Oligonucleotide Coating of Co-Cr Stents for EPC Attachment

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INTRODUCTION

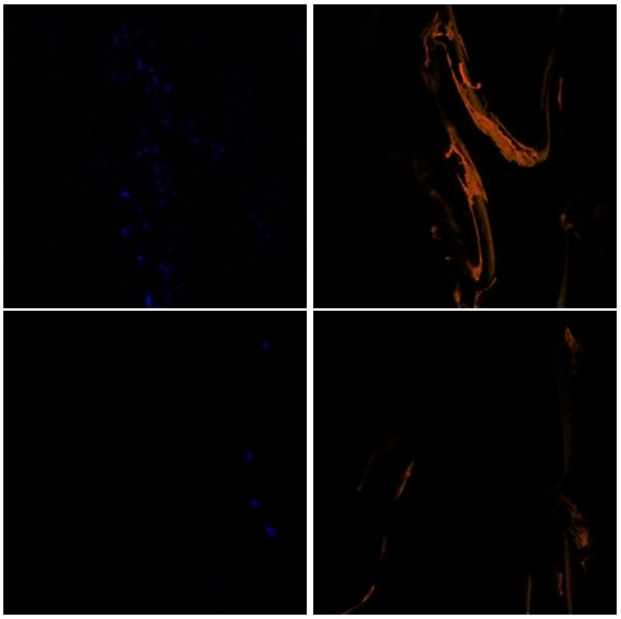
Stent surface modification could overcome side effects due to stent deployment. Moreover, the stent surface itself can result in hypersensitivity. As the native endothelium still represents the ideal surface, various endothelialization strategies have been attempted to improve the stent biocompatibility and non-thrombogenicity. Endothelial progenitor cells (EPCs) capture could accelerate endothelialization, preventing both thrombosis and restenosis. Aim of this work was the functionalization of Co-Cr stents with aptamers able to bind EPCs.

EXPERIMENTAL METHODS

As model surfaces, Co-Cr discs were used in addition to Co-Cr stents. Discs were aminosilanized with APTES; the reaction was assessed by ATR-FTIR. Surfaces were then activated with SMCC before deposition of an endothelial-specific 73-b thiolated DNA oligonucleotide (O.N.) labeled with 5',6'FAM. Immobilization of labeled O.N. was demonstrated by Confocal Laser Scanning Microscopy (CLSM). Porcine blood EPCs (10^4/ml) were seeded on unmodified or O.N.-discs and cultured for 4d before either MTT viability assay or staining (DAPI: nuclei; TRITC-phalloidin: F-Actin) and CLSM. Binding of 5',6'FAM-O.N. to EPCs was assessed by flow cytometry. The same protocol was performed with stents. $2*10^4$ EPCs/ml were seeded on unmodified or modified stents and cultured for 4d, before staining and CLSM.

RESULTS AND DISCUSSION

Co-Cr surfaces resulted efficiently coated with aminosilane; the binding of fluorescent single-strand O.N. was confirmed by LSCM. Specific cell-capturing O.N. coating significantly increased EPC adhesion and viability ($p<0.01$), with an increased number of cell clones. Flow cytometry confirmed cell binding. Stents were successfully functionalized; both O.N. and EPC binding were confirmed by LSCM.



"Figure. EPC adhesion to O.N.-stents (1st row) as compared to unmodified surfaces (2nd row)."

CONCLUSION

Our study demonstrated the suitability to fabricate biofunctionalized stents with EPC specificity. Such stents could be used as a strategy of *in vivo* endothelialisation with patients'autologous cells.

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