Scaffolds for Cartilage Regeneration: To Use or Not to Use?

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Abstract

Joint cartilage has been a significant focus on the field of tissue engineering and regenerative medicine (TERM) since its inception in the 1980s. Represented by only one cell type, cartilage has been a simple tissue that is thought to be straightforward to deal with. After three decades, engineering cartilage has proven to be anything but easy. With the demographic shift in the distribution of world population towards ageing, it is expected that there is a growing need for more effective options for joint restoration and repair. Despite the increasing understanding of the factors governing cartilage development, there is still a lot to do to bridge the gap from bench to bedside. Dedicated methods to regenerate reliable articular cartilage that would be equivalent to the original tissue are still lacking. The use of cells, scaffolds and signalling factors has always been central to the TERM. However, without denying the importance of cells and signalling factors, the question posed in this chapter is whether the answer would come from the methods to use or not to use scaffold for cartilage TERM. This paper presents some efforts in TERM area and proposes a solution that will transpire from the ongoing attempts to understand certain aspects of cartilage development, degeneration and regeneration. While an ideal formulation for cartilage regeneration has yet to be resolved, it is felt that scaffold is still needed for cartilage TERM for years to come.

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