**Abstract**

Polyvinyl alcohol hydrogel (PVA) is a water-soluble synthetic polymer with an increasingly use in biomedical applications including vascular grafting. It was argued that the copolymerization of PVA with dextran (Dx) can result in an improvement of blood/biomaterial interactions. The focus of this experimental work is to assess that interaction through an *in vivo* and *in vitro* evaluation of the coagulation system activation. The thrombogenicity of the copolymer was determined by quantification of the adhered platelets, by the lactate dehydrogenase assay (LDH), quantification of whole blood clotting time and by quantification of platelet activation assessed by flow cytometry. The thrombin-antithrombin complex value was also determined. The obtained results for the *in vitro* assays suggested a non-thrombogenic profile for PVA/Dx. Additionally; the *in vivo* determinations were focused in the coagulation and hematological profile assessment in the animal model (sheep) after PVA/Dx vascular graft implantation. For coagulation homeostasis assessment, the intrinsic and extrinsic pathway activation was measured by the determination of prothrombin time (PT), activated partial thromboplastin time (APTT). Other coagulation activation and inflammatory markers like D-dimers, interleukin-6 (IL-6) and C-reactive protein (CRP) were also assessed. The PVA/Dx (90/10, v/v) copolymer tended to inhibit the platelet adhesion/activation process and the contact activation process for coagulation. Those results were also confirmed with the *in vivo* experiments where the measurements for APTT, IL-6 and CRP parameters were normal considering the species normal range values. The response to those events is an indicator of the *in vitro* and *in vivo* hemocompatibility of PVA/Dx and it allows us to select this biomaterial for further pre-clinical trials in vascular reconstruction.