

BIOMATERIALS

March 27-28, 2017 Madrid, Spain

Nanogels preparation for controlled bioactives' delivery

Iordana Neamtu, Loredana E Nita, Aurica P Chiriac, Alina G Rusu, Alina Diaconu, Nita Tudorachi and Liliana Mititelu Tartau
Petru Poni Institute of Macromolecular Chemistry, Romania

Nanogels are cross-linked polymeric particles, which can be considered as hydrogels if they are composed of water soluble/swellable polymer chains. Their applications for polymer-based bioactives' delivery systems require biodegradability, controlled particle size with uniform diameter, large surface areas for multivalent bioconjugation and interior network for the incorporation of different therapeutics, environmental-stimuli responsive capability, dispersibility in biological fluids, sustained release in time of bioactives and facile removal of the devices after the bioactives delivery, etc. This study describes the synthesis and characterization of a stimuli-responsive nanogel performed by crosslinking poly(itaconic anhydride-co-3,9-divinyl-2,4,8,10-tetraoxaspiro [5.5] undecane) with 1,12 dodecandiol. The copolymer with different ratios between the two comonomers is able for network formation, binding properties, amphiphilicity, and good oxidative and thermal stability. At the same time the new nanogel structure has high functionality, biocompatibility, temperature and pH responsivity, and is designed to have potential biomedical applications. The chemical structure is explored utilizing common spectroscopic analyses, while the dual pH and temperature sensitivity is evaluated by determining the hydrodynamic radius and zeta potential by dynamic light scattering technique. The analysis of the thermal stability by thermogravimetric analysis supports the new covalent bonds realized by the crosslinking reaction between the copolymer and diol. The acute toxicity of the nanogel is estimated after mice oral administration. Accordingly, analysis of histological evaluation of liver tissues does not reveal substantial pathological modifications. The results propose that the nanogel may be suitable for *in vivo* use as bioactives' delivery system.

Biography

Iordana Neamtu is a Senior Scientific Researcher at "Petru Poni" Institute of Macromolecular Chemistry in Iasi - Romania. Her expertise is in synthesis of polymer materials with potential biomedical applications. She has published more than 50 papers in reputed journals and participated in more than 15 Romanian Projects.

dana.iordana@yahoo.com

Notes: