

New degradable nanogel based on poly (N-vinyl-2 pyrrolidone) for effective dissemination of active substances

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Due to the unwanted toxic properties of some drugs, new efficient methods of protection of the organisms against that toxicity are required. In the last decades, new materials were synthesized to effectively disseminate active substances without affecting the healthy cells. We propose a new degradable hydrogel consisting of nanoparticles sensitive to redox factors. The nanogels were based on poly (N-vinyl-2-pyrrolidone), acrylic acid and the degradable cystine crosslinker. The size of such modified poly (N-vinyl-2-pyrrolidone) nanogels was slightly bigger than 100 nm. Using the electrostatic interactions between the carboxylic groups in the polymer network and the protonated amine groups of doxorubicin it was possible to load the drug into the carrier to a very high level. The presence of the -S-S- groups made the polymer network susceptible to degradation by glutathione. The pharmaceutical dissolution testing was performed using the specially designed microfluidic system. The MTT assay indicated that compared to free doxorubicin the nanogel particles loaded with doxorubicin were more cytotoxic against the MCF-7 cancer cells, while they were less toxic against the MCF-10A healthy cells.

Biography

Ewelina Waleka-Bargiel started her PhD studies in 2018 within the interdisciplinary TRI-BIO- CHEM project, which was a result of the agreement of three scientific and research units: Faculty of Chemistry of University of Warsaw, Faculty of Chemistry of Warsaw University of Technology and Nencki Institute of Experimental Biology. The main aim of her research is synthesis, using the microfluidic systems and characterization of new polymeric materials. She has published 4 papers in international journals.