

Abstract Submitted  
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**Control of Protein Adsorption on Surfaces with Grafted Polymers** IGAL SZLEIFER, Northwestern University, JAN GENZER, North Carolina State University — Non-specific protein adsorption is the first process in the foreign body response. The molecular design of surface modifiers that prevent non-specific adsorption requires the understanding of the factors that determine protein adsorption. The hierarchy of time and length scales present in the adsorption requires a multiscale approach to treat the complexity of the process. We will discuss the driving forces that determine protein adsorption and how end-grafted polymers can be used to modify the ability of the proteins to reach the surface. We will show the differences between preventing protein adsorption thermodynamically and kinetically. For practical applications the relevant time scales are hours or days. We will show how a molecular approach can be used to study these time scales. In particular we will show two different levels of approximations based on a molecular understanding of the adsorption process that enables, through the proper integration of degrees of freedom, to determine the kinetics of adsorption over 16 orders of magnitude in time. This approach is applied to explain recent experimental observations carried out on orthogonal modified surfaces that suggest that protein adsorption is a universal function of the product of grafted polymer surface coverage and molecular weight.

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