Multimodal enhanced *in vivo* imaging of pancreatic β-cells using PGA-chitosan based nanoparticles

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in vivo targeting, multimodality, nanoparticles, pancreas, click chemistry

Molecular imaging probes should be capable of targeting specific biological markers and be rapidly cleared out of non-target ones, improving the spatial resolution, while added contrast guarantees a more precise and accurate visualization. Such approach allows us to investigate within living organisms, which are very complex systems. The targeting of pancreatic β-cells is acquiring tremendous interest, since it reveals precious information regarding the cell viability, and developing an efficient imaging approach can find applications in regenerative therapies for diabetes and early pancreatic cancer diagnosis.

Nanoparticles are a promising candidate as versatile probes, since their surface is ideal for labelling both targeting and contrast agents. In this work, two polymeric components, chitosan and γ-PGA, have been formulated as self-assembled polyelectrolyte complexes. Both the polymers have been functionalized for subsequent chemoselective decoration with a ligand for specific targeting of β-cells and different detecting agents, exploiting multiple imaging techniques (PET, SPECT, MRI, MSOT).[1]

The composition and the purity of polymers have been verified with different analytical methods. The properties of the nanoparticles (mobility, zeta potential, size distribution, concentration) have been characterized by ZetaSizer and Nanosight instruments, while their morphology has been characterized by TEM. *In vitro* and in vivo tests determined the β-cells targeting ability and their preliminary biocompatibility. Furthermore, biodistribution has been tested by PET in mice with Ga-68 labelled nanoparticles, and *in vitro* autoradiography confirmed the pancreatic uptake.

References:

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Acknowledgments: this project is funded by H2020-NMBP-15-2017- GA-760986 — iNanoBIT (1.10.2017-30.9.2022) Integration of Nano- and Biotechnology for beta-cell and islet Transplantation. http://inanobit.eu/