CHAPTER 13

Cell Response to Surface Chemistry for Tissue Engineering Applications

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Summary

Tissue engineering involves the use of cells, growth factors and scaffolds to develop a biological substitute to restore, maintain or improve tissue function. The scaffold is mainly used as a mechanical support for cells but is not specifically designed to interact with desired cell populations; yet the initial interaction between cells and the scaffold is very important and will determine the success or failure of the engineered device. There is a large amount of literature covering various aspects of the surface characteristics like topography and chemistry as these surface qualities determine the adsorption of proteins and cells. This review highlights the use of intelligent surfaces capable of guiding cell attachment, spreading, controlling cell morphology and affecting cell differentiation and covers surface modification methods such as surface coating or creating well defined topographies. This review considers 2D and 3D surfaces useful for tissue engineering applications. The most important advantages and disadvantages of the various methods are also discussed.

KEY WORDS: Surface chemistry, surface functionalisation, tissue engineering

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