Fabrication of porous mastic gum scaffolds by UV laser for drug delivery applications

Konstantina Terzaki[1], Maria Sygletou[1,2] , Chara Simitzi[1,3] , Alexandros Selimis,[1] Costas Fotakis.[1,2] Maria Farsari[1], Anthi Ranella[1]

[1] Foundation for Research and Technology-Hellas (F.O.R.T.H.), Institute of Electronic Structure and Laser (I.E.S.L.), Heraklion, Crete, Greece
[2] University of Crete, Department of Physics, Heraklion, Greece,
[3] University of Crete, Department of Biology, Heraklion, Greece
*Corresponding author email: kterzaki@iesl.forth.gr

Over the recent years a highly interdisciplinary field of research has been developed concerning the design, the synthesis and the fabrication of bioinspired materials and surfaces. Natural biopolymers offer an excellent environment for tissue regeneration, with the added capability of forming foam-like scaffolds when irradiated with UV laser light, imitating the natural conditions of cell adhesion (biomimetic scaffolds). Chitosan, a pH-sensitive biodegradable component, with controllable rate of drug release and an excellent tablet binder, is blended with mastic gum known for its antimicrobial, antibacterial, antioxidant activity, with cell healing properties and excellent mechanical behavior.
Laser biopolymer processing offers the potential for diverse scaffold fabrication, relying on the unique characteristics of laser light [1], [2]. In the present study, we report on the morphological features of the laser induced structures and their dependence on the irradiation parameters. Furthermore the effect of the different fabricated topographies was studied over cell response.

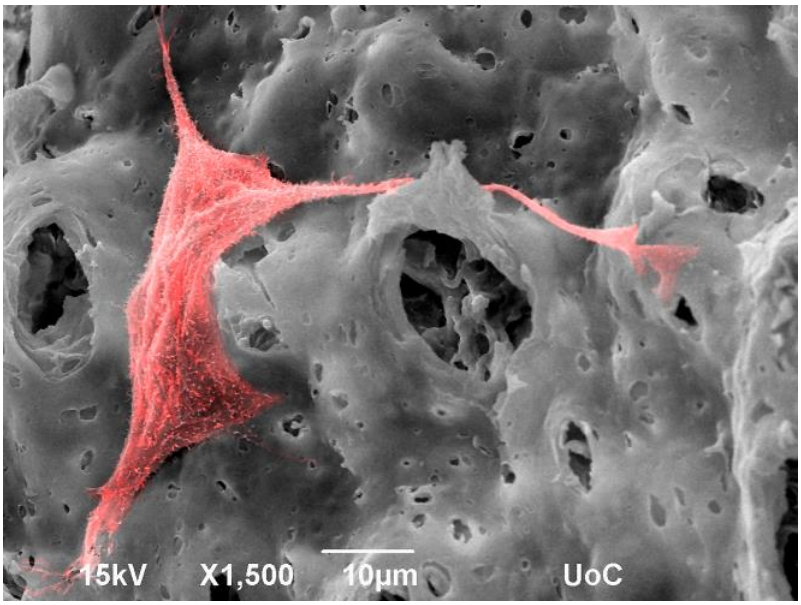

Figure 1: Cell culture on UV laser treated films

References:
[1] Castillejo, M., *et al*., Applied Surface Science 258, 8919, 2012
[2] Lazare, S., *et al*., Applied Physics A 81, 465, 2005