# CLPFFD-PEG functionalized NIR-absorbing hollow gold nanospheres and gold nanorods inhibit beta-amyloid aggregation

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## Abstract

Gold nanoparticles with specific optical properties in combination with the CLPFFD peptide that exhibits selectivity for beta-amyloid (A beta) aggregates are promising photothermal absorbers for application in Alzheimer's disease therapy. We report on hollow gold nanospheres (HAuNS) and gold nanorods (AuNR), which exhibit strong plasmonic near infrared (NIR) absorbance in the optical window of biological tissue and which are functionalized with CLPFFD in two different ways. Therefore the peptide was either directly bound to the particle surface or indirectly to a particle-protecting polyethylene glycol (PEG) ligand shell, thereby reducing the CLPFFD density on the surfaces of both types of particles. Fully PEGylated particles were used for comparison. The effects on cell viability and the fundamental suitability of the HAuNS and AuNR conjugates as photothermal absorbers to inhibit A beta-fibrillation are analysed in vitro. The positive influence of the use of PEG ligands on the reduced cytotoxicity of the conjugates and on the A beta-disaggregation is discussed.

## Palabras clave

**KeyWords Plus:** SURFACE-PLASMON RESONANCE; ALZHEIMERS-DISEASE; BIOMEDICAL APPLICATIONS; PHOTOTHERMAL ABLATION; OPTICAL-PROPERTIES; NANOPARTICLES; PEPTIDE; CONJUGATION; STABILITY; THERAPY

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