

Chapter 9

In Vitro and In Vivo Evaluation of 1-(3-Dimethylaminopropyl)-3-Ethyl Carbodiimide (EDC) Cross-Linked Gum Arabic–Gelatin Composite as an Ideal Porous Scaffold for Tissue Engineering



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1 Introduction

Restoration of lost tissue and organs is one of the contemporary challenges of health care. Tissue engineering is an alternative to solve the deficiency of transplants and organs. It deals with the development of tissues over synthetic biocompatible polymers. This involves the fabrication of scaffolds and seeding of either patients' own cells or cell from other sources and differentiation to the required type of tissue. One of the key steps in tissue engineering is the development of scaffolds with optimum cell friendly properties. Ideally, a scaffold should be biocompatible with the controllable degradation rate, highly porous with interconnectivity, optimum mechanical strength and should be able to initiate chemical signals to guide tissue growth.

The success of regenerative medicine lies mainly in the development of materials having defined positive interaction with cells. Porous matrices with predefined structural and mechanical properties—hydrogels, sponges and fibrous meshes have been widely used as three-dimensional supports for adhesion of the cell, proliferation and ECM formation [1–6]. Natural polymer-based porous matrices are synthesized from biopolymers, like cellulose [7] hyaluronic acid [8] collagen [9], chitosan [10] and

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