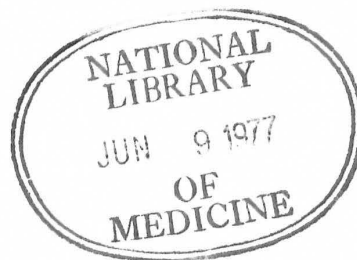
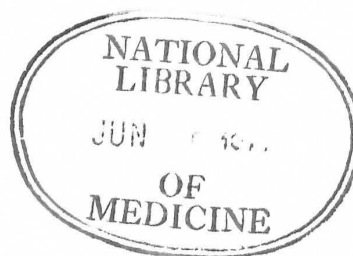


COLD SPRING HARBOR SYMPOSIA  
ON QUANTITATIVE BIOLOGY

VOLUME XLI

Origins of Lymphocyte Diversity



COLD SPRING HARBOR LABORATORY

1977

DEIZED BY 1116

COLD SPRING HARBOR SYMPOSIA ON QUANTITATIVE BIOLOGY  
VOLUME XLI

© 1977 by The Cold Spring Harbor Laboratory  
International Standard Book Number 0-87969-040-2 (clothbound)  
Library of Congress Catalog Card Number 34-8174

*Printed in the United States of America*  
*All rights reserved*

W3  
C160P  
V. 41  
1976

NATIONAL LIBRARY OF MEDICINE  
BETHESDA, MARYLAND 20014

COLD SPRING HARBOR SYMPOSIA ON QUANTITATIVE BIOLOGY

*Founded in 1933 by*

REGINALD G. HARRIS

*Director of the Biological Laboratory 1924 to 1936*

*Previous Symposia Volumes*

- |   |  |
|---|--|
| I (1933) Surface Phenomena  | XXI (1956) Genetic Mechanisms: Structure and Function                          |
| II (1934) Aspects of Growth   | XXII (1957) Population Studies: Animal Ecology and Demography                  |
| III (1935) Photochemical Reactions  | XXIII (1958) Exchange of Genetic Material: Mechanism and Consequences          |
| IV (1936) Excitation Phenomena  | XXIV (1959) Genetics and Twentieth Century Darwinism                           |
| V (1937) Internal Secretions  | XXV (1960) Biological Clocks   |
| VI (1938) Protein Chemistry   | XXVI (1961) Cellular Regulatory Mechanisms                                     |
| VII (1939) Biological Oxidations  | XXVII (1962) Basic Mechanisms in Animal Virus Biology                          |
| VIII (1940) Permeability and the Nature of Cell Membranes                                 | XXVIII (1963) Synthesis and Structure of Macromolecules                        |
| IX (1941) Genes and Chromosomes: Structure and Organization                               | XXIX (1964) Human Genetics   |
| X (1942) The Relation of Hormones to Development  | XXX (1965) Sensory Receptors   |
| XI (1946) Heredity and Variation in Microorganisms  | XXXI (1966) The Genetic Code   |
| XII (1947) Nucleic Acids and Nucleoproteins   | XXXII (1967) Antibodies  |
| XIII (1948) Biological Applications of Tracer Elements                                    | XXXIII (1968) Replication of DNA in Microorganisms                             |
| XIV (1949) Amino Acids and Proteins   | XXXIV (1969) The Mechanism of Protein Synthesis                                |
| XV (1950) Origin and Evolution of Man   | XXXV (1970) Transcription of Genetic Material                                  |
| XVI (1951) Genes and Mutations  | XXXVI (1971) Structure and Function of Proteins at the Three-dimensional Level |
| XVII (1952) The Neuron  | XXXVII (1972) The Mechanism of Muscle Contraction                              |
| XVIII (1953) Viruses  | XXXVIII (1973) Chromosome Structure and Function                               |
| XIX (1954) The Mammalian Fetus: Physiological Aspects of Development                      | XXXIX (1974) Tumor Viruses   |
| XX (1955) Population Genetics: The Nature and Causes of Genetic Variability in Population | XL (1975) The Synapse  |

The Symposium Volumes are published by the Cold Spring Harbor Laboratory, Cold Spring Harbor, New York 11724, and may be purchased directly from the Laboratory or through booksellers. Price of Volume XLI—2-part set \$60.00 (inc. postage). May be purchased only as a complete set. Price subject to change without notice.

PFIZER EX 1116

# Contents

## Part 1

Symposium Participants	v
Foreword	xv
<i>Introduction</i>	
The Common Sense of Immunology <i>N. K. Jerne</i>	1

### LYMPHOCYTE FUNCTION

#### *T-cell Markers and Differentiation*

Thymopoietin and Bursopoietin: Induction Signals Regulating Early Lymphocyte Differentiation <i>G. Goldstein, M. Scheid, E. A. Boyse, A. Brand and D. G. Gilmour</i>	5
Normal and Neoplastic Maturation of T-lineage Lymphocytes <i>I. L. Weissman, S. Baird, R. L. Gardner, V. E. Papaioannou and W. Raschke</i>	9
Regulation of Cellular and Humoral Immune Responses by T-cell Subclasses <i>H. Cantor and E. A. Boyse</i>	23
Surface Markers and Functional Relationships of Cells Involved in Murine B-lymphocyte Differentiation <i>L. A. Herzenberg, L. A. Herzenberg, S. J. Black, M. R. Loken, K. Okumura, W. van der Loo, B. A. Osborne, D. Hewgill, J. W. Goding, G. Gutman and N. L. Warner</i>	33
An Unusual Kappa Immunoglobulin Antigen Present on the Membrane of T and B Lymphocytes <i>A. B. Gottlieb, M. Engelhard, H. G. Kunkel and S. M. Fu</i>	47
Rat Thy-1 Antigens from Thymus and Brain: Their Tissue Distribution, Purification, and Chemical Composition <i>A. F. Williams, A. N. Barclay, M. Letarte-Muirhead and R. J. Morris</i>	51
Specialized DNA Polymerases in Lymphoid Cells <i>D. Baltimore, A. E. Silverstone, P. C. Kung, T. A. Harrison and R. P. McCaffrey</i>	63
Studies on the Interactions between Viruses and Lymphocytes <i>B. R. Bloom, A. Senik, G. Stoner, G. Ju, M. Nowakowski, S. Kano and L. Jimenez</i>	73

#### *Helper and Suppressor T Cells and Their Products*

The Hermaphrocyte: A Suppressor-Helper T Cell <i>R. K. Gershon, D. D. Eardley, K. F. Naidorf and W. Ptak</i>	85
Suppressor T Cells in Tolerance to Non-self and Self Antigens <i>A. Basten, R. Loblay, E. Chia, R. Callard and H. Pritchard-Briscoe</i>	93
Tolerance: Two Pathways of Negative Immunoregulation in Contact Sensitivity to DNFB <i>H. N. Claman, S. D. Miller and J. W. Moorhead</i>	105

Current Concepts of the Antibody Response: Heterogeneity of Lymphoid Cells, Interactions, and Factors <i>M. Feldmann, P. Beverley, P. Erb, S. Howie, S. Kontiainen, A. Maoz, M. Mathies, I. McKenzie and J. Woody</i>	113
Suppressive and Enhancing T-cell Factors as I-region Gene Products: Properties and the Subregion Assignment <i>T. Tada, M. Taniguchi and C. S. David</i>	119
<i>B-cell Differentiation and Commitment</i>	
In Vitro Studies on the Generation of Lymphocyte Diversity <i>J. J. T. Owen, R. K. Jordan, J. H. Robinson, U. Singh and H. N. A. Willcox</i>	129
Studies of Generation of B-cell Diversity in Mouse, Man, and Chicken <i>M. D. Cooper, J. F. Kearney, P. M. Lydyard, C. E. Grossi and A. R. Lawton</i>	139
Ontogeny of Murine B Lymphocytes: Development of Ig Synthesis and of Reactivities to Mitogens and to Anti-Ig Antibodies <i>F. Melchers, J. Andersson and R. A. Phillips</i>	147
Development and Modulation of B Lymphocytes: Studies on Newly Formed B Cells and Their Putative Precursors in the Hemopoietic Tissues of Mice <i>M. C. Raff</i>	159
Induction of Immunoglobulin Synthesis in Abelson Murine Leukemia Virus-transformed Mouse Lymphoma Cells in Culture <i>B. J. Weimann</i>	163
The Interplay of Evolution and Environment in B-cell Diversification <i>N. R. Klinman, N. H. Sigal, E. S. Metcalf, S. K. Pierce and P. J. Gearhart</i>	165
Synthesis of Multiple Immunoglobulin Classes by Single Lymphocytes <i>B. Pernis, L. Forni and A. L. Luzzati</i>	175
Immunoglobulin Receptors on Murine B Lymphocytes <i>E. S. Vitetta, J. Cambier, J. Forman, J. R. Kettman, D. Yuan and J. W. Uhr</i>	185
Functional and Structural Characterization of Immunoglobulin on Murine B Lymphocytes <i>R. M. E. Parkhouse, E. R. Abney, A. Bourgois and H. N. A. Willcox</i>	193
Origin and Differentiation of Lymphocytes Involved in the Secretory IgA Response <i>J. J. Cebra, P. J. Gearhart, R. Kamat, S. M. Robertson and J. Tseng</i>	201
Mechanism of B-cell Activation and Self-Non-self Discrimination <i>G. Möller</i>	217
Growth and Maturation of Single Clones of Normal Murine T and B Lymphocytes In Vitro <i>J. Andersson, A. Coutinho, F. Melchers and T. Watanabe</i>	227
Hapten-specific B Lymphocytes: Enrichment, Cloning, Receptor Analysis, and Tolerance Induction <i>G. J. V. Nossal, B. L. Pike, J. W. Stocker, J. E. Layton and J. W. Goding</i>	237
Regulation of Clonal B-lymphocyte Proliferation by Anti-immunoglobulin or Anti-Ia Antibodies <i>P. W. Kincade and P. Ralph</i>	245
Cellular and Molecular Interactions in Control of B-cell Immunity and Tolerance <i>E. Diener, C. Shiozawa, B. Singh and K.-C. Lee</i>	251
<i>Receptors</i>	
Lymphocyte Surface Immunoglobulins: Evolutionary Origins and Involvement in Activation <i>J. J. Marchalonis, J. M. Decker, D. DeLuca, J. M. Moseley, P. Smith and G. W. Warr</i>	261
Antigen-binding, Idiotypic Receptors from T Lymphocytes: An Analysis of Their Biochemistry, Genetics, and Use as Immunogens To Produce Specific Immune Tolerance <i>H. Binz and H. Wigzell</i>	275
On the Structure of the T-cell Receptor for Antigen <i>U. Krawinkel, M. Cramer, C. Berek, G. Hämmerling, S. J. Black, K. Rajewsky and K. Eichmann</i>	285
The Immune Response to Staphylococcal Nuclease: A Probe of Cellular and Humoral Antigen-specific Receptors <i>D. H. Sachs, J. A. Berzofsky, C. G. Fathman, D. S. Pisetsky, A. N. Schechter and R. H. Schwartz</i>	295
Functional Characterization of Rabbit Lymphocytes Carrying Fc Receptor <i>P.-A. Cazenave, D. Juy and C. Bona</i>	307
Structural and Functional Heterogeneity of Fc Receptors <i>H. M. Grey, C. L. Anderson, C. H. Heusser, B. K. Borthistle, K. B. Von Eschen and J. M. Chiller</i>	315

## THE MAJOR HISTOCOMPATIBILITY COMPLEX

<i>Structure of the Molecular Products of the MHC</i>	
Structure of HL-A A and B Antigens Isolated from Cultured Human Lymphocytes <i>J. L. Strominger, D. L. Mann, P. Parham, R. Robb, T. Springer and C. Terhorst</i>	323
Structural Studies of $\beta_2$ -Microglobulin-associated and Other MHC Antigens <i>P. A. Peterson, H. Anundi, B. Curman, L. Klareskog, S. Kvist, L. Östberg, L. Rask, L. Sandberg and K. Sege</i>	331
Comparative Chemical Analyses and Partial Amino Acid Sequences of the Heavy Chains of HL-A Antigens <i>E. Appella, N. Tanigaki, O. Henriksen, D. Pressman, D. F. Smith and T. Fairwell</i>	341
Structural Differences between Parent and Variant H-2K Glycoproteins from Mouse Strains Carrying H-2 Gene Mutations <i>S. G. Nathenson, J. L. Brown, B. M. Ewenstein, T. Nisizawa, D. W. Sears and J. H. Freed</i>	343
Structure of Murine Histocompatibility Antigens <i>B. A. Cunningham, R. Henning, R. J. Milner, K. Reske, J. A. Ziffer and G. M. Edelman</i>	351
Structural Studies of H-2 and TL Alloantigens <i>J. W. Uhr, E. S. Vitetta, J. Klein, M. D. Poulak, D. G. Klapper and J. D. Capra</i>	363
Chemical Characterization of Products of the H-2 Complex <i>J. Silver, J. M. Cecka, M. McMillan and L. Hood</i>	369
Human Ia Antigens—Purification and Molecular Structure <i>D. Snary, C. Barnstable, W. F. Bodmer, P. Goodfellow and M. J. Crumpton</i>	379
Chemical and Immunological Characterization of HL-A-linked B-lymphocyte Alloantigens <i>T. A. Springer, J. F. Kaufman, L. A. Siddoway, M. Giphart, D. L. Mann, C. Terhorst and J. L. Strominger</i>	387
The Guinea Pig MHC: Functional Significance and Structural Characterization <i>B. D. Schwartz, A. M. Kask and E. M. Shevach</i>	397
Partial Amino Acid Sequences of MHC Products <i>J. Silver</i>	405
Analysis of Lymphocyte Surface Antigen Expression by the Use of Variant Cell Lines <i>R. Hyman and I. Trowbridge</i>	407

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.