







#### THE NEW YORK ACADEMY OF SCIENCES

(Founded in 1817)

### BOARD OF GOVERNORS, 1971

BERT N. LA DU, JR., President SERGE A. KORFF, President-Elect

Vice-Presidents

I. B. LASKOWITZ MARGARET MEAD

Recording Secretary
GEORGE I. FUJIMOTO

HERMAN COHEN

PHILIP FEIGELSON

M. JACK FRUMIN

LLOYD MOTZ J. JOSEPH LYNCH JACOB FELD

Financial Counselor FREDERICK A. STAHL Treasurer GORDON Y BILLARD

Elected Governors-at-Large 1969-1971 ROSS F. NIGRELLI

E. CUYLER HAMMOND

JOEL L. LEBOWITZ

Past Presidents (Governors)
IRVING J. SELIKOFF

Executive Director EDWIN S. SCHANZE

BORIS PREGEL KENNETH W. THOMPSON

Corresponding Secretary H. CHRISTINE REILLY

MATTHEW ROSENHAUS

ETHEL TOBACH

SIDNEY A. SAVITT

MINORU TSUTSUI HILARY KOPROWSKI N. HENRY MOSS

Legal Counselor EDWARD D. BURNS

### ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

Volume 190



**EDITORIAL STAFF** 

Editorial Director
PETER ALBERTSON

Editor-in-Chief MARC KRAUSS

Associate Editor MILDRED MONGÉ

This conference was sponsored by The Academy's SECTION OF BIOLOGICAL AND MEDICAL SCIENCES Chairman LEONARD J. LERNER Vice-Chairman HAROLD YACOWITZ



### ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

VOLUME 190

December 31, 1971

### **IMMUNOGLOBULINS** \*

Editors and Conference Chairmen Shaul Kochwa and Henry G. Kunkel

### CONTENTS

#### Part I. Structure of Immunoglobulins

A MAR A. Det detute of Ammonoglobania	
Antibody Structure and Molecular Immunology. By Gerald M. Edelman Light Chain Structure and Theories of Antibody Diversity. By Leroy Hood,	5
MICHAEL D. WATERFIELD, JAMES MORRIS AND CHARLES W. TODD	26
Structure of IgA Proteins. By H. M. Grey, C. A. ABEL AND B. ZIMMERMAN Structural Studies of Immunoglobulin E: I. Physicochemical Studies of IgE	37
Molecule. By S. Kochwa, W. D. Terry, J. D. Capra and N. L. Yang Structural Studies of Immunoglobulin G, M and A Heavy Chains. By B. Frangione, F. Prelli, C. Mihaesco, C. Wolfenstein, E. Mihaesco	49
AND E. C. FRANKLIN	71
A. SHIMIZU, C. PAUL, T. SHINODA AND H. KÖHLER	83
A. FEINSTEIN, E. A. MUNN AND N. E. RICHARDSON	104
TON, D. SEGAL AND W. D. TERRY	122
Part II. Genetics of Immunoglobulins	
Immunoglobulin Genetics in Cellular Immunology. By Leonard A. Herzen- Berg	130
Formal Genetics of the Immunoglobulin Systems. By Erna van Loghem Genetic Control of the Constant Homology Regions of Immunoglobulin G Heavy Chain Subclasses. By J. B. Natvig, M. W. Turner and T. E.	136
MICHAELSEN Genetic Control of Rabbit H Chain Biosynthesis. By JAMES W. PRAHL AND	150
CHARLES W. TODD Genetic Control of Specific Immune Responses in Inbred Mice. By F. CARL	161
GRUMET, GRAHAM F. MITCHELL AND HUGH O. McDevitt	170
* This series of papers is the result of a conference entitled Immunoglobulins, he The New York Academy of Sciences on March 8-10, 1971	ld by



Anal

### Part III. Synthesis of Immunoglobulins

Introduction to the Session on Biological and Cellular Aspects of the Regulation of Immunoglobulin Synthesis. By Baruj Benacerraf  Effect of Antigenic Structure on Antibody Biosynthesis. By Michael Sela  Normal and Altered Quantitative Expressions of Allotypes on Light and Heavy Chains of Rabbit Immunoglobulins. By Rose G. Mage  Chronic Allotype Suppression in Mice: An Active Regulatory Process. By Leonore A. Herzenberg, E. B. Jacobson, Leonard A. Herzenberg and Roy J. Riblet  Proliferation and Differentiation of Lymphoid Cells: Studies with Human Lymphoid Cell Lines and Immunoglobulin Synthesis. By John L. Fahey, Donald N. Buell and Harold C. Sox	178 181 203 212 221 235
Nonsecretory Cells. By Charles J. Sherr, Isaac Schenkein and Jonathan W. Uhr.  Antibodies Induced by Local Antigenic Stimulation of Mucosal Surfaces. By J. F. Heremans and H. Bazin	250 268
Part IV. Monoclonal Antibodies	
Introduction to Session on Homogeneous Antibodies. By RICHARD M. KRAUSE	276
Homogeneous Elicited Antibodies: Induction, Characterization, Isolation, and Structure. By Edgar Haber	285 306
Polyvalence. By Henry Metzger.  Cold Agglutinins: Studies of Primary Structure, Serologic Activity and Antigenic Uniqueness. By Ralph C. Williams, Jr.	322 330
Part V. Active Sites of Antibodies	
Affinity Labeling of the Active Sites of Antibodies and Myeloma Proteins. By	
S. J. SINGER, NANCY MARTIN AND NEAL O. THORPE	342
GIVOL	352
ALFRED NISONOFF  Structure-Function Relationships Among Anti-Gamma Globulin Antibodies.  By J. Donald Capra, J. Michael Kehoe, Robert J. Winchester and	362
HENRY G. KUNKEL	371
Attempts to Locate Complementarity-Determining Residues in the Variable Positions of Light and Heavy Chains. By ELVIN A. KABAT AND T. T. Wu Mapping the Combining Sites of Antibodies Specific to Polyalanine Chains.	382
By Israel Schechter	394
Immunoglobulins as Cell Receptors. By Benevenuto Pernis, Luciana Forni	420
Chemical Approaches to the Cell Receptor Problem. By Leon Wofsy, Paolo Truffa-Bachi and David Naor	432

Copyright, 1972, by The New York Academy of Sciences. All rights reserved. Except for brief quotations by reviewers, reproduction of this publication in whole or in part by any means whatever is strictly prohibited without written permission from the publisher.



# DOCKET A L A R M

# 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.

