Sensorised “Smart” Scaffold to Monitor Cell Processes based on Impedance Characteristics

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**Abstract.** Currently, one interest in tissue engineering is realizing scaffolds which not only to direct the cell process but also to monitor them. This idea can be realised by transforming a conventional scaffold into a “smart scaffold” that acts as a sensor for cell activities. Adhesive and proliferative cells modify electrical properties of adhesion substrate. Therefore it is possible to monitor their activity by monitoring the impedance of scaffold. Furthermore, impedance techniques have been used to monitor bacterial growth and cell motility of fibroblast cells. For this scope microelectrodes were used, in order to have a stable and non-invasive interface. To investigate the feasibility of designing sensorised and biocompatible scaffolds, we have realised a polymer membrane with embedded carbon nanotubes (CNT), which present electro-conductive properties. In this work we present the cell effect of composite membrane and how it is possible to monitor cell adhesion from its change.

*Keywords*: carbon nanotubes, cell processes, impedance techniques, polymer membrane, scaffolds