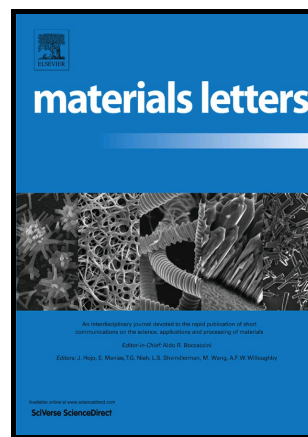


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Microfluidic production of hyaluronic acid derivative microfibers to control drug release**Stefano Agnello^a, Luca Gasperini^b, Rui L. Reis^b, João F. Mano^{b,*}, Giovanna Pitarresi^{a,c,*}, Fabio S. Palumbo^a, Gaetano Giammona^{a,d}**^aDipartimento di Scienze e Tecnologie Biologiche Chimiche e Farmaceutiche (STEBICEF), Università degli Studi di Palermo, Via Archirafi 32, 90123 Palermo, Italy^b3B's Research Group - Biomaterials, Biodegradables and Biomimetics, University of Minho, Headquarters of the European Institute of Excellence on Tissue Engineering and Regenerative Medicine, AvePark, 4806-909 Taipas, Guimarães, Portugal^cIBIM-CNR, Via Ugo La Malfa 153, 90146 Palermo, Italy^dInstitute of Biophysics at Palermo, Italian National Research Council, Via Ugo La Malfa 153, 90146 Palermo, Italy

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Abstract

Microfibers of a hyaluronic acid amphiphilic derivative (HA-EDA-C₁₈), with incorporated dexamethasone (Dex) as a model bioactive molecule, were obtained by microfluidic technique. Exploiting the ionic strength sensible behavior of HA-EDA-C₁₈, microfibers were formed in baths containing phosphate buffer saline with different salt concentration. The morphology and stability of the microfibers were studied. The release profile showed that it was possible to control the release rate of Dex from microfibers changing the salt concentration of the coagulating bath. The results indicated that HA-EDA-C₁₈ microfibers are potentially useful for drug delivery applications.

Keywords: biomaterials; polymers; hyaluronic acid; microfibers; microfluidic technique; drug delivery**1. Introduction**

In the past decade, many microfluidic devices have been broadly used in the field of analytical chemistry, tissue engineering, microbiology, biotechnology and drug discovery [1- 5]. The fabrication of continuous polymer fibers with microfluidics is a simple process that has many advantages such as control of size and easy loading of biological molecules. Microfibers are long, thin and flexible materials. They are useful for the creation of various three-dimensional (3D) objects, including clothes and other architectures by folding, bundling, reeling and weaving [6-11]. These microfibers have also been attractive for creating

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