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Characterization of a Polymer Surface With Sequentially Immobilized Proteins

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Characterization of a polymer surface with sequentially immobilized proteins

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To overcome the procoagulant processes on the surfaces of biomaterials, surface modifications have been undertaken to achieve hemocompatability characteristics that are comparable to the native endothelium. Our immediate goal in this paper is to design and develop strategies to inhibit thrombin activation on biomaterial surfaces. We will use biodurable polyurethane (PU) as the background polymer and synthesize biomaterial surfaces containing two immobilized recombinant proteins. To attain our objective, we have first undertaken the surface modification of biodurable polyurethane (chronoflex-AR) to enable the sequential immobilization of proteins via a bi-dentate bridge, a novel modification strategy. We have verified the creation of the bridge by surface FT-IR conducted on each intermediate and the product of the synthesis. We estimate a yield of 0.25 μmol of the proposed bi-dentate bridge/cm^2 polyurethane. We have characterized the protein binding on modified PU surfaces by immunofluorescence microscopy. As expected no visible fluorescence was detected on unmodified surfaces, while PU surfaces that has immobilized proteins via the bridge gave fluorescent signals, indicating the successful immobilization as per design. Results on surface modification and characterization of the resultant surface by FT-IR and dynamic mechanical analyses and immunofluorescence microscopy will be presented.