Gold nanoparticles for selective and remote heating of ?-amyloid protein aggregates

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Nanoparticles can be made to respond resonantly to a time-varying electromagnetic field with advantageous results related to the transfer of energy from the exciting field to the nanoparticles. The surface of each particle can be heated up, this heat being transmitted into the immediately surrounding tissue. This enables their use as hyperthermia agents delivering toxic amounts of thermal energy to targeted bodies such as tumours. Heating of nanoparticles in a magnetic field is mainly due to inductive coupling (via eddy currents), and in the case of magnetic particles, loss processes during the reorientation of the magnetization (hysteresis losses) or frictional losses (relaxational losses) if the particle can rotate in an environment of sufficiently low viscosity. We use this method to apply heat locally and remotely, dissolving toxic protein deposits of A?1-42 (amyloid deposits) via the combined use of weak microwave fields and gold nanoparticles (AuNP) without any bulk heating. This