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Chromatography for Protein Purification

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Various proteins are finding highly valuable applications in various industrial areas, as demonstrated for example by monoclonal antibodies for therapeutic applications. In many cases these proteins are needed in significant amounts but are produced through fermentation processes which lead to supernatant concentrations which are at best in the order of a few grams of protein per litre. This, together with the high purity and yield required, makes the purification process a significant part of the total production cost of these materials. Current technologies are based on stationary phases and chromatographic processes which are inadequate being largely based on previous knowledge about small molecule separations.

Through a clear understanding of the fundamental processes involved in the chromatographic separation of biomolecules, quantitative models can be derived which can guide to the definition of new stationary phases and processes which provide a breakthrough in this field. This refers in particular to the development of stationary phases, including monoliths, with highly controlled pore structure, and of innovative continuous processes able to integrate gradients of a suitable modifier. A prototype of such a process, referred to as Multi-column Counter-current Solvent-Gradient Purification (MCSGP), has been realized and its performance is discussed. Several industrial purification processes are considered, such as the purification of a growth hormone and a monoclonal antibody, where the traditional protein-A based stationary phases have not been used.

A comparison of the performance of the MCSGP-unit with that of the currently available technologies indicates significant improvements in terms of yield, productivity and solvent requirement.

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Seminars will be held at 11:30 am in CPSE Seminar Room (Coffee at 11 am),
C615 Roderic Hill Building, South Kensington Campus, Imperial College

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