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## Stimuli-responsive microgel/liposome hybrid biomaterials for controlled and targeted drug release applications

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Medical nanotechnology is a growing science that has applications on various areas of drug target, delivery or release. Nanosized particles provide a control on optimization of the therapeutic index of cancer drugs. Beyond this therapeutic functionality, nanoparticles modified with magnetic Fe3O4 have been designed to deliver multiple components and imaging agents, diagnostics and therapies. In this study, multi-responsive microgels, which were first introduced by our group in the literature, were used in order to control targeting and releasing properties of liposomes. Firstly, 5-fluorouracil (5FU), which is used clinically to treat breast, stomach and colon cancer, was loaded into liposomes in aqueous media. Then, a water-soluble monomer, namely 2-(N-morpholino) ethyl methacrylate, based multi-responsive microgel hosting 5FU loaded liposome system was synthesized. In the third stage, a hybrid system consisting of liposome-5FU loaded microgels was covered with magnetic-nanoparticles to provide them to get responsiveness to a magnetic field. Finally, the resulting hybrid system was used for *in vitro* studies as a drug carrier and controlled drug release system in phosphate buffer solution incubated at 37°C. All microgel, liposome and hybrid-nanoparticles were characterized by using dynamic light scattering instrument, zeta potentiometer and transmission electron microscopy. The release of 5FU from liposomemicrogel hybrid system was analyzed using HPLC with ultraviolet spectrophotometer detector having a wavelength of 266 nm.

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## **Biography**

Vural Bütün received his PhD at the University of Sussex-UK in 1999. He has been working at Chemistry Department of Eskişehir Osmangazi University (ESOGU), Turkey since 1999. He became a Member of the Turkish Academy of Sciences in 2009. He is holder of various scientific awards including TWAS Encouragement Award, Outstanding Young Scientist Award and TÜBİTAK Encouragement Award. He has published 60 papers with more than 2800 citations. Currently, he is the Director of Central Research Laboratory and the Dean of Faculty of Science at ESOGU.

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