Patterned cell culture and a microfluidic culture platform for CNS

패턴된 세포배양 및 중추신경계 신경세포 연구를 위한 미세 유체역학 배양 플랫폼

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Investigation of axonal biology in the central nervous system (CNS) is hindered by a lack of an appropriate in vitromethod to probe axons independently from cell bodies. Here we describe a microfluidic culture platform that polarizes the growth of CNS axons into a fluidically isolated environment without the use of targeting neurotrophins. In addition to its compatibility with live cell imaging, the platform can be used to (i) isolate CNS axons without somata or dendrites, facilitating biochemical analyses of pure axonal fractions and (ii) localize physical and chemical treatments to axons or somata. The platform also serves as a straightforward, reproducible method to model CNS axonal injury and regeneration. The results presented here demonstrate several experimental paradigms using the microfluidic platform, which can greatly facilitate future studies in axonal biology.