Polym. Bull. (2014) 71:2999–3016
DOI 10.1007/s00289-014-1234-y

ORIGINAL PAPER

Electrospinning of chitosan/poly(lactic acid-*co*-glycolic acid)/hydroxyapatite composite nanofibrous mats for tissue engineering applications

Tugba Endogan Tanir · Vasif Hasirci · Nesrin Hasirci

Received: 21 November 2013 / Revised: 11 June 2014 / Accepted: 25 August 2014 /
Published online: 2 September 2014
© Springer-Verlag Berlin Heidelberg 2014

Abstract Electrospinning, which is a fiber fabrication technique using electrical forces to produce fibers with diameters ranging from nanometers to several micrometers, can be used to prepare materials mimicking the extracellular matrix proteins for potential use as tissue engineering scaffolds. In this study, nanofibrous mats of chitosan (CH) and poly(lactic acid-*co*-glycolic acid) (PLGA) having fiber diameters between 167 to 525 nm, and containing hydroxyapatite (HAp), were prepared by electrospinning technique. Morphological, chemical, thermal and degradation tests and cell affinity tests were carried out. Chitosan mats were stable in aqueous media and showed degradability in the presence of lysozyme. In PBS solution, PLGA mats disintegrated completely in 2 weeks. Meanwhile, CH-PLGA mats containing equal amounts of both CH and PLGA fibers and CH-PLGA-HAp samples containing 20 % HAp lost 50 and 40 % of their initial weight in 4 weeks, respectively. Cell culture tests showed that all electrospun fibrous mats promoted

T. E. Tanir · N. Hasirci
Graduate Department of Polymer Science and Technology, Middle East Technical University, Ankara 06800, Turkey

T. E. Tanir
Central Laboratory, Middle East Technical University, Ankara 06800, Turkey

V. Hasirci
Department of Biological Sciences, Middle East Technical University, Ankara 06800, Turkey

V. Hasirci · N. Hasirci
Graduate Department of Biotechnology, Middle East Technical University, Ankara 06800, Turkey

V. Hasirci · N. Hasirci
BIOMATEN, Center of Excellence in Biomaterials and Tissue Engineering, Ankara 06800, Turkey

N. Hasirci (✉)
Department of Chemistry, Middle East Technical University, Ankara 06800, Turkey
e-mail: nhasirci@metu.edu.tr