

## Aqueous two-phase system applied microchannel for protein separation

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There exist numerous methods for protein separation: dialysis, membrane separation, chromatography and solvent extraction. Among them, we took aqueous two phase system (ATPS). ATPS is biocompatible, so it is widely used for the pretreatment of samples. We observed protein partitioning in Polyethylene glycol (PEG)-potassium phosphate ATPS with various pH and PEG molecular weights. In this experiment PEG-potassium phosphate system was selected because pH control is possible without addition of other salts. Bovine serum albumin (BSA) was used as a sample. With the data in bulk system, we applied ATPS to the PDMS-based microfluidic device for protein separation. Separation skill in microchannel, especially for protein, is very important for the development of micro total analysis system ( $\mu$ -TAS) and can be extended to a continuous separation process. By introducing two separate flows (top and bottom phases) into the microchannel, we performed protein extraction experiment. We manipulated flow rates to control retention time and width ratio of two flows. The efficiency of protein extraction was enhanced with the increase of retention time and the decrease of channel width. This is mainly because the main driving force of extraction is related to the diffusion rate of protein.