



The Physics of Soft and Biological Matter

P.39 Fibrous scaffolds for neural tissue engineering in the auditory system

K Ngamkham

University College London, UK

At present, some types of hearing impairments have a palliative treatment whereas some, especially for those where otic neurons are damaged, cannot be properly treated. Recent findings had shown it possible to use human embryonic stem cell-derived otic neural progenitors (ONPs) as a new mode of treating hearing loss caused by damage to the spiral ganglion neurons (SGNs). To improve the efficiency and overcome some limitations of this treatment, the concept of tissue engineering, which involves an interaction between cells and scaffold, the matrix-mimicking construct, should be applied. Here, we describe the influence of poly(l-lactic acid)(PLLA) aligned fibers on ONP cell morphology, proliferation, neuronal differentiation and establishment of neural polarity in both progenitor and neuralising conditions. Furthermore, the PLLA fibers can be surface functionalized using amphiphilic block copolymers of poly(lactic acid)(PLA)-poly(2-methacryloyloxyethyl phosphorylcholine) (PMPC) and poly(lactic acid)(PLA) - poly[oligo (ethylene glycol) methyl ether methacrylate] (POEGMA) to generate cell inert hydrophilic fibers. By conjugating cell adhesive peptides such as RGD to the hydrophilic block (e.g. POEGMA), could be enhancing both cell adhesion and alignment.