

Polymeric nanoparticles decorated for *in vivo* multimodal imaging

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Abstract:

A novel diagnostic approach has been developed to evaluate the viability of transgenic beta pancreatic cells inside an implantable bioartificial pancreas (BAP). As part of the H2020 European project (iNanoBIT), this study aims to obtain multi-decorated biopolymeric nanoparticles as diagnostic nanotools, exploiting different imaging techniques including MRI, MSOT, SPECT and PET. Self-assembled nanoparticles have been obtained based on γ -polyglutamic acid (PGA) and chitosan (CH), by exploiting their opposite charges in aqueous solution. The functionalization with furan and azido groups, respectively of PGA and chitosan, allows the subsequent nanoparticle decoration by chemoselective click reactions. Therefore, both the targeting agent, Exendin-4, and the detection agents have been introduced on nanoparticles surface. In particular, Exendin-4 is an agonist of glucagon-like peptide 1 (GLP-1), while IRDye®800 CW has been used as contrast agent for MSOT, while Gd, Ga-68 and Tc-99/Cu-64 have been incorporated using a chelating agent, BCN-DOTA. Preliminary *in vivo* and *in vitro* tests have also been performed.

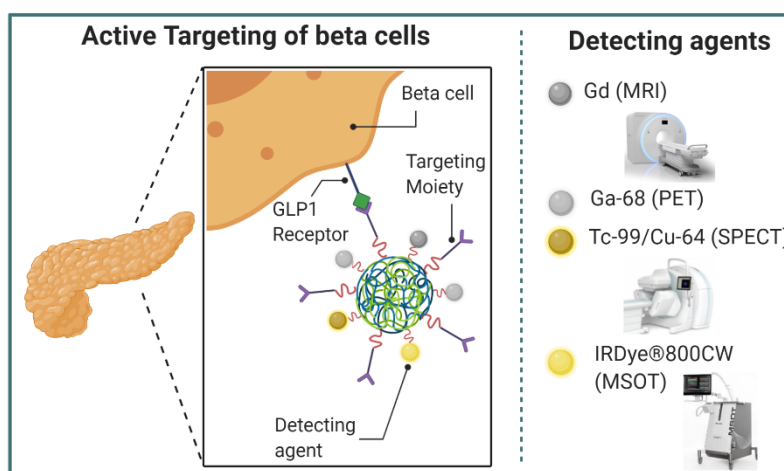


Figure 1 - Polymeric nanoparticles targeting pancreatic beta cells