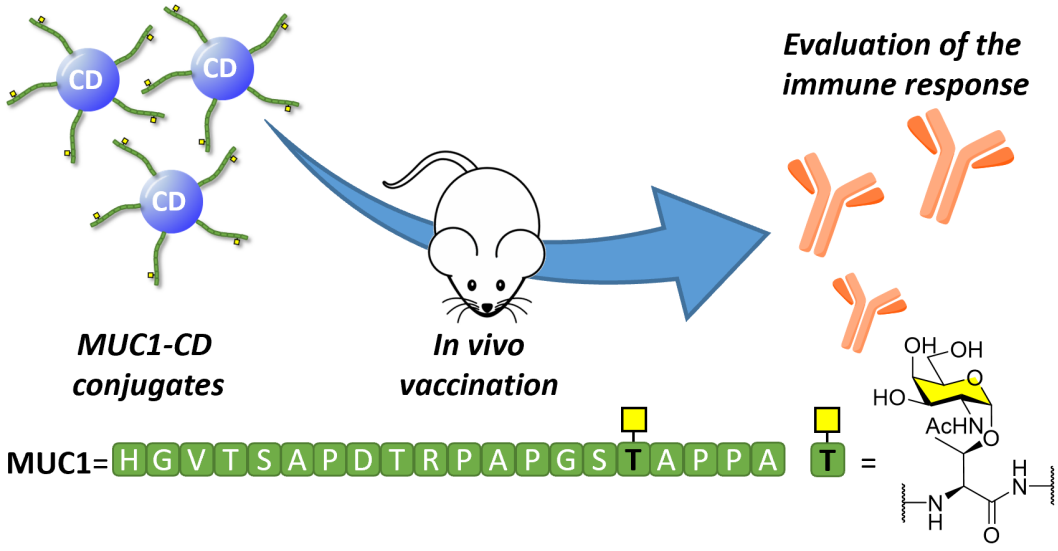
Carbon dots (CDs) are an emerging class of carbon-based nanoparticles which possess inherent immunostimulant properties [1]. Several types of CDs have been synthesized from different precursors, and conjugated with the MUC1 antigen. MUC1 is highly glycosylated glycoprotein expressed on the surface of epithelial cells. In cancer cells, it is overexpressed and presents truncated carbohydrate residues, such as the Tn antigen (α-*O*-GalNAc-Ser/Thr), which can be recognized by the immune system [2]. Unfortunately, MUC1 has low *in vivo* stability and low immunogenicity. Therefore, the conjugation of MUC1 on the surface of carrier proteins or nanoparticles such as CDs is essential to elicit a strong immune response [3].

Herein we report the preliminary results of a novel set of MUC1-CD conjugates. We show that the immunostimulant properties of CDs depend on the nature of the CD precursors, and that CD nanoparticles constitute promising scaffolds for the synthesis of novel self-adjuvant cancer vaccines.



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