

A Comparative Analysis of Neurite Development in PC12 cells Cultured on Nanopillars and Nanopores

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Abstract

The underlying topography of the basal membrane found *in vivo* and of the substrates used *in vitro* influences various cellular activities of attached cells. We investigated the role of substrate topography with nanoscale vertically aligned pillars and pores on the cellular activities of PC12 cells. Cells on nanopillars and nanopores had shorter and fewer neurites per cell and higher cell density than cells on smooth substrates. But cells on nanopores had longer and more neurites per cell and lower cell density than cells on nanopillars. Furthermore, cells on nanopillars were less spread as compared with cells on nanopores. These results suggest that nanopillars restricted cell spreading and inhibited neurite development. When comparing between the nanostructures, nanopillars promoted cell proliferation while nanopores promoted cell differentiation.