

Development of Novel Hydrogels for Biomedical Application

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Abstract. In recent years, hydrogels have become the most favourable materials used for cell encapsulation, as their high water content and rubbery nature mimic many natural biological tissues, they also have mechanical and structural properties similar to many tissues, can be processed under relatively mild conditions and delivered in a minimally invasive manner, allowing reduction of undesirable side effects [1,i]. Hydrogels are composed of either natural or synthetic polymers. Since the first successful application of hydrogels in cell encapsulation was achieved by Lim and Sun, 1980 [ii], both synthetic and natural based hydrogels have been advanced with numerous applications with varying levels of development. Most researchers focus on natural hydrogels as they are known to provide biological signals *in vivo* to encourage cell proliferation and differentiation, both of have been shown to be crucial for successful implantation. However, synthetic hydrogels have physical and mechanical properties that can be easily manipulated. In this study, synthetic hydrogels of a poly(vinyl alcohol) solution are prepared by a freeze/thawing method for the study of cell encapsulation.