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A method for the non-covalent immobilization of heparin to surfaces

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Abstract

The interaction of heparan sulfate (HS) with specific proteins facilitates a wide range of fundamental biological processes including cellular proliferation and differentiation, tissue homeostasis, and viral pathogenesis. This multiplicity of function arises through sequence diversity within the HS chain. Heparin, which is very similar in structure to the sulfated regions of HS, is an excellent model for studying HS–protein interactions. The development of high-throughput enzyme-linked immunosorbent-like assays using surface-immobilized heparin has been hindered by the inability of this glycosaminoglycan to adhere to microtiter surfaces. Here we report the passive noncovalent adsorption of heparin onto microtiter wells following their treatment by plasma polymerization; there was no detectable binding of functional heparin onto untreated plates. Heparin immobilized in this way was able to interact with four different heparin-binding proteins tested, i.e., TSG-6, chemokines IL-8 and KC, and complement factor H. Heparin

preparations ranging in size from high molecular weight to a defined decasaccharide could be adsorbed onto these plates in a functionally active form. Since plasma polymerization is possible for virtually any surface, this technique is likely to be of general use in the identification and characterization of heparin/HS-binding proteins in a wide range of applications.



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