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Synthesis of the optical mesoporous silica nanoparticle for cancer treatment by photodynamic therapy method

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In this work, we synthesized the novel composites based on mesoporous silica nanoparticles (MSN) to use in photodynamic therapy (PDT). This composite included MSN/photosensitizer (PS), protoporphyrin IX (PP IX) and titanium oxide. In the nanocomposite, PS/PP IX was covalently conjugated to a mesoporous silica network, and titanium oxide (with the ability to stimulate ROS optical production which causes damage to the cancerous cell) was coated onto the surface of the composite by both coordination and electrostatic interaction. Silica nanoparticles have been used to bind with the light-sensitizers from porphyrin family. Silica-based nanomaterials have been developed as a substitute for the polymeric nanoparticles. These nanoparticles are resistant toward the microbial invasion, and their size, shape and the porosity can be easily controlled during the preparation process. In addition, the nanoparticles release their encapsulated compounds even in the unconventional pH and temperature conditions, therefore they can be used in PDT. The mesoporous silica-based composite possesses the good physicochemical properties can be applied as the suitable supports to carry the PS/Ti-grafted PP IX as a good agent to damage the cell cancers via PDT method.

Biography

Mehrgan Ghazaeian has her expertise in medicinal chemistry and nanotechnology. Her last research is about cancer therapy using nanotechnology and photodynamic therapy. She has two another research items that published on ISI journals in her bachelor of science thesis. She is now working on protoporphyrins as photosensitizers on photodynamic therapy for cancer disease. And she improved and synthesized the novel composites based on mesoporous silica nanoparticles (MSN) with help of her master supervision on 2017 and this research work will predict for the publisher of at least three articles in ISI journals. She is 28 years old with full of researches motivations in future.

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