# Immobilization of recombinant human activated protein C to poly (ethylene terephthalate) (Dacron): Creation of a novel anti-coagulant surface.

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**Purpose**: Thrombosis remains a significant and potentially catastrophic complication of polyethylene terephthalate (Dacron) prosthetic vascular graft implantation. Numerous attempts have been made to create a novel surface that reduces the adverse effects of blood interaction with the material. Activated protein C (APC), an active form of protein C that is activated by thrombin/thrombomodulin complex during blood clotting, inhibits the coagulation cascade by cleaving Va and VIIIa and thus is a potent anticoagulant. The purpose of this study was to immobilize APC onto a bifunctional Dacron surface and evaluate the anticoagulant activity of the modified Dacron surface. **Methods**: Dacron was modified via exposure to ethylenediamine (EDA) to create amine and carboxylic acid sites within the polyester backbone. APC was modified with the cross linker sulfo-SMCC at various molar ratios of the cross linker and applied to the bifunctionalized Dacron constructs under varied experimental conditions. An *in vitro* flow loop was used to evaluate structural stability of the APC-SMCC bound to the Dacron surface. A chromogenic assay and clotting assay were used to evaluate the enzymatic activity of crosslinker-modified and surface-bound APC (under static experimental condition). **Results/discussion**: Crosslinker-modified APC activity in solution remained unchanged with SMCC ratio at 1:2 compared to native APC (ratio 1:0), and decreased with ratio greater than 1:10. When surface-bound, APC activity increased with increasing ratio, whether it is due to increased binding is yet to be determined. Under simulated arterial flow conditions, no significant loss of surface-bound APC was seen up to 7 days. Under static conditions, surface bound APC activity also remained unchanged for up to 7 days suggesting surface bound APC constantly cleaves its substrate without losing its ability within the time period tested. **Conclusions**: These results illustrate that the anticoagulant APC can be immobilized onto a clinically utilized biomaterial (Dacron) while still maintaining its enzymatic activity, which may provide prevention of localized clot formation.