

세미나 초록

성명	이상진
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발표 주제	A high-density stem cell therapy based on scaffold-free tissue engineering & regenerative medicine
발표 내용	<p>Formation of chondromimetic human mesenchymal stem cells (hMSCs) condensations typically required in vitro culture in defined environments. In addition, extended in vitro culture in differentiation media over several weeks is usually necessary prior to implantation, which is costly, time consuming and delays clinical treatment. Here, this study reports on immediately implantable core/shell microgels with a high-density hMSC-laden core and rapidly degradable hydrogel shell. The hMSCs in the core formed cell condensates within 12 hours and the oxidized and methacrylated alginate (OMA) hydrogel shells were completely degraded within 3 days, enabling spontaneous and precipitous fusion of adjacent condensed aggregates. By delivering transforming growth factor-β1 (TGF-β1) within the core, the fused condensates were chondrogenically differentiated and formed cartilage microtissues. Importantly, these hMSC-laden core/shell microgels, fabricated without any in vitro culture, were subcutaneously implanted into mice and shown to form cartilage tissue via cellular condensations in the core after 3 weeks. This innovative approach to form cell condensations in situ without in vitro culture that can fuse together with each other and with host tissue and be matured into new tissue with incorporated bioactive signals, allows for immediate implantation and may be a platform strategy for cartilage regeneration and other tissue engineering applications.</p>