PEGylated Poly(Alkyl Cyanoacrylate) Nanoparticles Functionalized by Click Chemistry for Applications in Alzheimer's Disease

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Purpose: PEGylated poly(alkyl cyanoacrylate) (PEG-PACA) nanoparticles (NPs) have been shown to increase biodistribution of drugs in vivo but in the same time are non-specifically distributed in the body. This clearly points out the need to functionalize nanoparticles to obtain targeting systems. We report in this work on the synthesis of ligand functionalized PEG-PACA NPs to selectively target and interact with β-amyloid peptide (Aβ) implicated in Alzheimer disease (AD).

Methods: the functionalization of PEG-PACA copolymers with appropriate ligands has been realized through the click chemistry method that allowed the preparation of different ligand functionalized NPs that have been tested, after physico-chemical characterization, for their potential applications in the Alzheimer’s disease.

Results: The new functionalized copolymers have been characterized. The corresponding NPs have been prepared by nanoprecipitation and characterized (diameter, zeta potential and stability). Finally, their bioaffinity for Aβ was found to be significantly higher when compared to non-functionalized NPs. Conclusion: The need for antibody-bearing NPs seems essential for the obtention of good activities.