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Fibrocyte - A multi-potential autologous cell source for tissue engineering

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Abstract

Recent advances in biotechnology and bioengineering have offered novel approaches to engineer three-dimensional tissues for the augmentation or replacement of injured or diseased organs. An appropriate cell source is a fundamental requirement for such approaches. Considerations in selecting a cell source include the accessibility and availability of biocompatible cells, ease of incorporation of cells into a suitable biodegradable scaffold, and capacity of the seeded cells to synthesize appropriate proteins to establish intercellular connections and an extracellular matrix. In this study we investigated the potential of fibrocytes as an autologous cell source for tissue engineering. Fibrocytes are monocyte-lineage cells in peripheral blood that express both hematopoietic and mesenchymal lineage makers. In our experiments, fibrocytes were easily isolated and differentiated into mature fibroblasts or epithelial cells under permissive in vitro conditions. Newly differentiated fibrocyte-dervied fibroblasts survived well in a collagen, type I-enriched scaffold and produced additional collagens and other extracellular matrix structural proteins to form an immature stroma. This engineered stroma supported epithelial cell attachment, proliferation and stratification, resulting in a multilayered engineered tissue substrate. These data support the potential of blood-isolated fibrocytes as an easily obtained autologous cell source for tissue engineering

Biography

Changying Ling has completed her Ph.D. from Rutgers University and postdoctoral trainings from Massachusetts Institute of Technology. She is an Associate Research Scientist in the Department of Surgery, Division of Otolaryngology, University of Wisconsin School of Medicine and Public Health. She has published more than 25 papers in reputed journals.