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Atomic Force Microscopy Based Cell Shape Index[1] USIENEMFON ADIA-NIMUWA, VOLKAN MUJDAT TIRYAKI, STEVEN HARTZ, KAN XIE, VIRGINIA AYRES, Michigan State University — Stellation is a measure of cell physiology and pathology for several cell groups including neural, liver and pancreatic cells. In the present work, we compare the results of a conventional two-dimensional shape index study of both atomic force microscopy (AFM) and fluorescent microscopy images with the results obtained using a new three-dimensional AFM-based shape index similar to sphericity index [1]. The stellation of astrocytes is investigated on nanofibrillar scaffolds composed of electrospun polyamide nanofibers that has demonstrated promise for central nervous system (CNS) repair. Recent work by our group has given us the ability to clearly segment the cells from nanofibrillar scaffolds in AFM images [2]. The clear-featured AFM images indicated that the astrocyte processes were longer than previously identified at 24h. It was furthermore shown that cell spreading could vary significantly as a function of environmental parameters, and that AFM images could record these variations [3]. The new three-dimensional AFM-based shape index incorporates the new information: longer stellate processes and cell spreading. [1] AWl. Jay, Biophys. J.:15, 205 (1975) [2] VM Tiryaki, et al, Scanning:34, 316 (2012) [3] VM Tiryaki, et al, Int. J. Nanomed.:07, 3891 (2012)

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