Time-regulated drug delivery system based on coaxially incorporated platelet α-granules for biomedical use.

Abstract
AIM: Platelet derivatives serve as an efficient source of natural growth factors. In the current study, α-granules were incorporated into coaxial nanofibers.
MATERIALS & METHODS: A nanofiber scaffold containing α-granules was prepared by coaxial electrospinning. The biological potential of the nanofiber scaffold was evaluated in chondrocyte and mesenchymal stem cell cultivation studies. Additionally, the concentration of TGF-β1 was determined.
RESULTs: Microscopy studies showed that intact α-granules were incorporated into the coaxial nanofibers. The cultivation tests showed that the novel scaffold stimulated viability and extracellular matrix production of chondrocytes and mesenchymal stem cells. In addition, the concentration of growth factors necessary for the induction of cell proliferation significantly decreased.
CONCLUSION: The system preserved α-granule bioactivity and stimulated cell viability and chondrogenic differentiation of mesenchymal stem cells. Core/shell nanofibers incorporating α-granules are a promising system for tissue engineering, particularly cartilage engineering.

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