

Gold Nanoparticles (AuNPs) Applied in Hyperthermia Therapy

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Clinical hyperthermia treatment consists in local heating of cancerous tissue; this may be achieved by locating metallic particles within tissue susceptible to be heated under the influence of a radiofrequency (RF) or a magnetic field. Furthermore it has been shown that hyperthermia treatments enhances others cancer therapies like chemotherapy or radiotherapy. However, the applications of these heating techniques not guarantee that healthy cells surrounding cancerous tissue are not damaged. A solution that has been recently explored enables precise local heating; subjecting the cancer tissue embedded with nanoparticles to a laser beam whose power and the spot radius are controllable. This procedure can be applied for superficial head and neck cancer. Gold nanoparticles (AuNPs) absorb energy in the ultraviolet (UV) and visible range (Vis); however at these wavelengths the penetration depth of energy is very low. The solution proposed by various authors is functionalized gold nanoparticles to absorb energy in the wavelength of the infrared range (approx. 800 nm). In this work we present the study of the optical and thermal properties of gold nanoparticles functionalized to absorb energy on the infrared range. Samples of AuNPs were heated with a solid state laser ($\lambda = 808$ nm) specific absorption rate (SAR) was obtained as a function of the time of exposure to the laser energy; also reflectance spectra in the UV-VIS-NIR was obtained.