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Editorial

Gold Nanoparticles in Cancer Therapy

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Gold nanoparticles are at the vanguard of nanoparticles nowadays due to their outstanding chemical and physical properties, which can be used in a variety of scientific areas. The advancement of cancer treatments could be aided by gold nanoparticle technology, which has some qualities that make them great choices for targeted drug delivery systems, such as small dimensions, inert nature, high stability, high dispersity, non-cytotoxicity, non-immunogenicity and biocompatibility. Gold nanoparticles are classified into a variety of subtypes based on their size, shape, and physical qualities (Figure 1) and their size used as drug delivery vehicles in therapeutic agents conjugation typically range from 10 to 300 nm. Gold nanoparticles are often made by reducing chloroauric acid in a liquid by trisodium citrate and stabilizing agents like colloidal stabilizer are used to keep the nanoparticles from aggregating [1,2].

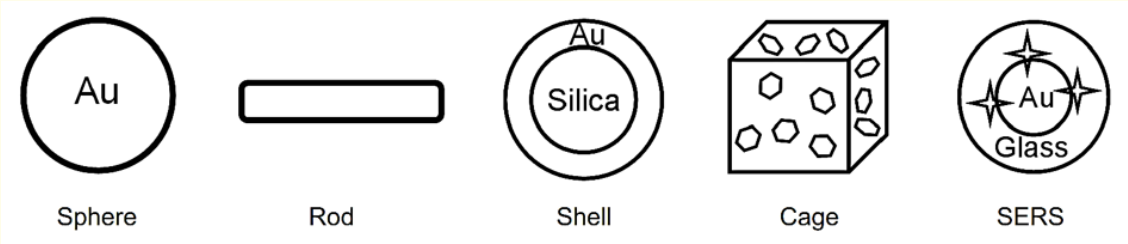

Figure 1: Gold nanoparticles in different shapes (from ref. [3]).

Gold nanoparticles have numerous features that make them interesting for use in cancer treatment. They are unique because of their interesting optical characteristics, which can be used for both imaging and therapeutic purposes, due to the ability of including targeting ligands, imaging labels, and therapeutic agents, as their conjugates [3]. Gold emits distinct X-ray spectra that can be detected with an ionization chamber, so they could be visualized using CT and MRI [4]. The therapeutic application of gold nanoparticles includes (i) photothermal therapy, due to their property of absorption and scattering of electromagnetic radiation; (ii) radiofrequency therapy caused by induced surface plasmon resonance in the particles; (iii) controlled release by using them as drug delivery systems to overcome some disadvantages of common chemotherapy strategies such as poor solubility or unfavorable biodistribution; and (iv) targeted therapy to increase drug accumulation in tumors by passive targeting using the enhanced permeability and retention effect, active targeting by conjugating targeting molecules, or a mix of these approaches [5]. Moreover, Gold nanoparticles can be functionalized with a variety of organic ligands to develop advanced organic-inorganic hybrids [6].

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