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*bioaffinity
chromatography*

second, completely revised edition

Jaroslava Turková

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Contents

Preface	XVII
Chapter 1	
Introduction	1
References	7
Chapter 2	
The principle, history and use of bioaffinity chromatography	9
2.1. The principle of bioaffinity chromatography and noncovalent interactions in complementary binding sites of biospecific complexes	9
2.2 History and use of bioaffinity chromatography	14
References	27
Chapter 3	
Choice of affinity ligands (affinants)	31
3.1 Highly specific and group-specific matrices	31
3.2 Enzymes and their effectors	35
3.2.1 Naturally occurring high molecular weight and synthetic low molecular weight inhibitors	38
3.2.2 Coenzymes	40
3.2.3 Dyes	43
3.2.4 Substrates	49
3.2.5 Other bioaffinity ligands	51
3.2.6 Use of immobilized enzymes	54
3.3 Antibodies and antigens	56
3.4 Lectins, glycoproteins and saccharides	66
3.4.1 Importance of carbohydrate analysis	66
3.4.2 Lectins, isolation and application	67

VI

3.4.3 Antibodies against carbohydrate antigens	74
3.4.4 Boronic acid ligands	75
3.5 Nucleotides and nucleic acids	76
3.5.1 Oligonucleotides and polynucleotides	76
3.5.2 Affinants of nonbiological origin	80
3.5.3 Antibodies against polynucleotides	81
3.5.4 Protein-nucleotide or nucleic acid interactions	81
3.6 Receptors, binding and transport proteins, hormones, vitamins, growth factors, lipids and other substances	85
3.6.1 Receptor substrates	85
3.6.2 Antibodies against receptors	86
3.6.3 Receptor-affinity chromatography	87
3.6.4 Vitamins, lipids, hormones and other substances	89
3.7. Specific peptides	90
3.8 Biotin and avidin or streptavidin	93
3.9 Cells and viruses	99
3.9.1 Lectins and glycoconjugates	99
3.9.2 Antibodies and antigens	101
3.9.3 Other affinity ligands	103
3.10 Commercially available insoluble affinants	105
References	106

Chapter 4

General considerations on affinant - sorbent bonding	113
4.1 Steric accessibility	116
4.1.1 Nonporous and highly porous solid supports	116
4.1.2 Spacer molecules	122
4.2 Microenvironmental effect of matrix nature	130
4.3 Conformation, oriented immobilization and stability of attached affinant	134
4.3.1 Oriented immobilization by use of biospecific complex formation	137

4.3.2 Stabilization of trypsin by use of multipoint attachment	140
4.3.3 Stabilization by use of hydrophilization	145
4.3.4 Carbohydrates as a tool for oriented immobilization of glycoproteins and RNA	146
4.4. Concentration of the affinant on the matrix	149
4.5 Effect of the heterogeneity of the immobilized affinants	158
4.6 Non-specific sorption	161
4.6.1 Control of non-specific binding	161
4.6.2 Ionic and hydrophobic effects and suppression of secondary interactions.	163
4.6.3 Compound affinity	165
References	166

Chapter 5

Solid matrix supports	171
5.1 Required characteristics	171
5.2 Biopolymers	175
5.2.1 Cellulose and its derivatives	176
5.2.2 Dextran gels	178
5.2.3 Agarose and its derivatives	180
5.3 Synthetic copolymers	184
5.3.1 Polyacrylamide supports and their derivatives	185
5.3.2 Hydroxyalkyl methacrylate supports	188
5.3.3 Oxirane acrylic beads	190
5.3.4 Hydrophilic acrylate-based supports	191
5.3.5 Hydrophilic vinyl polymers	192
5.4 Combination of biopolymers with synthetic polymers	193
5.5 Inorganic supports	197
5.5.1 Controlled pore glass	198
5.5.2 Porous and nonporous silica	200

VIII

5.5.3 Iron and nickel oxides	206
5.6 Nylon membranes and tubes	207
5.7 Other supports	209
References	211

Chapter 6

Survey of the most common coupling procedures	215
6.1 Effect of the nature of proteins and solid supports	216
6.2 Support modification and affinity ligand immobilization	218
6.2.1 Epoxide-containing supports	218
6.2.2 Hydrazide derivatized solid supports	223
6.2.3 Periodate oxidation	232
6.2.4 Glutaraldehyde activation technique	234
6.2.5 Cyanogen bromide activation	237
6.2.6 Coupling with condensation agents	241
6.2.7 Active esters	244
6.2.8 Activation with carbonylating reagents	247
6.2.9 Triazine method	250
6.2.10 Reversible covalent immobilization of proteins by thiol-disulphide interaction	252
6.2.11 Benzoquinone activation	254
6.2.12 Diazotization	255
6.2.13 Sulphonyl chloride-containing supports	256
6.2.14 Other methods	257
6.3 Blocking of unreacted groups and washing out of noncovalently bound ligands	258
6.4 Leakage of the coupled affinant	262
6.5 General considerations in the choice of sorbents, coupling and blocking procedures	264
References	276

Chapter 7

Characterization of supports and immobilized affinity ligands	283
7.1 Methods for the determination of non-specific sorption	284
7.1.1 Determination of adsorption capacity	284
7.1.2 Determination of residual negatively charged groups (according to Porath et al., 1975)	285
7.2 Determination of activatable and active groups	285
7.2.1 Determination of carboxyl, hydrazide and amino groups on the basis of acid-base titration (Inman, 1974)	285
7.2.2 Spectrophotometric method for the quantitative determination of solid phase supported amino groups (Ngo, 1986 a)	287
7.2.3 Determination of the content of free carboxyl groups (according to Goldstein, 1973)	287
7.2.4 Colorimetric determination of the coupling capacity of solid-supported carboxyl groups (Ngo, 1986 b)	288
7.2.5 Determination of free amino groups in polymers on the basis of the condensation reaction with 2-hydroxy-1-naphthaldehyde (Esko et al., 1968)	288
7.2.6 Procedure for azide assay (Brenna et al., 1975)	289
7.2.7 The sodium 2,4,6-trinitrobenzenesulphonate colour test	289
7.2.8 Fluorescamine test for the rapid detection of trace amounts of amino groups (Felix and Jimenez, 1973).	290
7.2.9 Determination of oxirane groups (Sundberg and Porath, 1974) . . .	291
7.2.10 Determination of aldehyde groups on the antibody molecule (Solomon et al., 1990)	292
7.2.11 Determination of the capacity of p-nitrophenol ester derivatives of hydroxyalkyl methacrylate (NPAC) gels (Turková, 1976)	292
7.2.12 Determination of the degree of substitution of benzylated dibromopropanol crosslinked Sepharose (Låås, 1975)	293
7.2.13 Determination of vinyl groups (Porath et al., 1975)	293

7.2.14 Determination of sulphhydryl groups (Lowe and Dean, 1974) . . .	293
7.2.15 Determination of soluble and immobilized N-hydroxysuccinimide esters (Miron and Wilchek, 1982)	294
7.3 Methods for the determination of immobilized	
affinity ligands	295
7.3.1 Difference analysis	295
7.3.2 Spectroscopic methods	295
7.3.3 Determination by means of acid-base titration	298
7.3.4 Determination of immobilized proteins, peptides, amino acids, nucleotides, carbohydrates and other substances after liberation by acid, alkaline or enzymatic hydrolysis	299
7.3.5 Determination of the amount of bound affinant on the basis of elemental analysis	303
7.3.6 Determination of labelled affinity ligands	303
7.3.7 Determination of immobilized diaminodipropylamine by ninhydrin colorimetry (Holleman and Weis, 1976)	303
7.3.8 Determination of immobilized proteins on the basis of tryptophan content (Eskamani et al., 1974)	304
7.4 Study of conformational changes of immobilized proteins	304
7.5 Studies of the distribution of proteins bound to solid supports	308
References	310

Chapter 8

General considerations on sorption, elution and non-specific binding	313
8.1 Practical aspects of bioaffinity techniques	313
8.2 Sorption conditions	316
8.2.1 Concentration of adsorbed molecules, equilibration time, geometry of column, and flow rate	316
8.2.2 Effect of temperature	324

8.2.3 Effect of pH, ionic strength and nature of molecules suitable for biospecific sorption	328
8.2.4 Practice of sorption	338
8.3 Conditions for elution	340
8.3.1 Elution with competitive affinity ligands	340
8.3.2 Elution by change of pH, ionic strength or the presence of molecules suitable for elution	346
8.3.3 Elution by change of temperature	350
8.3.4. Photocontrol of bioaffinity chromatography	353
8.3.5 Elution in an electric field	354
8.3.6 Elution in a magnetic field	360
8.4 Establishment of optimum conditions and saturation effect	363
8.5 Regeneration and storage of bioaffinity columns	366
References	367

Chapter 9

Bioaffinity chromatography in the isolation, determination or removal

of biologically active substances	371
9.1 Classical bioaffinity chromatography	371
9.2 High-performance liquid bioaffinity chromatography	551
9.3 Large-scale isolation using bioaffinity chromatography	568
References	581

Chapter 10

Immobilization of enzymes by biospecific adsorption to immobilized

monoclonal or polyclonal antibodies	643
10.1 Immobilization of enzymes by biospecific adsorption to immobilized monoclo- nal antibodies	643
10.2 Monoclonal antibodies in comparison with polyclonal antibodies	647

XII

10.3 Oriented immobilization of chymotrypsin and trypsin by adsorption to immunoadsorbents prepared from suitable polyclonal antibodies . . .	648
10.4 Active protein stabilization by antibodies	653
References	655

Chapter 11

Study of the modification, mechanism of action and structure of biologically active substances using bioaffinity chromatography	657
11.1 Semi-synthetic nuclease and complementary interaction of nuclease fragments	657
11.2 Bioaffinity chromatography in combination with gene fusion vectors . . .	661
11.3 Study of the mechanisms of enzymatic action	666
11.4 Molecular structure of fibroblast and leucocyte interferons investigated with lectin	669
References	671

Chapter 12

Solid-phase immunoassay and enzyme-linked lectin assay	673
12.1 Solid-phase radioimmunoassay (RIA)	676
12.2 Enzyme-linked immunosorbent assay (ELISA)	680
12.3 Amplification systems for enzyme immunoassay	688
12.4 Elisa-plaque (ELISPOT) assay	692
12.5 Cellular enzyme-linked immunospecific assay (CELISA) and enzyme-linked lectin assay (ELLA)	694
12.6 Microfluorimetric immunoassay	697
References	698

Chapter 13

Several examples of the application of biospecific adsorption in medicine	703
13.1 Studies of various components in the human body	703

13.2 Extracorporeal removal of substances in vivo	710
13.3 Selective targeting of drugs	719
References	728
 Chapter 14	
Application of bioaffinity chromatography to the quantitative evaluation of specific complexes	731
4.1 Determination of dissociation constants by elution analysis	733
14.2 Determination of dissociation constants by frontal analysis	740
14.3 Developments in quantitative bioaffinity chromatography	744
14.4 Recycling partition equilibrium system	750
14.5 Kinetic aspects of membrane-based immunoaffinity chromatography .	756
References	759
 Chapter 15	
Theory of bioaffinity chromatography	761
15.1 Theory of membrane-based receptor bioaffinity chromatography	762
15.2 Interactions in complementary binding sites in bioaffinity chromatography	764
15.3 Energy of biospecific complex formation	770
15.4 Models suitable for efficient large-scale bioaffinity chromatography . . .	773
References	779
 Subject index	 781

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To my daughters,

Radka and Vladka with their husbands,

my effective helpers

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PREFACE

In the rapidly developing field of bioaffinity chromatography, where new findings are published in a vast range of journals, there is an urgent need to be able to offer the most up-to-date coverage of information. Reprints of papers, lectures presented at symposia on affinity chromatography, and valuable discussions with my friends and colleagues have considerably helped me in studying the increased accessibility and stability of active sites of biologically active compounds attached to solid supports in bioadsorbents. I have also taken advantage of the work of many polymer chemists in Prague who have prepared many different activated solid supports for my study. I wish to cordially thank all my friends and colleagues who made the preparation of this book much easier than anticipated.

This book would never have been written without the support of my friends, Dr. Otakar Mikeš, author of many chapters and the books "High-performance Liquid Chromatography of Biopolymers and Biooligomers" (Part A and B, Elsevier, 1988) and Dr. Karel Macek, also an author of many chapters and chief editor of the Journal of Chromatography, Biomedical Applications (Elsevier, Amsterdam). I am profoundly grateful to them.

At present there are far more than 5000 references in bibliographic reviews dealing with the isolation, determination or removal of biologically active substances using bioaffinity chromatography. Therefore, this book cannot provide a comprehensive bibliographic review. All types of substances have been represented by selecting 40% of the studied materials. Tables dealing with low- and high-performance and large-scale bioaffinity chromatography include information on biologically active substances with their affinants, solid supports and methods of coupling. I am greatly indebted to Dr. Bedřich Meloun, who has checked the separation of substances according to their types.

I considered it necessary to have the manuscript read by other persons in order to eliminate possible errors and oversights that might easily have occurred. In this respect special thanks are due to my daughter, Dr. Radomíra Vaňková (Institute of Expe-

XVIII

rimental Botany, Academy of Sciences of the Czech Republic, Prague), who read the whole manuscript and pointed out shortcomings and made preliminary linguistic corrections. I am also grateful to Dr. Zdeněk Havlas (Institute of Organic Chemistry and Biochemistry, Academy of Sciences of the Czech Republic, Prague) for critically reading and commenting on the chapter about the theory of bioaffinity chromatography. Beyond this, I am indebted to my son-in-law, Dr. Tomáš Vaněk (Institute of Organic Chemistry and Biochemistry, Academy of Sciences of the Czech Republic, Prague), who helped with the final preparation of the manuscript. I am also grateful to Dr. J. Cirýn, Mrs. D. Dundrová, Mrs. E. Schauerová and Mrs. H. Talacková for re-drawing the figures.

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Chapter 1

Introduction

The rapid growth of industrial output and the population explosion lie beneath many social problems throughout the world. The management of biomolecules could be a key strategic factor in the amelioration of such problems. Fig. 1.1 is taken from the article of Sjö Dahl (1989) concerning his investigation of biotechnology in Japan. The Japanese government, academia and industry have perceived the potential of state-of-the-art biomolecule management, and are gearing up for the future business of applying the new biology. They appear to be pursuing the goal of a logical management of life, as is shown in this figure. As human knowledge of biological function advances, so does the range of potential products. Advances in biotechnology, biochemistry and pharmacology are increasingly dependent on bioaffinity chromatography, which is a very important and indispensable separation technique for the isolation and characterization of specific biomacromolecules (Anspach et al., 1989).

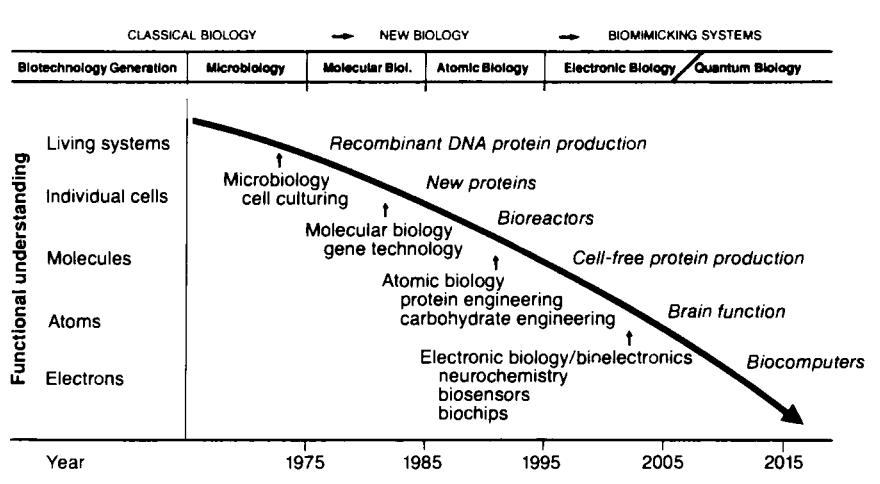


Fig. 1.1 The relationship between knowledge of biological systems and the development of new product areas. Reproduced with permission from J. Sjö Dahl, Trends Biotechnol., 7(1989) 144 - 147.