

MAR05-2004-003773

Abstract for an Invited Paper  
for the MAR05 Meeting of  
the American Physical Society

### **Proteins at the Biomaterial Electrolyte Interface<sup>1</sup>**

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Proteins adsorb rapidly onto solid and polymeric surfaces because the association process is in the vast majority of cases energetically favourable, i.e. exothermic. The most common exceptions to this rule are hydrophilic interfaces with low net charge and high mobility, e.g. immobilized PEGs. Current research in the research area tries to understand and control unwanted and wanted adsorption by studying the adsorption kinetics, protein surface binding specificity, protein exchange at interfaces, and surface protein repulsion mechanisms. In blood plasma model systems humoral cascade reactions such as surface mediated coagulation and immune complement raise considerable interest due to the immediate association to blood compatibility, and in tissue applications the binding between surfaces and membrane receptors in cells and tissues. Thus, the understanding of interfacial events at the protein level is of large importance in applications such as blood and tissue contacting biomaterials, in vitro medical and biological diagnostics, food industry and in marine anti-fouling technology. Well described consequences of adsorption are a lowered system energy, increased system entropy, irreversible binding, conformational changes, specific surface/protein interactions, and in biomedical materials applications surface opsonization followed by cell-surface interactions and a host tissue response. This lecture will deal with some mechanisms known to be of importance for the adsorption processes, such as the influence of surface chemistry and surface energy, the composition of the protein solution, the Vroman effect, and residence time. Examples will be shown from ellipsometric experiments using different model surfaces in single/few protein solutions, and specific attention be given to blood serum and plasma experiments on coagulation and immune complement at interfaces.

<sup>1</sup>Linköping County/Linköping University strategic research program “Materials in Medicine”