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In vitro controlled release of 5-FU drug from a stimuli-responsive microgel/liposome biomaterials at different temperatures

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Poly (ethylene glycol) stabilized stimuli-response microgels have been used as a drug carrier and a release system due to its low toxicity and high biocompatibility nature. They are promising material for the advancement of specific drugs carriers like cancer drugs. They have huge pore size which can be decreased by varying cross-linker ratio. They might be modified with liposome and magnetic nanoparticles as well. Liposome/microgel stimuli-response drug release system may provide better application opportunities such as delivery of multiple components and imaging agents, diagnostic and therapies. In this study, multi-response liposome/microgel hybrid drug delivery and targeting system was synthesized. 5-fluorouracil (5-FU) drug was loaded into liposomes in aqueous media, and then a water soluble monomer based multi-responsive microgel hosting liposome-5-FU system was synthesized. Finally, 5-FU loaded hybrid system was covered with magnetic Fe₃O₄ nanoparticles in order to provide a response to magnetic field. This hybrid system was used *in vitro* studies as a drug carrier for a target and controlled drug release system in phosphate buffer solution (pH 7.4) incubated at 37°C and 42°C and physiological saline solution incubated at 37°C. All microgel, liposome and liposome/microgel systems were characterized by using dynamic light scattering, zetapotentiometer, transmission electron microscopy. Magnetic Fe₃O₄ nanoparticles covered liposome/microgel hybrid system was characterized by using TEM. The release of 5-FU from liposome-microgel hybrid system was analyzed using high-performance liquid chromatography with ultraviolet spectrophotometer detector at 266 nm.

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Biography

Damla Ülker is a PhD student at the Department of Polymer Science and Technology of Eskisehir Osmangazi University. She works in various projects based on polymer synthesis and their application studies. Her recent research is based on "Synthesis and Characterization of Novel Microgels, Nanometals, Nanocomposites, Block Copolymer Stabilizers for Related Application Studies". She has great experience on nanometal dispersion preparation, ATRP chemistry and heterogeneous polymerization techniques including both emulsion and dispersion polymerizations.

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