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Poster Presentation

Microfibers and Nanoparticles with Controlled Dimensions of a Hyaluronic Acid Derivative

 Sunday (01.01.2040)

 00:00 - 08:29

 Part of:



P.2: Poster Session 2 Session

📅 Tuesday (09.05.2017)

🕒 08:00 - 15:00

Microfluidics is defined as the technology that deals with the precise control and manipulation of small quantities of fluids constrained in micro-channels of small cross-sectional dimensions [1].

Microfluidics has recently emerged as a very promising route for the production of polymeric fibers at the micro and nanoscale, providing a fine control over fiber shape, size, chemical anisotropy and biological activity [2]. Furthermore, the ability to manipulate nanoliter volumes of liquid and to control mixing and reaction precisely, opens up the possibility of creating smart targeted drug delivery systems as nanoparticles, especially with uniform and narrow size distribution [3].

This work describes the versatility of an amphiphilic hyaluronic acid derivative (HA-EDA-C18) [4] to produce well-defined microfibers and nanoparticles based on self-assembly of its polymer chains, by using microfluidic technique. In particular, two HA-EDA-C18 derivatives with different molecular weight have been synthesized and characterized by SEC and rheological analyses. HA-EDA-C18 with major molecular weight (~322000 Da) has been employed to produce full and hollow microfibers. In particular, full microfibers have been obtained with different size changing microfluidic parameters and chip. Possibility to perform biofunctionalization of fibers was demonstrated by chemical and physical fiber functionalization with cy-RGD and fibronectin respectively, and the adhesive properties have been assayed on Human Umbilical Vein Cells (HUVECs). Hollow microfibers were produced using a 3D flow focusing chip. The potentiality to cell encapsulation has been evaluated on primary bovine chondrocytes.

HA-EDA-C18 with minor molecular weight (~125000 Da) has been employed to prepare nanoparticles with controlled dimension. These have been obtained by monitoring the nano-precipitation in DPBS pH 7.4 into Micromixer chip, using a different flow rate ratio between the inner and external channels and nanoparticles obtained were finally characterized by dynamic light scattering and TEM.

Speaker:

Ph.D. Calogero Fiorica ([https://biomat2017.dgm.de](https://biomat2017.dgm.de/profil)

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