Graphene-matrix nanotopography as a biomimetic scaffold for
engineering structure and function of stem cells

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초 록: It is a great challenge to design and develop biologically inspired hierarchical platforms composed of nano and sub-nanopatterned topography for cell and tissue engineering. In this work, we have developed the novel platforms as a synthetic extracellular matrix using graphene and nanopatterned substrates for promoting functions of cells. Monolayer graphene was coated on the nanopatterned matrix with various nanoscale parallel ridges and grooves as scaffolds with hierarchical structures. Strictly, it was found that graphene-matrix nanotopography platforms could promote the functions of cells including stem cells, osteoblast cells, and endothelial cells through the synergically controlled cell-substrate and cell-cell interactions. Our results proposed that the graphene-based nanopatterned scaffolds would allow us to set up an efficient strategy for designing advanced biomimetic engineering systems toward stem cell-based tissue regeneration.