

BIOCOMPATIBLE AND THERMORESPONSIVE HYDROGELS EVALUATED IN TISSUE ENGINEERING APPLICATIONS

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ABSTRACT

Poly(*N*-vinylpyrrolidinone) (PVP) has been used in various biomedical applications for many years. Due to the increasing interest in thermoresponsive hydrogels for biomedical applications, biocompatible hydrogels based on *N*-vinyl-2-pyrrolidinone (NVP) and 3-Ethyl-1-vinyl-2-pyrrolidone (ethyl NVP) were designed and synthesized. Copolymerizations of NVP and ethyl NVP in various ratios were carried out via RAFT polymerization. Azobisisobutyronitrile (AIBN) was used as the free radical initiator and *S*-(2-cyano-2-propyl)-*O*-ethyl xanthate (X6) was used as the RAFT agent. A PVP macro-RAFT-agent was synthesized and subsequently chain-extended with ethyl-NVP. The obtained block copolymer was characterized using ¹H NMR and size exclusion chromatography (SEC). Further analysis to ascertain the morphology of the hydrogels was done using cryo-transmission electron microscopy analysis (Cryo-TEM) to obtain a rod-like morphology. The polypeptide cyclo(Arg-Gly-Asp-d-Phe-Cys) was then attached via Michael addition to the block copolymer through the thiol functionality of the cysteine residue. These hydrogels were then assessed for biocompatibility using confocal fluorescence microscopy.