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The ionic polymers in the targeted drug delivery agents as the coating materials

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Targeted drug delivery applications are highly researched over several decades due to their promising benefits such as improving drug efficacy and minimizing side effects of the drugs that are in hand. It is known that most chemotherapeutic approaches for cancer treatment are non-specific for tumor tissue, which leads to toxicity to healthy cells and manifestation of side effects. Multifunctional magnetic nanoparticles (MNP) can be used to minimize the side effects of chemotherapeutic drugs and to target them to be delivered at the tumor site. MNPs such as iron oxide nanoparticles (IONP), are suitable for such applications because of their biocompatibility in moderate doses, ease of surface modification, known metabolic pathways, variety of their sizes and their magnetic properties, ability to be manipulated upon application of a magnetic field. There are several handicaps to use IONPs as drug delivery nanoparticles in their pure form such as their toxicity to healthy cells, colloidal instabilities, low drug loading capacities etc. To eliminate these handicaps IONPs can be coated using biocompatible biopolymers to form core-shell structures. Biocompatible biopolymers are commonly used for functionalization of nanoparticles due to their non-toxic nature and their ability to modulate physical and chemical properties (surface charge, etc.). Also, biopolymers improve stability, and enable high amounts of drug loading and protection of drugs for core-shell structures. In this study, the aim was to obtain multifunctional core shell nanostructures of superparamagnetic iron oxide nanoparticles (Fe_3O_4) coated with various ionic biopolymers that can optimize toxicity to healthy cells, colloidal instabilities, drug loading capacities and can allow drug delivery to tumor tissue by magnetic manipulations. The influence of biopolymers with different ionic properties to final core shell structures were investigated and compared in terms of their colloidal properties, toxicities, drug adsorption and drug delivery capacities.

Biography

Sevim İşçi has completed her PhD from Istanbul Technical University, Turkey. She is an Associated Professor of Istanbul Technical University, Turkey. She has over 30 publications that have been cited over 150 times, and her publication H-index is 10.

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