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RECOMMENDATIONS FOR STANDARDIZATION OF NOMENCLATURE IN AFFINITY CHROMATOGRAPHY

At the Third Enzyme Engineering Conference held in Portland, Oregon, on August 3–8, 1975, under the auspices of the Engineering Foundation Conferences, the undersigned participants met as an ad hoc Committee to discuss the possible standardization of terminology encountered in a variety of techniques employed in the separation of biological molecules that depend on specific intermolecular interactions and are known collectively as "affinity chromatography" or "biospecific affinity chromatography." It is now recognized that isolation and purification of biological molecules involving these methods of separation has become a major tool in biochemistry, and that a lack of conformity in terminology is causing ambiguity in the communication and understanding of vital facts. The following recommendations are made in the belief that the standardization of the nomenclature will facilitate both communication and literature surveys using key words.

Recommendation 1. Choice of a Name for the Technique of Separation

Techniques are now available for the separation of synthetic and biological molecules and polymers of varying sizes based on the principle that the molecule being isolated interacts specifically with another molecule that is generally immobilized on an insoluble polymer. A variety of related techniques that use this general principle but involve different modes of interaction have recently been developed and have been given names such as "covalent chromatography" and "hydrophobic chromatography."

WHEREAS, the suffix "chromatography" in all these names is in itself a misnomer, many of these terms have now become established, if only because of familiarity through publication. For example, separation of proteins by "gel filtration" is often referred to as "chromatography" through a gel column, even though it is well known that the resolution of the different proteins is primarily a separation on the basis of size, as a result of variations in penetration into gel particles; adsorption is admittedly a factor involved in some cases.

WHEREAS, the need to choose an all-inclusive term to describe the processes of separation that involve specific interactions between biological molecules was recognized to exist, if only for brevity, the inherent difficulties soon became apparent. Despite arguments running both for and against the various terms discussed, the two-worded phrase *affinity chromatography*, which is currently preferred by a majority of scientists, was found to be acceptable and adequate and is defined as follows:

> Affinity chromatography is a process involving the separation of molecules that takes advantage of biospecific interactions.

Recommendation 2. Choice of Terminology and Definition of Units of Expression

Support: The insoluble polymer on which a ligand is immobilized is called the *support*. The term *matrix*, which has thitherto been used synonymously with *support*, represents the array of sites available on the support for either or both the physical and the chemical binding of the ligand.

Ligand: The ligand is the specific molecule that interacts with the biological molecule to be separated. This ligand may be coupled to the support either directly or through another molecule or molecules called a spacer, which separates the support from the ligand by a suitable distance, thus minimizing steric hindrance. Chemical groups connect the spacer to the ligand or the support (Fig. 1). It may be easier to express a system verbally—e.g., support (matrix):connector:spacer:connector:ligand—than to give an exact chemical description. This being the case, the author will probably prefer to define his method of linkage in the experimental section and mention only the support (matrix):ligand (e.g., agarose:AMP) in the remaining text.

Ligand Concentration of the Column: In some cases, the phrase "specific activity" or "capacity" of the column has been used rather imprecisely to specify the ligand concentration of the column, which is best expressed as micromoles of ligand per gram (μmol/g) dry weight of the gel support or μmol/ml packed gel support. In the former case, the conditions of drying, should be indicated; in the latter, the procedure should be

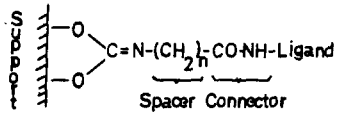

FIG. 1. Scheme representing terminology.

specified (for example: "The gel is sucked dry in a Büchner funnel until the surface cracks").

In cases where macromolecules such as proteins, antigens, or antibodies act as ligands, the specific activity should be expressed as milligrams of ligand per gram (mg/g) of support or mg ligand/ml packed gel support.

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