523a Cartridge Filter Separation System: an Alternative to Column Chromatography in Downstream Purification of Protein Therapeutics

Masayuki Nakamura, Kelly J. Gibbens, Robert T. Fitzsimons, Andrew W. Rabins, Kannan Seshadri, Steve M. Larsen, Douglas A. Hanggi, Catherine A. Bothof, Larry J. Carson, Gustov H. Castro, James I. Hembre, Patrick L. Coleman, Jarald K. Rasmussen, and Steven M. Heilmann

We describe a potential replacement for traditional chromatography columns, such as Protein A affinity columns, in typical downstream purification schemes. The system uses an approach that renders the traditional packed column as an extremely large diameter bed using pleated filters with recirculation flow. Therefore, dynamic capacity or frontal loading characteristics of the media do not limit the capture step. Very high flow rates can be utilized, with negligible pressure drops, resulting in high production rates. The chromatography media are also utilized much more efficiently, with loading approaching much closer to saturation capacity. The approach also allows for greater flexibility in choice of media; smaller particle diameters and morphologies can be utilized in a facile manner. Capture kinetics and recovery yield will be discussed based on standard equilibrium isotherms, recirculation flow profile and extra/intra-media mass transfer, both with experimental result and models. Further results utilizing ion-exchange media will also be discussed.