

Peptide conjugate on multilayer graphene oxide film for the osteogenic differentiation of human Wharton's jelly-derived mesenchymal stem cells

ABSTRACT

Graphene oxide (GO) is extensively studied as a template material for mesenchymal stem cell application due to its two-dimensional nature and unique functionalization chemistries. Herein, a new type of peptide-conjugated multilayer graphene oxide (peptide/m-GO film) was fabricated and used as biomaterial for culturing human Wharton's jelly-derived mesenchymal stem cells (WJ-MSCs). The characterization of the peptide/m-GO films was performed, and the biocompatibility of the WJ-MSCs on the peptide/m-GO films was investigated. The results demonstrated that the peptide conjugate on the m-GO film did not hamper the normal growth of WJ-MSCs but supported the growth of WJ-MSCs after the 6-day culture period. In addition, the osteogenic differentiation of WJMSCs on the peptide/m-GO films was enhanced as compared with the parent m-GO film. Therefore, such peptide-conjugated m-GO films could provide a highly biocompatible and multifunctional 2D material to tailor the potential application of WJ-MSCs in bone tissue regeneration.