

60 YEARS OF ADVANCING RESEARCH TO IMPROVE HEALTH

LONG-TERM NIDDK HEMATOLOGY RESEARCH GRANTEES

DDK Hematology Program	LONG-TER	MIDDKHEM	
.950 the "Omnibus Medical Research Act" established a new	1950s	1960s	
titute at NIH to support basic and clinical research relevant to a ad range of medical subspecialty areas, including hematology. Sinning in the early 1950s this new Institute, the National	University of Utah 1955-1983 TRAINING GRANT IN HEMATOLOGY INVESTIGATIONS IN HEMATOLOGY HEREDITARY HEMOCHROMATOSIS MAKEBULA WILLIAM B CASTLE, MD Albert Massa Massa TRAINING GRANT IN HEMATOLOGY METABO REGULA MAKEBULA MAKEB	RALPH O WALLERSTEIN, MD t Einstein College of Medicine achusetts Institute of Technology 5-1995 CLISM OF THE ERYTHROCYTE ATION OF HEMOGLOBIN SYNTHESIS AND HEMATOPOIESIS KIO MURAMAYAMA, PhD RALPH O WALLERSTEIN, MD Children's Hospital, San Francisco 1957-1971 TISSUE IRON IN ANEMIA TRAINING GRANT IN HEMATOLOGY LOUIS R WASSERMAN, MD Mt. Sinai Hospital, NY	
itute of Arthritis and Metabolic Diseases (NIAMD), began to ard grants for support of research on "erythrocyte production,	1954-1967 ERYTHROPOIETIC REGULATION AMOZ L CHERNOFF, MD ROS	1955-1968 LOCALIZATION AND KINETICS OF STORAGE IRON ABNORMAL PROTEINS IN HEMATLOGIC DISORDERS E G SCHNEIDER, MD MAXWELL M WINTROBE, MD	
nover, and metabolism; erythropoietin; hemoglobin; iron,	1957-1971 BIOCHEMICAL AND GENETIC STUDIES OF HEMOGLOBIN HEMOG	University of Utah 1950-1972 HEREDITARY DISORDERS PROGRAM PROJECT APHAEL SHULMAN, MD ROBERT I WEED, MD	
fts; transplant immunology; immune-hematology; and	Boston City Hospital, Tufts University 1956-1972 EFFECT OF AGING ON RED CELL MEMBRANES NIH Ir 1955 THROM VIRAL H	Tramural Laboratories (NIAMD, NIAMDD, NIDDK) 5-1995 BOCYTOPENIA, HEMOSTASIS, HEMOPHILIA BEPATITIS TRAINING GRANT IN HEMATOLOGY ERYTHROCYTE ULTRASTRUCTURE AND METABOLISM PROGRAM OF TRAINING FOR CLINICAL INVESTIGATION	
kocyte cell biology." • In 1972, the institute's name was nged to the National Institute of Arthritis, Metabolism, and	University of Washington 1957-1986 HEMATOLOGY AND NUTRITIONAL ANEMIAS TRAINING GRANT ERYTHR	DERICK STOHLMAN, Jr., MD Intramural Laboratories (NIAMD) 8-1963 ROPOIESIS AND GRANULOPOIESIS OPOIETIC STEM CELL BILOGY AND TRANSPLANTATION OPOIETIC STEM CELL BILOGY AND TRANSPLANTATION OPOIETIC STEM CELL BILOGY AND TRANSPLANTATION SURFACE DIFFERENTIATION OF DEVELOPING HEMIC CE	
estive Diseases (NIAMDD) and subsequently in 1986, as grew and new institutes were established, changed again	Presbyterian Hospital, University of Pennsylvania 1954–1973 RED CELL PRODUCTION AND DESTRUCTION 1951 INTERAC	TT N SWISHER, MD Persity of Rochester gan State University I-1974 CTIONS OF ANTIBODIES AND BLOOD CELLS WILLIAM S BECK, MD Massachusetts General Hospital, Harvai 1960-1984 TRAINING GRANT IN HEMATOLOGY RIBOSOMAL BINDING OF VITAMIN B12	
the National Institute of Diabetes and Digestive and Kidney eases (NIDDK). Throughout its history, however, the Institute	1955-1998 studies of erythrocyte production & destruction 1953	N F TAYLOR, PhD Persity of Louisville S-1975 CDRYL GROUPS AND PROPERTIES OF HEMOGLOBIN HEMATOLOGIC ROLE OF VITAMIN B12 AND ITS ANALO C LOCKARD CONLEY, MD Johns Hopkins University Hospital 1960-1980 TRAINING GRANT IN HEMATOLOGY	DGUE
maintained its commitment to supporting leading edge natology research in areas defined from the beginning,	HARVEY A ITANO, PhD NIH Intramural Laboratories (NIAMD) 1953-1968 HEMOGLOBIN CHEMISTRY	WILLIAM A EATON, MD, PhD NIH Intramural Laboratories (NIAMD, N 1968-2011 SICKLE CELL HEMOGLOBIN KINETICS PROTEIN FOLDING	JIAN
rking in parallel with blood diseases programs in the National icer Institute, NCI , and the National Heart Institute, which sequently became the National Heart, Lung, and Blood	JAMES H JANDL, MD Harvard University School of Medicine 1956-1975 ERYTHROPOIETIC REGULATION TRAINING GRANT IN HEMATOLOGY CHARLES A JANEWAY, MD	SHIRLEY N EBBE, MD St. Elizabeth's Medical Center, Boston Lawrence Berkeley Laboratory, Universit 1964-1987 KINETICS OF MEGAKARYOCYTE AND PLATELET TURNOM HEMOPOIETIC CELLULAR PROLIFERATION AND ITS REG	ity o
itute, NHLBI. • NIDDK's 60th anniversary year provides an asion to highlight the Institute's many contributions to the	Children's Hospital, Harvard University 1951-1966 STUDIES ON BLOOD PROTEINS AARON M JOSEPHSON, MD Michael Reese Hospital, Chicago 1951-1966	GRANT GARY FELSENFELD, PhD NIH Intramural Laboratories (NIAMD, N 1960-2011 GLOBIN GENE EXPRESSION CHROMATIN STRUCTURE	
port of academic and research hematology throughout its cory. The NIDDK Hematology Program has been privileged	SIGNIFICANCE OF ABNORMAL HEMOGLOBINS	ERNST R JAFFE, MD Albert Einstein College of Medicine 1965-1983 METHEMOGLOBIN AND PYRIDINE NUCLEOTIDE METAB RESEARCH IN HEMATOLOGY TRAINING GRANT RESEARCH AND HEREDITY CLINIC RESEARCH IN RED BLOOD CELL DISEASES TRAINING GR	
have been a source of long-term support for the research I training activities of a distinguished group of hematology demicians and researchers, including 23 ASH presidents.		VICTOR D HERBERT, MD Harvard University Columbia University SUNY Downstate, Mt. Sinai School of Medicine 1961-1990 VITAMIN B12 AND FOLATE METABOLISM	
		RICHARD M LEVENSON, PhD Duke University 1963-1985 IMMUNOLOGICAL STUDIES OF TISSUE ALLOANTIGENS IMMUNOLOGICAL STUDIES OF PRIMATE MEMBRANE A	
		WARNER E LOVE, PhD Johns Hopkins University 1959-1992 X-RAY STRUCTURE ANALYSIS OF BIOLOGICAL MOLECU X-RAY CRYSTAL STRUCTURE OF HB S AND OTHER MUT	

or Clinical Investigation HACKERMAN, PhD HEMICAL AND CYTOLOGICAL STUDIES

N OF DEVELOPING HEMIC CELLS General Hospital, Harvard University VITAMIN B12 VITAMIN B12 AND ITS ANALOGUES

CONLEY, MD niversity Hospital A EATON, MD, PhD

aboratories (NIAMD, NIAMDD, NIDDK) LOBIN KINETICS N EBBE, MD

Nedical Center, Boston eley Laboratory, University of California CYTE AND PLATELET TURNOVER PROLIFERATION AND ITS REGULATION TRAINING

_aboratories (NIAMD, NIAMDD, NIDDK)

College of Medicine YRIDINE NUCLEOTIDE METABOLISM GY TRAINING GRANT CELL DISEASES TRAINING GRANT HERBERT, MD

ot Medicine e metabolism M LEVENSON, PhD ES OF TISSUE ALLOANTIGENS ES OF PRIMATE MEMBRANE ANTIGENS

JRE OF HB S AND OTHER MUTANT HB'S

ROBERT C WOODWORTH, PhD University of Vermont 1961-2000 NATURE OF IRON-BINDING PROTEINS IRON DELIVERY VIA BLOOD; STRUCTURAL ROLE OF TRANSFERRIN

PHILIP AISEN, MD, PhD Albert Einstein College of Medicine IRON TRANSPORT IN MAMMALIAN CELLS

RESEARCH TRAINING IN HEMATOLOGY

REGULATION OF HEMOGLOBIN SYNTHESIS

REGULATION OF HUMAN GLOBIN GENE EXPRESSION

NORMAL/ABNORMAL CELL GROWTH

HEMATOLOGY TRAINING GRANT

Scripps Research Institute

DANE R BOGGS, MD

H FRANKLIN BUNN, MD

REGULATION OF THE ERYTHROPOIETIN GENE

OXYGEN SENSING AND SIGNAL TRANSDUCTION

S WALTER ENGLANDER, PhD

PROTEIN BONDING, STABILITY, AND FUNCTION

University of Pennsylvania

University of Pittsburg

1971-2008

1970-1988

City of Hope National Medical Center

DIAGNOSIS AND THERAPY OF GAUCHER'S DISEASE

GAUCHER DISEASE - MOLECULAR BIOLOGY & THERAPY

KINETICS AND CONTROL OF NEUTROPHILIC GRANULOCYTES

HEMOGLOBIN AIC IN PATIENTS WITH DIABETES MELLITUS

NONENZYMATIC GLUCOSYLATION OF PROTEIN IN DIABETES

HEMOCHROMATOSIS — EPIDEMIOLOGY AND MOLECULAR MECHANISMS

INVESTIGATIVE HEMATOLOGY TRAINING GRANT

ARTHUR BANK, MD

Columbia University

1965-2004

1970s

NIH Intramural Laboratories (NIAMD, NIAMDD, NIDDK) ROBERT H ALLEN, MD, PhD University of Colorado THE STRUCTURE AND FUNCTION OF B12 BINDING PROTEINS JOHN W ATHENS, MD PROTEIN AND NUCLEOTIDE METABOLISM IN ERYTHROID CELLS University of Utah

BIOSYNTHESIS OF HUMAN AND RABBIT HEMOGLOBINS THE EFFECTS OF MESSENGER RNA STRUCTURE ON TRANSLATION URSULA MULLER-EBERHARD, MD Scripps Clinic and Research Foundation 1963-1995 HEMOLYTIC ANEMIAS IN CHILDHOOD HEMOGLOBIN METABOLISM CLINICAL AND BASIC APPROACH DISTRIBUTION OF IRON AND HEME BY PROTEINS

JOHN R MURPHY, MD Case Western Reserve University DOROTHY F BAINTON, MD, PhD 1959-1978 University of California, San Francisco ENERGY METABOLISM OF THE ERYTHROCYTE 1969-1995 MATURATION AND FUNCTION OF BONE MARROW CELLS HELEN M RANNEY, MD EXPERIMENTAL AND CLINICAL STUDIES ON PMN LEUKOCYTES Albert Einstein College of Medicine MATURATION AND FUNCTION OF PMN LEUKOCYTES SUNY Buffalo University of California, San Diego **EARNEST BEUTLER, MD, PhD**

1960-1989 STUDIES OF THE PROPERTIES OF HEMOGLOBIN KURT R REISSMANN, MD University of Kansas 1964-1980 STUDIES ON ERYTHROPOIETIN

PAUL A MARKS, MD

ALLEN P MINTON, PhD

HEMOGLOBIN THERMODYNAMICS

ALLAN J MORRIS, PhD

Michigan State University

1964-1982

Columbia University

IRWIN A ROSE, PhD University of California, Irvine 1964-1982 CARBOHYDRATE METABOLISM IN RED BLOOD AND TUMOR CELLS REGULATION OF CARBOHYDRATE METABOLISM

ALAN N SCHECHTER, MD Brigham & Womens Hospital, Harvard University NIH Intramural Laboratories (NIAMD, NIAMDD, NIDDK) 1965-2011 SICKLE CELL DISEASE HEMOGLOBIN BIOCHEMISTRY

ROBERT F SCHILLING, MD University of Wisconsin 1960-1975 PHYSIOLOGY OF VITAMIN B12 AND INTRINSIC FACTOR TRAINING GRANT IN HEMATOLOGY

STANLEY L SCHRIER, MD

METABOLISM OF ERYTHROCYTE STROMA

ROBERT S SCHWARTZ, MD

STUDIES IN SYSTEMIC LUPUS ERYTHEMATOSUS

TRAINING PROGRAM IN CLINICAL IMMUNOLOGY

MONOCLONAL HUMAN LUPUS AUTOANTIBODIES

University of California, Los Angeles

SEROLOGICAL TYPING FOR HOMOTRANSPLANTATION

HYBRIDOMA-PRODUCED AUTOANTIBODIES — SYSTEMIC LUPUS

HOMOTRANSPLANTABILITY BY HOST ALTERATION AND MATCHING

ELECTRON MICROSCOPY OF THE RETICULOENDOTHELIAL SYSTEM

EXPERIMENTAL HEMATOLOGY AND CELL BIOLOGY TRAINING GRANT

Training grant in Hematology

PAUL I TERASAKI, PhD

hla in disease and transplantation

LEON P WEISS, MD

Johns Hopkins University

University of Pennsylvania

Stanford University

1960-2001

1963-1986

1959-1995

1961-1997

IMMUNOSUPPRESSION

BERNARD G FORGET, MD Boston Childrens Hospital, Harvard University Yale University School of Medicine 1972-2007 HEMOGLOBIN MESSENGER RNA OF HUMAN ERYTHROID CELLS MOLECULAR BIOLOGY OF HUMAN HEMOGLOBIN SYNTHESIS New England Medical Center Hospital, Tufts University MOLECULAR BIOLOGY OF THALASSEMIA CELLULAR AND MOLECULAR ASPECTS OF HEMATOPOIESIS PHYSICIAN SCIENTIST PROGRAM AWARD HUMAN GLOBIN AND ERYTHROPOIETIN RECEPTOR GENE REGULATION MOLECULAR GENETICS OF THE RED CELL MEMBRANE SKELETON

1967-2000

EUGENE GOLDWASSER, MD, PhD University of Chicago 1974-1994 FORMATION OF ERYTHROPOIETIN IN CELL CULTURE BIOCHEMICAL MECHANISM OF ERYTHROPOIETIN ACTION HEMOPOIETIC STEM CELLS AND INDUCED DIFFERENTIATION IRWIN J GOLDSTEIN, PhD University of Michigan 1966-1981 PROTEIN-CARBOHYDRATE INTERACTION

DONALD WELDON JACOBSEN, PhD Scripps Clinic and Research Foundation Cleveland Clinic Foundation 1970-1991 MECHANISM OF B12 COENZYMES B12 DEFICIENCY: COENZYME SYNTHESIS & INTERCONVERSION B-12 BINDING PROTEINS: FUNCTION & CLINICAL SIGNIFICANCE

CHAN Y JUNG, MD, PhD State University of New York at Buffalo IDENTIFICATION AND ISOLATION OF SUGAR TRANSPORT CARRIER

ENTEROHEPATIC CIRCULATION OF COBALAMINS

Massachusetts Institute of Technology DIFFERENTIATION AND IMMUNOLOGY OF ERYTHROPOIESIS HARVEY A ITANO, MD

STUDIES IN MOLECULAR HEMATOLOGY HARRY S JACOB, MD University of Minnesota 1967-1982 ABNORMAL BLOOD CELL MEMBRANES IN DISEASE

University of California, San Diego

YUET W KAN, MB, MD University of California, San Francisco 1974-2009 Studies on Sickle Cell Anemia and Thalassemia ABNORMAL HEMOGLOBIN SYNTHESIS — MECHANISM & DETECTION BASIC RESEARCH IN HEMATOLOGY TRAINING GRANT CENTER OF EXCELLENCE IN MOLECULAR HEMATOLOGY MURINE MODELS TO INVESTIGATE THE HEMATOLOGIC SYSTEM

HAIG H KAZAZIAN, MD Johns Hopkins University University of Pennsylvania 1970-1996 THE GENETIC CONTROL OF HEMOGLOBIN SYNTHESIS

JUNE LASCELLES, PhD

ERYTHROPOIETIN RECEPTORS

SANFORD B KRANTZ, MD Vanderbilt University 1972-2004 ERYTHROPOIETIN AND THE REGULATION OF ERYTHROPOIESIS Postgraduate training program in Hematology

University of California, Los Angeles 1966-1982 REGULATION OF HEME AND HEMOPROTEIN SYNTHESIS DAVID G NATHAN, MD Children's Hospital Boston, Harvard University 1967-1981 RED CELL LYSIS IN DISEASE OF HEMOGLOBIN AND MEMBRANE POSTGRADUATE TRAINING IN HEMATOLOGY

BIOCHEMICAL APPROACHES TO SICKLE CELL ANEMIA **CONSTANCE T NOGUCHI, PhD** NIH Intramural Laboratories (NIAMDD, NIDDK) 1975-2011 ERYTHROPOIESIS

JOHN C PARKER, MD University of North Carolina 1968-1995

SERGIO S PIOMELLI, MD New York University Columbia University 1965-1991 THE MECHANISM OF RED CELL AGING - HEMOLYTIC ANEMIAS PROTEIN SYNTHESIS IN ERYTHROID PRECURSORS TRAINING GRANT FOR RESEARCH IN DISEASES OF BLOOD

GOETZ W RICHTER, MD University of Rochester 1968-1991 IRON IN CELL PATHOLOGY STEPHEN H ROBINSON, MD Beth Israel Deaconess Medical Center, Harvard University 1968-1988 ORIGIN AND FATE OF BILE PIGMENTS HEMATOLOGY CAREER TRAINING PROGRAM FACTORS REGULATING HEMOPOIETIC CELL DIFFERENTIATION

HEMATOLOGY CAREER TRAINING PROGRAM

JOHN R SACHS, MD

CATION TRANSPORT IN RED BLOOD CELLS

Yale University

1970-2007

SHELDON P ROTHENBERG, MD New York Medical College State University of New York, Downstate 1963-1999 KINETICS OF B12, INTRINSIC FACTOR, AND OTHER PROTEINS SPECIFIC RADIOASSAYS FOR FOLATE ANALOGUES Training Program in Hematology

State University of New York, Stony Brook PHYSIOLOGICAL ASPECTS OF MEMBRANE CATION TRANSPORT FUNCTIONAL STUDIES OF FULLY ACTIVE Na, K-ATPase

SAMUEL SCHWARTZ, MD University of Minnesota

1980s

DAVID SHEMIN, MD Northwestern University PORPHYRINS — ENZYMIC MECHANISMS AND CONTROL OF SYNTHESI STEPHEN B SHOHET, MD

University of California, San Francisco MEMBRANE LIPID METABOLISM IN BLOOD CELLS ARCHITECTURE OF ERYTHROCYTE SKELETON: BILAYER INTERFACE RED CELL MEMBRANE STUDIES PROGRAM PROJECT

Johns Hopkins University 1973-1995 ROLE OF ERYTHROPOIETIN IN TRANSCRIPTIONAL CONTROL **FUMITO C TAKETA, PhD** Medical College of Wisconsin

JERRY L SPIVAK, MD

1971-1986 STRUCTURE AND FUNCTION OF HEMOGLOBIN KOUICHI R TANAKA, MD University of California, Los Angeles 1963-1992 METABOLIC AND BIOCHEMICAL STUDIES OF BLOOD CELLS

SHERMAN M WEISSMAN, MD Yale University 1971-2014 HEMOGLOBIN MRNA IN THALASSEMIA — CLINICAL RESEARCH TRAINING 1982-2015 GRANT — GENETIC HEMATOLOGY TRAINING GRANT — MOLECULAR FACTORS REGULATING CELLULAR UPTAKE OF IRON MAPPING OF IMMUNE RESPONSE & COMPLEMENT GENES — MOLECULAR MOLECULAR REGULATION OF IRON AND HEME METABOLISM HEMATOLOGY CENTER: GENE EXPRESSIONS AND GENOMIC ANALYSIS CORE GENETIC ANALYSIS OF MITOCHONDRIAL IRON METABOLISM

HOX CLUSTER INTERGENIC NON-CODING RNAS IN MYELOID DIFFERENTIATION AND FUNCTION ADEL A YUNIS, MD University of Miami 1969-1988 CHLORAMPHENICOL-INDUCED MARROW APLASIA — PATHOGENESIS BIOCHEMISTRY AND IMMUNOLOGY OF BLOOD DISEASES GRADUATE TRAINING PROGRAM IN HEMATOLOGY

PATHOGENETIC MECHANISM IN BLOOD DISEASES PROGRAM PROJECT

Internal medicine — Hematology training grant

DRUG-INDUCED BONE MARROW INJURY JOHN W ADAMSON, MD University of Washington IN VITRO STUDIES OF HEMATOPOIETIC REGULATION

STUDIES OF IN VITRO ERYTHROPOIETIC REGULATION PATHOBIOLOGY OF BONE MARROW SUPPRESSION IN AIDS, ARC JANE E BARKER, PhD Jackson Laboratories 1980-2005 GENETIC ENGINEERING OF CELLS FROM ANEMIC ANIMALS GENETIC ENGINEERING OF PLURIPOTENT STEM CELLS

G VANN BENNETT, MD, PhD Johns Hopkins University, Duke University 1981-2000 ERYTHROCYTE MEMBRANE CYTOSKELETON ASSOCIATIONS INTERACTION OF ERYTHROCYTE MEMBRANE PROTEINS

IN UTERO STEM CELL TRANSFER FOR MPS VII

RAYMOND J BERGERON, PhD University of Florida 1982-2015 Synthesis and evaluation of redox iron chelators ORAL IRON CHELATORS PREDICATED ON DESFERRITHIOCIN MARCEL E CONRAD, MD University of South Alabama 1978-2002 IRON-INTESTINAL MUCOSAL METAL BINDING PROTEINS REGULATORS OF IRON ABSORPTION

HARRY A DAILEY, PhD University of Georgia 1981-2011 MEMBRANE BOUND ENZYMES OF THE HEME SYNTHETIC PATHWAY TERMINAL ENZYMES OF THE HEME BIOSYNTHETIC PATHWAY CHARACTERIZATION OF PROTOPORPHYRINOGEN OXIDASE CHARACTERIZATION OF MAMMALIAN FERROCHELATASE Mammalian heme synthesis

DAVID C DALE, MD University of Washington 1976-2004 MARROW REGULATION IN CYCLIC HEMATOPOIESIS CELLULAR AND GENETIC BASIS FOR CYCLIC HEMATOPOIESIS ROBERT J DESNICK, PhD, MD University of Minnesota Mount Sinai School of Medicine

Virginia Commonwealth University 1981-2011

GLOBIN GENE REGULATION DURING ERYTHROID DIFFERENTIATION

STUDIES OF PORPHYRIA AND HUMAN HEME BIOSYNTHESIS

NORMAL AND PATHOLOGIC GENE EXPRESSION IN HEMATOPOIETIC CEL ROSS C HARDISON, PhD Pennsylvania State University 1981-2014 ORGANIZATION AND EXPRESSION OF GLOBIN GENE LOCI REGULATION AND EVOLUTION OF GLOBIN GENES GLOBAL PREDICTIONS AND TESTS OF ERYTHROID REGULATION

DAVID E HARRISON, PhD Jackson Laboratory 1974-2012 STEM CELL INTERACTIONS IN MARROW TRANSPLANTATION EXPERIMENTAL HEMATOLOGY TRAINING GRANT M P HEILBRUN, MD

University of Utah 1977-1995 PORPHYRIN BIOSYNTHESIS IN NORMAL AND DISEASE STATES HEREDITARY HEMOCHROMATOSIS STEM CELLS HOMING AND MOTILITY HEMATOPOIETIC CIRCADIAN RHYTHMS JERRY KAPLAN, PhD University of Utah GRIFFIN P RODGERS, MD

KENNETH KAUSHANSKY, MD University of Washington. University of California, San Diego 1984-2014 ROLE OF COLONY-STIMULATION FACTORS IN HEMATOPOIESIS

STRUCTURE-FUNCTION ANALYSIS OF IL-3 AND ITS RECEPTOR MOLECULAR AND CELLULAR BIOLOGY OF THROMBOPOIETIN PHILIP A KNAUF, PhD University of Rochester 1980-2007

ION TRANSPORT MECHANISMS IN BLOOD CELLS

1982-2001

1981-2014

DIFFERENTIATION AND FUNCTION

MECHANISM AND REGULATION OF IRON EXPORT BY FERROPORTIN

Inildren's Hospital Boston, Harvard University PATHOPHYSIOLOGY OF RED CELL MEMBRANE DISEASES HEMOLYTIC ANEMIAS OF PEROMYSCUS AND MUS PROGRAM PHYSICAL SCIENTIST AWARD

MARK A MILANICK, PhD Yale University University of Missouri 1982-2009 ALTERATIONS IN THE NA PUMP STOICHIOMETRY CYTOSOLIC MODULATION OF PLASMA MEMBRANE ION TRANSPORT DEVELOPMENTAL BIOLOGY OF HEMOGLOBIN SWITCHING PROGRAM PROJECT MECHANISM OF THE CA/H EXCHANGE PUMP FROM CLINIC-BENCH & BACK CLINICAL BIODETECTIVE TRAINING

RED CELL DEFORMABILITY IN VITRO AND SURVIVAL IN VIVO

CLONING OF GENES FOR RED CELL MEMBRANE SKELETAL PROTEINS

ICHIRO NAKAMURA, PhD State University of New York at Buffalo ELIZABETH C THEIL, PhD North Carolina State University FACTORS CONTROLLING GRAFT-HOST INTERACTIONS Children's Hospital of Oakland Research Institute 1971-2011 **MOHANDAS NARLA, DSC** MECHANISM OF HEMOGLOBIN TRANSITION DURING DEVELOPMENT University of California, San Francisco RED CELL FERRITIN MRNA AND PROTEIN — STRUCTURE/FUNCTION Lawrence Berkeley Laboratory IRON & OXYGEN BIOLOGY IN SCH, HH & BETA-THAL MICE FERRITIN: PROTEIN/mrna/dna in fe and oxygen regulation/metabolism New York Blood Center 1980-2013

New York University School of Medicine PROGRAM PROJECT: RED CELL MEMBRANE STUDIES 1968-1993 PETER E NEWBURGER, MD ULTRASTRUCTURE OF LEUKOCYTES AND PLATELETS University of Massachusetts M AMIN ARNAOUT, MD Massachusetts General Hospital, Harvard University STUDIES OF IN VITRO HEMATOPOIESIS LEUKOCYTE GLUTATHIONE PEROXIDASE EXPRESSION 1989-2014 ID FAMILY REGULATION OF STEM CELL DEVELOPMENT MOLECULAR BASIS OF MO1/LFA-L DEFICIENCY GENE EXPRESSION IN MATURE NEUTROPHILS GRANULOCYTE CYTOPLASMIC ANTIGENS IN RENAL VASCULITIS HOX CLUSTER INTERGEIC NON-CODING RNAs IN MYELOID PHAGOCYTE MEMBRANE

PAUL R ORTIZ DE MONTELLANO, PhD University of California, San Francisco

1990s

1982-2003

1976-1995

1980-2008

Duke University

MEMBRANE ABNORMALITIES IN PNH

HEME SYNTHESIS IN HUMAN LIVER CULTURE

ANTERO G SO, MD, PhD

University of Washington

MOLECULAR MEDICINE TRAINING PROGRAM

MOLECULAR CONTROL OF HUMAN GLOBIN GENE SWITCHING

DOROTHEA ZUCKER-FRANKLIN, MD

STRUCTURE AND FUNCTION OF BETA2 INTEGRIN

VASCULAR DEVELOPMENT

ROLE OF THE ZINC FINGER TRANSCRIPTION FACTOR ZBP89 IN BLOOD AND

CENTER OF EXCELLENCE IN MOLECULAR HEMATOLOGY

University of Miami

1979-2002

1982-2012

ELIZABETH R SIMONS, PhD

Boston University School of Medicine

Fidelity of DNA synthesis in Hematopoietic Tissues

GEORGE STAMATOYANNOPOULOS, MD, DSC

MOLECULAR BIOLOGY OF HEMOPOIETIC STEM CELLS PROGRAM PROJECT

Rockefeller University

1982-1997

1983-2004

Indiana University

University of Virginia

University of Massachusetts

Medical University of South Carolina IDENTIFICATION AND PURIFICATION OF HUMAN STEM CELLS

THALIA PAPAYANNOPOULOU, DSC, MD HAL E BROXMEYER, PhD University of Washington Indiana University 1985-2015 STUDIES OF GLOBIN SWITCHING & ERYTHROID DIFFERENTIATION FRANK W PUTNAM, MD, PhD

JANE-JANE CHEN, PhD BLOOD PLASMA PROTEINS: STRUCTURE AND FUNCTION 1994-2013 PETER J QUESENBERRY, MD

Roger Williams Hospital HEMOPOIETIC CELLULAR INTERACTIONS AND LITHIUM HEMATOLOGY/ONCOLOGY TRAINING GRANT HEMOLYMPHOPOIETIC GROWTH FACTORS PROGRAM PROJECT REPETITIVE MARROW TRANSPLANTATION INTO NORMAL MICE STEM CELL BIOLOGY PROGRAM PROJECT MINIMAL TREATMENT MODELS OF STEM CELL ENGRAFTMENT

NIH Intramural Laboratories (NIDDK) 1984-2011 SICKLE CELL DISEASE WENDELL F ROSSE, MD

THE GENETICS AND DEVELOPMENT OF ERYTHROID HEME ENZYMES

HEMATOPOIETIC ORIGIN OF MESENCHYMAL STEM CELLS

FUNCTION OF THE HEMOCHROMATOSIS PROTEIN SHIGERU SASSA, MD, PhD

MARK T GROUDINE, MD, PhD University of Washington 1992-2011

FUNCTION OF HUMAN & MOUSE B GLOBIN LOCUS CONTROL REGIONS

1994-2013 Research training grant in Hematology HEREDITARY HEMOCHROMATOSIS CENTER OF EXCELLENCE IN MOLECULAR HEMATOLOGY PORPHYRIN BIOSYNTHESIS IN NORMAL AND DISEASE STATES HEMOCHROMATOSIS MODIFIER GENES

JAMES N IHLE, PhD St. Jude Children's Hospital 1990-2008 CYTOKINE REGULATED GROWTH OF HEMATOPOIETIC CELLS IHOR R LEMISCHKA, PhD

Princeton University Mount Sinai School of Medicine 1990-2010 MOLECULAR STUDIES OF HEMATOPOIETIC STEM CELLS CHARACTERIZATION OF HUMAN HEMATOPOIETIC STEM CELLS ANALYSES OF STEM CELL PLASTICITY GLOBAL GENOMIC ANALYSIS OF HUMAN HEMATOPOIESIS

TIMOTHY J LEY, MD Washington University 1987-2010 REGULATION OF FETAL AND ADULT HUMAN HEMOGLOBIN PRODUCTION GRANZYMES AND CYTOTOXIC LYMPHOCYTE FUNCTIONS

BING LIM, MD, PhD Beth Israel Deaconess Medical Center, Harvard University 1991-2009 HEMATOPOIETIC DIFFERENTIATION IN EMBRYONAL STEM CELLS HEMATOPOIETIC SPECIFIC GENES IN STEM CELL DEVELOPMENT Lysosomal proteolysis in Hematopoietic Cells

BARBARA A MILLER, MD Pennsylvania State University, Hershey Medical Center Ferritin, IRON HOMEOSTASIS, AND CELLULAR STRESS SIGNAL TRANSDUCTION MECHANISMS OF ERYTHROPOIETIN

2000s

JEFFERY L MILLER, MD

ERYTHROID CELL GENOMICS

1995-2011

IRON METABOLISM

1983-2010

NIH Intramural Laboratories (NIDDK)

KENNETH N RAYMOND, PhD

FERRIC ION SEQUESTERING AGENTS: IRON REMOVAL IN MAN

CHRISTA E MULLER-SIEBURG, PhD

ISOLATION OF HEMATOPOIETIC AND STROMAL CELL PRECURSORS

GENE TRANSFER INTO STEM CELLS VIA STROMAL CELL PRODUCERS

STROMAL CELL MOLECULES REGULATE STEM CELL PROLIFERATION

Burnham Institute for Medical Research

EPIGENETIC CONTROL OF HEMATOPOIETIC STEM CELLS

Memorial-Sloan Kettering Cancer Center

STEPHEN DAVID NIMER, MD

University of California, Los Angeles

THERAPEUTIC MULTIDENTATE IRON SEQUESTERING AGENTS

University of California, Berkeley

ONTOGENY OF GLOBIN GENE EXPRESSION

MOLECULAR CONTROL OF NEUTROPHIL-SPECIFIC GENE EXPRESSION JAMES J BIEKER, PhD

NANCY BERLINER, MD

Yale University

Mount Sinai School of Medicine FUNCTION OF A PUTATIVE DETERMINANT IN HEMATOPOIESIS REDIRECTING HEMOGLOBIN EXPRESSION DURING HUMAN ES CELL DIFFERENTIATION HEMATOPOIETIC STEM CELL COMMITMENT — MOLECULAR REGULATION

REGULATION OF HEMATOPOITIC CELL PRODUCTION TRAINING GRANT CHEMOKINES/CYTOKINES AND RECEPTORS IN STEM CELL HOMING REGULATING HEMATOPOIETIC STEM CELLS AND HEMATOPOIESIS FOR CLINICAL EFFICACY

Massachusetts Institute of Technology REGULATION OF PROTEIN SYNTHESIS AND ERYTHROPOIESIS STRUCTURE/FUNCTION OF HEME REGULATED ELF-2ALPHA KINASE HRI/elF2aP SIGNALING PATHWAY AS POTENTIAL PHARMACEUTICAL TARGETS FOR THALASSEMIA JOHN L CLEVELAND, PhD

St. Jude Childrens Research Hospital Scripps Florida Research Institute C-MYC FUNCTION IN MYELOID CELL GROWTH & DIFFERENTIATION C-MYC ROLE IN HEMATOPOIESIS, VASCULOGENESIS, AND ANGIOGENEISIS ALAN D D'ANDREA, MD

> Dana Farber Cancer Institute, Harvard University STRUCTURE AND FUNCTION OF THE ERYTHROPOIETIN RECEPTOR ABNORMAL SIGNAL TRANSDUCTION IN HEMATOPOIETIC DISEASE REGULATION OF THE FANCONI ANEMIA PATHWAY BY UBIQUITINATION CAROLINE ENNS, PhD Oregon Health and Science University

STRUCTURE - FUNCTION OF THE HUMAN TRANSFERRIN RECEPTOR FUNCTIONAL DOMAINS OF THE TRANSFERRIN RECEPTOR REGULATION AND FUNCTION OF TRANSFERRIN RECEPTOR-2

1990-2012 CELLULAR CONTROL OF HEMOPOIETIC GROWTH FACTOR PRODUCTION FUNCTION OF MEF IN HEMATOPOIETIC CELLS Molecular Pathogenesis of Myeloid Leukemia

VITAMIN D3 INDUCIBLE GENES MEDIATING DIFFERENTIATION STUART H ORKIN, MD Children's Hospital Boston, Harvard University MOLECULAR DEVELOPMENTAL HEMATOPOIESIS

> CENTER FOR MOLECULAR DEVELOPMENTAL HEMATOPOIESIS WILLIAM R OSBORNE, PhD University of Washington 1989-2008 PURINE NUCLEOSIDE PHOSPHORYLASE GENE TRANSFER

CANINE G-CSF GENE TRANSFER CLINICAL MODEL OF ERYTHROPOIETIN GENE THERAPY ENCAPSULATED CELLS TO TREAT TYPE-1 DIABETES MICHAEL K PANGBURN, PhD University of Texas 1984-2012

REGULATION OF COMPLEMENT BY MEMBRANE PROTEINS

STEPHEN T SMALE, PhD University of California, Los Angeles 1991-2016 REGULATION OF TDT EXPRESSION DURING LYMPHOPOIESIS BIOLOGICAL FUNCTIONS AND MECHANISMS OF ACTION OF IKAROS PROTEINS University of California, Los Angeles

ACTIVATION OF THE ALTERNATIVE PATHWAY OF COMPLEMENT

DANIEL G TENEN, MD Beth Israel Deaconess Medical Center, Harvard University 1994-2013 REGULATION OF THE HUMAN CD34 STEM CELL GENE HEMATOPOIETIC STEM CELL COMMITMENT

FRANK M TORTI, MPH, MD Stanford University Wake Forest University 1989-2012 TUMOR NECROSIS FACTOR AND IRON METABOLISM

Indiana University Cincinnati Children's Hospital Children's Hospital Boston 1994-2011 STEEL GENE PRODUCT AND STEM CELL PROLIFERATION GENETIC MODIFICATION — ALTERNATIVE SOURCES OF STEM CELLS CORE CENTERS OF EXCELLENCE IN MOLECULAR HEMATOLOGY RAC PROTEIN IN HEMATOPOIETIC CELL SURVIVAL AND FUNCTION CHEMORESISTANCE AND STEM CELL SELECTION DEVELOPMENT OF A PEDIATRIC MYELODYSPLASTIC SYNDROME PATIENT REGISTRY NOVEL THERAPIES FROR FANCONI ANEMIA

DAVID A. WILLIAMS, MD

NANCY CATHERINE ANDREWS, PhD, MD Boston Childrens Hospital, Harvard University Duke University 1998-2013 REGULATION OF IRON HOMEOSTASIS IRON TRANSPORT AND ERYTHROPOIESIS MODIFIERS OF IRON LOADING IN MICE

GERD A BLOBEL, MD, PhD Children's Hospital of Philadelphia, University of Pennsylvania 1999-2014 TRANSCRIPTIONAL ERYTHROID CELL DIFFERENTIATION MECHANISMS OF GENE REPRESSION DURING HEMATOPOIETIC DIFFERENTIATION CHROMATIN LOOPS AT THE BETA GLOBIN LOCUS

EMERY H BRESNICK, PhD University of Wisconsin 1996-2015 COACTIVATORS THAT MEDIATE BETA GLOBIN LCR FUNCTION TRANSCRIPTIONAL CONTROL OF HEMOGLOBIN SYNTHESIS HEMATOPOIETIC REGULATION OF GATA SWITCHES NOVEL ERYTHROID MEMBRANE PROTEIN

JORG BUNGERT, PhD

Northwestern University

University of Florida 1997-2014 STRUCTURE/FUNCTION OF THE HUMAN B-GLOBIN LCR LOCUS CONTROL REGION FUNCTION ON INACTIVE X-CHROMASOMES FUNCTIONAL PROTEOMICS IN DIFFERENTIATING ERYTHROID CELLS ANDREW B DANCIS, MD University of Pennsylvania 1998-2013

IRON TRAFFICKING IN SACCHAROMYCES CEREVISIAE

BIOCHEMISTRY AND GENETICS OF IRON TRANSPORT IN MITOCHONDRIA

SHUO LIN, PhD Medical College of Georgia 1998-2015 GENETIC ANALYSIS OF HEMATOPOIETIC DEVELOPMENT TARGETED MUTAGENESIS IN ZEBRAFISH BY ANIMAL CLONING ZEBRAFISH CORE – UCLA MOLECULAR HEMATOLOGY CENTER OF EXCELLENCE

LEONARD I ZON, MD, PhD Children's Hospital Boston, Harvard University 1996-2013 INDUCTION OF HEMATOPOIETIC STEM CELLS DURING ZEBRAFISH EMBRYOGENESIS — COMPARATIVE APPROACH TO GLOBIN REGULATION/ THALASSEMIA — CHARACTERIZING THE ZEBRAFISH GENOME COMPARATIVE APPROACH TO THE HEMATOPOIETIC STEM CELL