# COMPARISON OF THE EFFECT OF PHOTOINITIATOR P2CK AND AS7 ON THE VIABILITY OF ENCAPSULATED HUMAN ADIPOSE-DERIVED STEM CELLS VIA TWO-PHOTON POLYMERIZATION

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Natural-based polymers such as gelatin have been widely used in medical research due to their biodegradability and biocompatibility, although they often present poor mechanical properties. The lack of control over material behavior in native gelatin is restrictive; therefore, their modification with crosslinkable groups prior to polymerization is desired. Free radical polymerization, including two-photon polymerization (2PP) can create a hostile environment for cells, due to the formation of reactive oxygen species, which in turn lead to poor cell survival. While there are several commercially available UV-photoinitiators for cell encapsulation, there are no adequate options for 2PP. The aim of the present study is to compare effect of the benzylidene-cycloketone based photoinitiator (PI) P2CK with azosulfonate based PI AS7 on cell viability. Human adipose-derived stem cells (ASCs) were encapsulated in 10% methacrylamide-modified gelatin (GelMOD) hydrogel using either P2CK or AS7 via 2PP. The cell viability increased significantly by using AS7 and the material did not present any auto-fluorescence that was experienced with P2CK **Figure 1**. The properties of the hydrogel including stiffness, swelling and elasticity can be fine-tuned by the concentration of the PI and the laser power, creating a versatile platform for in vitro modelling and tissue engineering constructs.

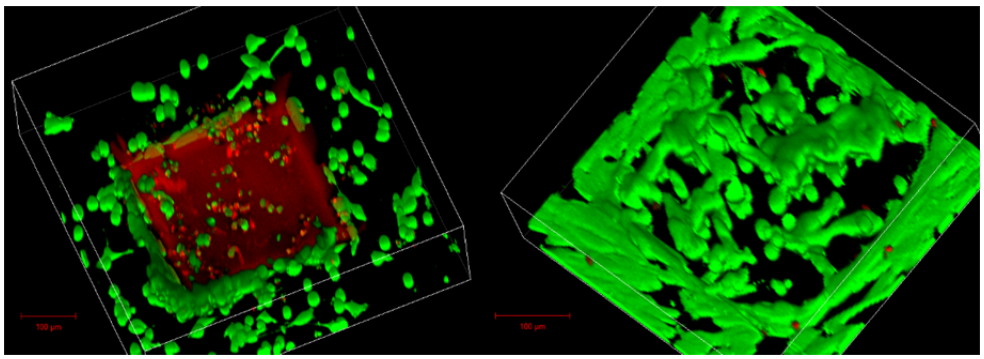

Figure 1. Comparison of P2CK and AS7 on cell viability. (left) 10% GelMOD-95 with 1mM P2CK, resulting in poor cell survival and high auto-fluorescence of the material. (right) 2mM AS7 leading to high cell survival within the printed structures.