

Methods in ENZYMOLGY

Volume 228

Aqueous Two-Phase Systems

Edited by

Harry Walter

Göte Johansson

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Methods in Enzymology

Volume 228

AQUEOUS TWO-PHASE SYSTEMS

METHODS IN ENZYMOLOGY

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Preface

Partitioning of biomaterials in aqueous two-phase systems is a general and sensitive method for purification of and analytical studies on cell constituents of various sizes including proteins, nucleic acids, membranes, and cell organelles. Whole cells can also be fractionated and aspects of their surface properties gauged from their partitioning behavior. The two-phase systems often provide an excellent milieu in which biochemical activities of biomaterials are not only retained but are often stabilized.

The use of two-phase systems is simple, and can be carried out without the use of sophisticated equipment. Section I in this volume deals with fundamental properties of the phases and techniques of partitioning, including a description of devices used in multistep extraction processes. Section II presents an assortment of purification procedures for proteins and nucleic acids primarily by use of phase-constricted affinity ligands.

In addition to their use in the purification of biomaterials, aqueous two-phase systems can also be used to study physical properties of macromolecules and their behavior in solution. Such methods are described in Section III with examples given for determining protein hydrophobicity or charge, protein-protein interaction and protein-ligand binding, isoelectric point, and conformational changes.

The absence of solid supports or adsorptive surfaces, as exist in chromatography, makes aqueous two-phase systems ideal for the separation and study of cell particles by partitioning. Section IV gives procedures for partitioning of particulates both for purification, including the isolation of highly purified plasma membranes (even of vesicles of desired sidedness), and for analytical studies such as the tracing of cell surface changes that accompany normal or abnormal biological processes.

The ease with which procedures using the two-phase systems can be scaled up makes them valuable tools in biotechnology. Section V presents selected downstream processes for the extraction of specific proteins of commercial interest and of other large-scale applications such as the concentration of viruses and the removal of microorganisms from technically employed liquids.

We hope that this volume, which represents the sole, currently available, collection of procedures devoted to partitioning in aqueous two-phase systems, will prove useful to those who wish to test this versatile methodology on their own specific problems by guiding them along a shorter and smoother path to success.

HARRY WALTER
GÖTE JOHANSSON

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