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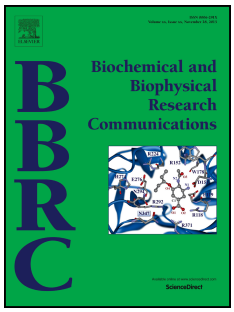

Control of vascular network location in millimeter-sized 3D-tissues by micrometer-sized collagen coated cells

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Control of vascular network location in millimeter-sized 3D-tissues by micrometer-sized collagen coated cells

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Abstract

Engineering three-dimensional (3D) vascularized constructs remains a central challenge because capillary network structures are important for sufficient oxygen and nutrient exchange to sustain the viability of engineered constructs. However, construction of 3D-tissues at single cell level has yet to be reported. Previously, we established a collagen coating method for fabricating a micrometer-sized collagen matrix on cell surfaces to control cell distance or cell densities inside tissues. In this study, a simple fabrication method is presented for constructing vascular networks in 3D-tissues over micrometer-sized or even millimeter-sized with controlled cell densities. From the results, well vascularized 3D network structures can be observed with a fluorescence label method mixing collagen coated cells and endothelia cells,