

Poster session 9: Other applications of biofabrication

P9.1

Laser assisted bioprinting using a femtosecond laser and a gold transductive layer: a parametric study

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Laser-Assisted Bioprinting (LAB) has been used for cell biomolecules and biomaterials printing. We were wondering whether a femtosecond laser could be used for LAB printing in order to reduce heat accumulation on the donor substrate to increase the printing spatial resolution and to reduce the laser fluence of LAB using an absorptive layer.

The aim of this work was to evaluate the possibility of printing bioinks with a LAB set-up using a femtosecond laser pulse and an absorptive layer of gold and to identify printing parameters. A LAB workstation was used to print different model viscous solutions (cell culture medium a solution of water + glycerol a solution of alginate + water + glycerol) and keratinocytes cells line HaCaT onto a modified soda-lime glass substrate covered with a thin layer of gold. Moreover the laser-induced jet formation and evolution were observed by shadowgraphy. Solutions viscosities ranged between 1.3 to 146 mPa.s. Fluences used for printing ranged between 2.5 to 4.5 J.cm⁻². Also we have observed a good reproducibility of the process and the most adequate fluence for cell printing was 3.8 J.cm⁻². Cell viability was maintained 24 h after printing.

