GOLD NANOPARTICLES AND MICROWAVE IRRADIATION INHIBIT IRREVERSIBLY THE $A\beta_{1-42}$ AMYLOIDOGENESIS

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In a recent report, we demonstrated the feasibility of remote deposit redissolving by using the local heat dissipated by gold nanoparticles (AuNP) selectively attached to $A\beta_{1-42}$ (a protein involved in Alzheimer´s disease) toxic fibrils, when irradiated with microwaves (MW) [1]. Although the mature fibril was once assumed to be the biologically toxic species, it has recently been hypothesized that soluble intermediates are most damaging [2]. In this study, we selectively bound AuNP to soluble aggregation intermediates of $A\beta_{1-42}$ (Aß PIAA) and investigated the effect of MW irradiation on the amyloidogenic process. AuNPs were attached selectively to the amyloidogenic $A\beta_{1-42}$ structures. The samples were then irradiated in a cupper resonating chamber using a 14 GHz RF signal and 100 mW power. After irradiation, the samples were incubated for 48 h at room temperature to allow fibril formation and assess whether the amyloidogenic capacity of PIAA is altered determining fibril formation by ThT assay and by transmission electronic microscopy (TEM) [3].

MW and AuNP linked to peptides like CLPFFD that selectively attaches to amyloidogenic $A\beta_{1-42}$ structures, inhibit irreversibly their normal aggregation (Figure). Our approach provides a viable means to inhibit irreversibly the amyloidogenic process of Aβ. This principle could be used for therapeutically purposes by inhibiting locally and remotely the amyloidogenic process.

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References:

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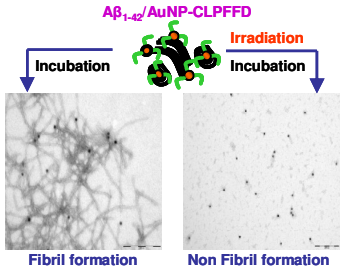
[2] Kayed R.; Head E.; Thompson J.L.; McIntire T.M.; Milton S.C.; Glabe C.G. Science **300** (2003) 486.
[3] Araya E, Olmedo I, Bastus N., Guerero S., Puntes V., Giralt E. Kogan MJ (Submitted, 2008).

Figure:



TEM micrograph of Aβ PIAA/AuNP with or without irradiation and incubation.