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Poly(3-hydroxybutyrate) graft copolymer dense membranes for human mesenchymal stem cell growth

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Abstract

Background: The use of novel materials as an artificial extracellular matrix for stem cell growth is a current strategy of increasing interest for regenerative medicine. Here, we prepare thermal-remolded membrane scaffolds from poly(3-hydroxybutyrate) grafted with 2-amino-ethyl methacrylate hydrochloride. However, it is unclear whether these membranes are useful for tissue engineering.
Results: The mechanical properties, tribology, and morphology of the dense membranes were assessed. The results show that tensile strain at break and roughness of the compressed membrane decrease with increasing graft degree. Moreover, graft copolymer membranes showed lower resistance to scratching, greater degree of swelling and higher brittleness than un-grafted P(3HB) films. Thus, it effectively supports the growth of dermal fibroblast, as demonstrated by epifluorescence microscopy.
Conclusions: It is concluded that the developed membrane can be properly used in is the restoration of skin tissue.

Keywords: Artificial extracellular matrix; Dense membranes; Membrane scaffolds; Mesenchymal; Methacrylate; Regenerative medicine; Scaffolds; Stem cell growth; Stem cell growth; Thermal properties; Thermal-remolded.

1. Introduction