

Ion-Exchange Chromatography of Proteins: The Inside Story

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Despite its inherent inefficiencies, chromatography remains the workhorse for protein purification in the pharmaceutical and biotechnology industries, with ion-exchange the most widely used mode. Many aspects of a chromatographic process are still optimized empirically, but there is an increasing recognition that a mechanistic understanding of the relation between adsorbent and protein structure and separation performance can be valuable in process design and optimization. This presentation will cover efforts to obtain such insights into the behavior of proteins inside chromatographic adsorbents. Approaches to be discussed include powerful experimental tools such as confocal microscopy and scattering methods, but there is also a critical role for fundamental principles of engineering, albeit specialized for the peculiar physicochemical properties of protein solutions.

Abraham Lenhoff is the Allan P. Colburn Professor and Chair of the Department of Chemical and Biomolecular Engineering at the University of Delaware, where he has been on the faculty since 1984. He earned a Bachelor's degree from the University of Cape Town and Master's and Ph.D. degrees from the University of Wisconsin, all in chemical engineering. At Delaware he is also director of the NIH-funded Center for Membrane Protein Production and Characterization at University of Delaware. His research is primarily on application of principles of thermodynamics, transport phenomena, biophysics and colloid science to protein separations and phase behavior, especially chromatography and crystallization.