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강연 제목: Alignment of collagen fibrils for anisotropic organization of 3D tissue constructs
3D 생체 조직의 이등방성 조직화를 위한 콜라젠 섬유의 정렬

Abstract:
Anisotropically organized neural networks are indispensable routes for functional connectivity in the brain, which remains largely unknown. While prevailing animal models require additional preparation and stimulation-applying devices and have exhibited limited capabilities regarding localized stimulation, no in vitro platform exists that permits spatiotemporal control of chemo-stimulation in anisotropic three-dimensional (3D) neural networks. We present the integration of microchannels seamlessly into a fibril-aligned 3D scaffold by adapting a single fabrication principle. We investigated the underlying physics of elastic microchannels' ridges and interfacial sol-gel transition of collagen under compression to determine a critical window of geometry and strain. We demonstrated the spatiotemporally resolved neuromodulation in an aligned 3D neural network by local deliveries of KCl and Ca^{2+} signal inhibitors. We anticipate that our technology will pave the way to elucidate functional connectivity and neurological diseases associated with transsynaptic propagation.

Brief Biosketch
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