Hyaluronic acid glycidyl methacrylate hydrogel gelation in turbid medium of biotissue

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Tissue engineering is an innovative field of medicine involved in regeneration and replacement of damaged or diseased tissues. In particular, the specially designed implant is integrated to the place of defect aiming to mimic physical and biological properties of the native tissue. Unfortunately, this approach remains not beneficial for repair of small defects in plastic surgery due to impossibility to place matrix in the depth of organism without surgery.

In this study we implement local injection of endogenous biocompatible polymer in the lesion site using standard needle. Therefore, the hydrogel fills the required volume in the minimally invasive way. In order to achieve required mechanical properties, the injected hydrogel can be photocrosslinked. However, it is favorable to utilize irradiation within biotissue transparency window in red and near infrared ranges of spectrum (630-1310 nm).

It motivated us to design injectable bioink on the base of hyaluronic acid glycidyl methacrylate and photoinitiators possessing absorption in the red region. For this reason we synthesized water-soluble 17^3-N-(methoxy-PEG_{2000})-13^1,15^1- chlorin p_6 dimethyl ester and {4,4',4'',4'''-(29H,31H-phthalocyanine-1,8,15,22-tetrayl-134 κ4N29,N30,N31,N32)tetrakis[1- methylpyridiniumato(2-)]}zinc(4+) tetraiodide. Herein we have studied implementation of these photoinitiators *in vitro* and *in vivo for crosslinking under irradiation at 660/675 nm wavelengths.*

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