



Title: Effect Nanogold-collagen Composite of Mesenchymal Stem Cell for Vascular Biomaterial Application

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Object: To explore the biocompatibility, biological function and vascular differentiation ability of mesenchymal stem cells (MSC) while seed on collagen-Au nanogold composite film by using *in vitro* study.

Methods: Type I collagen containing a small amount (17.4, 43.5, and 174 ppm) of nanogold particle (Au) were prepared in this study. The collagen and collagen-Au nanogold composites (Col-Au) were analyzed by the UV-Vis spectroscopy, surface-enhanced raman spectroscopy and atomic force microscopy. The interaction between collagen and Au was determined by infrared spectra assay. The effect of Au on the biocompatibility capacity of collagen, investigated by the cell growth and reactive oxygen species generation of MSC as well as the monocyte and platelet activation effect.

Results: It was suggested that collagen-Au 43.5 ppm had better biocompatibility ability than collagen. Moreover, MSC highly expressed the levels of v3 integrin/CXCR4, focal adhesion kinase (FAK), matrix metalloproteinase-2 (MMP-2), and Akt/endothelial nitric oxide synthase (eNOS) proteins when grown on the collagen-Au (43.5 ppm) after stimulation by vascular endothelial growth factor (VEGF) or stromal derived factor-1 (SDF-1).

Conclusion: Collectively, collagen-Au may promote the better biological function as well as promoted the endothelial differentiation ability of MSC. It was suggested that collagen-Au may be used a novel biomaterials for vascular regeneration.

References:

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