HEALTH EFFECTS RESEARCH LABORATORY

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HEALTH EFFECTS RESEARCH LABORATORY

The Health Effects Research Laboratory formulates and implements a comprehensive research program to investigate human health effects from exposure to environmental pollutants. Staffed by health scientists with recognized expertise in a variety of disciplines--environmental medicine, physiology, epidemiology, statistics, biochemistry, neurotoxicology, reproductive toxicology, teratology, perinatal toxicology, geriatric toxicology, pulmonary toxicology, immunotoxicology, cardiovascular toxicology, genotoxicology, hepatotoxicology and other target organ toxicology, and microbiology--HERL is the focal point for toxicological, clinical and epidemiological research within the Agency. HERL also establishes cooperative research projects with academic and other scientific institutions which facilitate the Agency efforts in understanding health effects of environmental pollutants. This research program develops and applies state-of-the-science biological assays, predictive models and extrapolation methods which serve as the basis for the Agency's health risk assessments.

The long-term basic components of the HERL research program are designed to anticipate the future needs of the Agency and enable the Office of Health Research to provide direction on environmental health issues. In recognition of legislative and regulatory needs, HERL conducts an effective mission-related research program to enable the Agency to better determine toxicological hazard, define dose-response relationships, and estimate human exposure characteristics in support of the Agency's overall risk assessment and guideline development. The breadth of expertise of the HERL researchers is also marshalled in the event of Program Office requests and environmental emergencies to address immediate public health issues. HERL evaluates and communicates its research results and provides advice on their use to offices for criteria development and scientific assessments in support of regulatory and standard setting activities.

HERL advises the Agency on the scientific interpretation and integration of information used in the determination of human health risks. It responds with recognized authority to changing requirements for technical assistance to other ORD offices, Program Offices, Regions, senior Agency managers, Agency workgroups, and Interagency Task Forces. Through the active involvement of its scientific staff with Agency research and advisory committees, other Agency offices, and through interaction with academic and other independent scientific bodies, the Laboratory assists in the formulation of health science policy for the Agency. Finally, as a result of these relationships and the scientific capabilities of its staff, the Laboratory provides the leadership in the development of national and international environmental health research efforts.

BIOGRAPHICAL SKETCHES OF MANAGERS

Lawrence W. Reiter

Director, National Health and Environmental Effects Research Laboratory. Dr. Reiter received a Ph.D. from the University of Kansas Medical Center Department of Pharmacology in 1970, and a B.S. in Chemistry from Rockhurst College in Kansas City, MO, in 1965. After a three year postdoctoral fellowship at the University of California/Davis, Dr. Reiter joined the EPA Health Effects Research Laboratory in 1973. From 1978 through 1988 he served as the Director of the Neurotoxicology Division of HERL. He is the recipient of a number of awards such as the Presidential Rank Award for Sustained Meritorious Accomplishment. He has served on the editorial boards for a number of toxicology journals, holds an adjunct appointment in toxicology at the University of North Carolina School of Medicine, has served on numerous advisory panels, both within EPA as well as in the scientific community (e.g., FASEB, NAS), and has held elected positions in national scientific organizations.

Ann H. Akland

Deputy Director, National Health and Environmental Effects Research Laboratory. Ms. Akland attended Duke University and received a B.S. in Business Administration from Barton College. She has held several positions in HERL or predecessor organizations since 1973, including Administrative Assistant, Administrative Officer, Director of Program Operations, Management Analyst, Chief of the Information Management Staff, Special Assistant to the Laboratory Director, and Director of the Program Support Office. She has served on numerous Agency and ORD Work Groups and Committees concerned with management and administrative issues.

Harold Zenick

Associate Director for Health. Dr. Zenick earned a Ph.D. in Physiological Psychology/Psychopharmacology from the University of Missouri (Columbia) in 1972. He also completed a Post-doc in Toxicology at the University of Cincinnati. Prior to joining NHEERL, he was a Branch Chief in the Office of Health and Environmental Assessment, preceded by 15 years in academia. Dr. Zenick serves as EPA's liaison to the NIEHS and NTP Advisory Councils. He is also a member of the Advisory Committee for EPA Minority Academic Institution Traineeship Program.

Currently, Dr. Zenick is Co-Chair of the Interagency Coordinating Committee on Environmental Health on the U.S.-Mexico Border and Director of ORD's Border Workgroup. His research interests are in noncancer risk assessment methods and the role of science in the regulatory decision-making process.

Ila Leigh Cote

Assistant Laboratory Director for Air and Radiation. Dr. Cote earned a Ph.D. from the University of New Mexico Medical Department of Physiology in Albuquerque, NM, in 1978. She is currently responsible for the coordination of all research for Air and Radiation. She is the recipient of an EPA Achievement Award and the EPA Bronze Medal for Contributions in the Risk Assessment of Air Pollutants. She serves on EPA's Risk Forum and the Executive Board of the N.C. Society of Risk Analysis. Prior to her work at EPA, Dr. Cote served as an Assistant Research Professor at the New York University Medical Center, where she specialized in chemical carcinogenesis research.

Robert S. Dyer

Assistant Laboratory Director for Hazardous Waste and Superfund. Dr. Dyer received a Ph.D. in Physiological Psychology from the State University of New York at Buffalo in 1970 and performed postdoctoral research in neurophysiology at the University of Michigan and in environmental health sciences at the Johns Hopkins University. Dr. Dyer taught Psychology at Towson State University, where he was awarded tenure and the Faculty Award for Excellence in Teaching in 1974. More recently, Dr. Dyer was Chief of the Neurophysiology Branch, Neurotoxicology Division from 1981-1989, Acting Director of the Neurotoxicology Division in 1989 and Associate Director of HERL from 1989-1995. Dr. Dyer was the recipient of an EPA Scientific and Technological Achievement Award in 1985, and is listed in the current "Who's Who in Frontiers of Science and Technology." He served as Neurophysiology Section Editor for Neurotoxicology and Teratology from 1983-1990, and has been on the Editorial Advisory Board of Neurotoxicology since 1978. Dr. Dyer has been an invited participant at numerous international symposia and workshops and has authored more than 200 peer-reviewed publications, book chapters and abstracts.

Fred S. Hauchman

Assistant Laboratory Director for Water. Dr. Hauchman received a Ph.D. in Environmental Health Sciences from the Johns Hopkins University in 1984, and an M.S. in Public Health from the University of North Carolina in 1976. After conducting

postdoctoral research in environmental virology at the University of North Carolina, Dr. Hauchman joined the EPA Office of Air Quality Planning and Standards as a senior environmental health scientist. As Assistant Director for Water at NHEERL, Dr. Hauchman is responsible for managing the EPA health and ecological effects research program for water pollutants. He has received numerous special achievement awards and two bronze medals at EPA for contributions to risk assessments from hazardous air pollutants. Dr. Hauchman has been an invited speaker at many national and international symposia and meetings, and is a member of several professional societies.

Suzanne B. McMaster

Assistant Laboratory Director for Pesticides and Toxic Substances. Dr. McMaster holds bachelor of Science and Master of Arts degrees from the University of Texas. She studied at the University of Oklahoma Health Sciences Center as a MacLeod Predoctoral Fellow and was awarded a Ph.D. in Biological Psychology in 1984.

Dr. McMaster joined the Environmental Protection Agency in Washington, D.C. in 1989. She initially worked as a staff neurotoxicologist in the Office of Toxic Substances and was later assigned to the Office of the Assistant Administrator for Pesticides and Toxic Substances. In 1993, she moved to EPA's Health Effects Research Laboratory in Research Triangle Park, North Carolina, as Assistant Laboratory Director for Pesticides and Toxics.

Dr. McMaster is a co-author of several EPA testing and risk assessment guidance documents, the federal policy document on neurotoxicity and the proposed international guidelines for neurotoxicity testing. She serves as an ad hoc reviewer for a number of scientific journals and is the neurotoxicology Section Editor for the Journal of the American College of Toxicology.

John J. Vandenberg

Assistant Laboratory Director for Multi-media and Director of the Research to Improve Health Risk Assessments (RIHRA) Program. Dr. Vandenberg earned a Ph.D. in Biophysical Ecology from Duke University in 1987, and an M.S. in the same field, also from Duke, in 1982. He presently is on the faculty of the Duke University School of the Environment as an Adjunct Assistant Professor and teaches a graduate course in air quality assessment and management. Prior to joining HERL, he worked for seven

years in EPA's air office performing risk assessments for air toxics. His work on air toxics has resulted in several awards including four Bronze Medals. He also was on detail for a year to the California Department of Health Services developing risk assessment guidelines for reproductive and developmental toxicants and assessing modeling approaches for reproductive endpoints. As Director of the RIHRA program he is currently responsible for the coordination of multi-office research program to develop health effects data and models to improve the scientific basis for risk assessment. Dr. Vandenberg is an active member of several professional associations, including the Society for Risk Analysis and the Air and Waste Management Association.

Michael D. Waters

Senior Scientist and Assistant Laboratory Director for International Programs. Dr. Waters received a Ph.D. in Biochemistry from the University of North Carolina at Chapel Hill in 1969 and was Chief of the Biochemistry Branch, Environmental Toxicology Division, from 1976 to 1979 and Director of the Genetic Toxicology Division from 1979-1992. He was awarded the Bronze Medal by EPA in 1980 for his work in developing HERL's genetic toxicology program and in 1987 for his work in assessing the genetic toxicology of chemicals. He was President-Elect and President of the Environmental Mutagen Society from 1990-92 and is currently President of the Genotoxicity and Environmental Mutagen Society. He has served on a number of International Scientific Committees and Editorial Boards. He is Adjunct Professor of Toxicology at the University of North Carolina at Chapel Hill (since 1980) and at Duke University (since 1992). He has organized many national and international conferences and has more than 120 publications.

DEVELOPMENTAL TOXICOLOGY DIVISION

The Developmental Toxicology Division conducts and manages biological research on the effects of environmental pollutants, singly or in combination, on reproduction and development. The research identifies and quantifies effects using the appropriate biological systems as models to provide data needed by the agency for the assessment of potential hazards to humans resulting from exposure to various environmental pollutants. The chemical agents under investigation include toxic substances, pesticides, air pollutants, drinking water contaminants, and hazardous wastes. Biological indices for assessing damage include germ cell physiology, morphology and function, reproductive development and function, endocrine function related to reproduction and teratogenesis. Major research emphasis is on the development of new and improved methodologies for the assessment of male and female reproductive toxicity, embryo and fetal toxicity, and postnatal functional deficits. The Division also has research programs involving health related issues pertaining to the use of microbial agents as pesticides. The research generated in the Division contributes to the improved interpretation of toxicological data, and the development of guidelines for the safe usage of pesticides and toxics (chemical and biological), management of hazardous waste, and establishment of safe drinking water criteria as mandated by the Environmental Protection Agency.

BIOGRAPHICAL SKETCHES OF MANAGERS

Robert J. Kavlock

Director of the Developmental Toxicology Division. Dr. Kavlock holds a Ph.D. in Biology from the University of Miami (1977). The Division conducts research in the areas of experimental teratology, developmental physiology, reproductive development and endocrinology, and gamete cell biology. His research interests include embryology, teratogenesis, renal physiology, and risk extrapolation. He has authored more than 100 journal articles and two books. Currently, his activities are focused on the application of benchmark dose methodology to developmental toxicity data and the development of biologically based dose-response models. His research has been recognized by ten STAA awards and in 1995 he received the EPA's Science Achievement Award for his efforts in validating the benchmark dose approach for developmental toxicity risk assessment. He holds academic appointments at North Carolina State University and Duke University and has given invited presentations on his research at numerous national and international scientific meetings. Dr. Kavlock was a member of the National Toxicology Program's Board of Scientific Councilors on Developmental and Reproductive Toxicology (1989-1993). He is a member of the Society of Toxicology, Sigma Xi, and the Teratology Society. He was Chairperson of the Scientific Program Committee of the 1988 Teratology Society Meeting, served on the Education Committee of the Teratology Society (1989-1992) and is now a Councilor (1993-1995). He served as Secretary/Treasurer (1989-1991), Councilor (1993-1995) and is Vice-President-Elect of the Reproductive and Developmental Toxicology Subsection of the Society of Toxicology. He served as Chair for the U.S. EPA Endocrine Disruptor Research Needs Workshop in April, 1995. He is a member of the editorial boards of Fundamental and Applied Toxicology, The Journal of Toxicology and Environmental Health and Teratogenesis, Carcinogenesis and Mutagenesis.

John M. Rogers

Chief of the Perinatal Toxicology Branch and Acting Chief of the Experimental Teratology Section. Dr. Rogers earned a Ph.D. in Biology from the University of Miami in 1982, and received a National Research Service Award from the National Eye Institute for postdoctoral work at the University of California at Davis from 1982-84. His research interests include developmental biology, mechanisms of abnormal development, developmental nutrition, and

risk assessment. Dr. Rogers has authored over 50 journal articles and chapters, and has been an invited speaker or participant at EPA, NIEHS, FDA and EPRI workshops. He serves on Health Research Grant Review Panels for the Center for Indoor Air Research, and ATSDR. He is a member of the Society of Toxicology, the Teratology Society and the Society for Experimental Biology and Medicine. He has taught courses in cell and developmental zoology at North Carolina State University and is an Adjunct Assistant Professor in the Curriculum in Toxicology at the University of North Carolina, Chapel Hill.

Sally Perreault Darney

Chief of the Reproductive Toxicology Branch and Acting Chief of the Gamete Biology Section. Dr. Darney earned a Ph.D. in Reproductive Biology from the University of Hawaii in 1980 and a National Research Service Award (NICHHD) as a postdoctoral fellow at the Johns Hopkins University before joining EPA in 1984. The author of over 40 journal articles and chapters, her expertise includes sperm/egg maturation and function (fertilization) and reproductive toxicology. She has been invited to discuss these topics in national forums such as the Society of Toxicology annual meetings, the CIIT Symposium on Reproductive Toxicology, the Serono Symposium on Fertilization in Mammals, and various EPA, NIOSH and NIEHS workshops. She has also spearheaded a national effort to standardize methods for computer-assisted sperm motility analysis and made significant contributions to the proposed EPA Reproductive Risk Assessment Guidelines. An active member of the American Society of Andrology, The Society for the Study of Reproduction, and The American Society for Cell Biology, she also serves on the editorial boards of Reproductive Toxicology and Molecular Reproduction and Development.

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ENVIRONMENTAL CARCINOGENESIS DIVISION

The research program of the Environmental Carcinogenesis Division encompasses the fields of mutagenesis, carcinogenesis and related studies in cellular toxicology. The program includes definitive studies on the metabolic activation and detoxification of those agents which exert their effects via genetically-related mechanisms as well as investigations of alternative mechanisms which result in mutation and cancer. The Division possesses the capability of fully evaluating the mutagenic and oncogenic potential of agents of environmental concern including pure chemicals and complex environmental mixtures. The process of evaluation of potential environmental genotoxicants is approached through the step-wise application of bioassay methodologies involving short-term screening tests, confirmatory short-term bioassays, and eventually, established whole animal mutagenesis and carcinogenesis bioassays. The Division has major research programs in improving risk assessment procedures, applying biomarkers to environmental health studies, improving the bases for heritable mutation risk assessment and application of structure activity methods (SAR) to environmental toxicology. The intramural research competence of the Division is directed principally toward the development, validation, and application of short-term bioassays and research in biotechnology to meet the research and regulatory needs of the Agency. Long-term mutagenesis and carcinogenesis bioassays are conducted through the use of extramural grants and contracts.

BIOGRAPHICAL SKETCHES OF MANAGERS

Larry D. Claxton

Acting Director of the Environmental Carcinogenesis Division. Dr. Claxton received his Ph.D. in Genetics from North Carolina State University at Raleigh in 1980. His minor for his Ph.D. in Public Health Administration was taken at the School of Public Health, University of North Carolina at Chapel Hill. Dr. Claxton also has done research at the Oak Ridge National Laboratory and the National Institute of Environmental Health Sciences. He was awarded the Bronze Medal by EPA in 1980 for scientific contributions to the understanding of the toxicology of automotive emissions and in 1992 for his biotechnology health effects research. He has received Special Act Awards for biotechnology health effects research and for the Alaskan Oil Spill Research Program. He has also received the Scientific and Technical Achievement Award upon three occasions for his peer-reviewed scientific publications. He is a Past President of the Genotoxicity and Environmental Mutagen Society and a former councilor of the Environmental Mutagen Society. He has served on a number of Agency and international scientific committees (IPCS, ICPEMC, ASTM). Presently, he is a member of the editorial board of Mutation Research. Formerly, he served on the editorial board for Molecular and Environmental Mutagenesis. He presently holds Adjunct Associate Professor Appointments at both the University of North Carolina, Chapel Hill and North Carolina State University, Raleigh. Research interests include the carcinogenicity of environmental mixtures and their effects upon the human population. Research also involves the health effects of environmentally released genetically engineered microorganisms and the toxicology of their metabolic products. He was a coauthor of a book Atmospheric Chemical Compounds: Sources, Occurrence, and Bioassay, co-editor on five books, and has published over 100 peer-reviewed journal articles and book chapters.

Martha M. Moore

Chief of the Mutagenesis and Cellular Toxicology Branch. Dr. Moore joined EPA in 1977 as a Research Biologist in the Environmental Toxicology Division (later reorganized to the Genetic Toxicology Division) and most recently the Environmental Carcinogenesis Division. A Summa Cum Laude graduate of Western Maryland College, she received a Ph.D. in Genetics from the University of North Carolina at Chapel Hill in 1980. In 1982,

Dr. Moore received an EPA Scientific/Technological Achievement Award for her research. She is a member of the American Association for the Advancement of Science, the Environmental Mutagen Society, the Association for Women in Science, and several other regional societies. Dr. Moore is a former President of the Genotoxicity and Environmental Mutagen Society and former member of the Environmental Mutagen Society Council. She serves on two EPA Gene-Tox committees. In addition to publishing more than 70 scientific articles, she has served as editor of several books, including "Banbury Report 28" from the Cold Spring Harbor Laboratory Press.

Stephen Nesnow

Chief of the Carcinogenesis and Metabolism Branch. Dr. Nesnow received a Ph.D. in Organic Chemistry in 1968 and an M.S. in Organic Chemistry in 1966, both from New York University. He is an Adjunct Professor in the School of Medicine and a member of the Cancer Research Center at the University of North Carolina at Chapel Hill. Dr. Nesnow acquired post-doctoral experience at the Sloan-Kettering Institute for Cancer Research and at the McArdle Laboratory for Cancer Research before joining the faculties of the University of Wisconsin and the University of North Carolina. He has received a number of awards from EPA including a Bronze Medal, and four Scientific and Technological Achievement Awards. Dr. Nesnow is a member of the editorial boards of Cancer Letters, The Journal of Toxicology and Environmental Health and The Journal of Environmental Science and Health, a member of the Aspen Cancer Conference Advisory Committee, a member of the Board of Governors of the International Symposium on Polynuclear Aromatic Hydrocarbons, and has served many times on International Agency for Research on Cancer (IARC) Working Groups. Dr. Nesnow has been an invited speaker to many national and international symposia and has served as organizer and session chairman at many of these meetings. He is the author of 160 journal articles, book chapters, and books.

Joellen Lewtas

Chief of the Genetic Bioassay Branch. Dr. Lewtas received her Ph.D. in Biochemistry from North Carolina State University, Raleigh, NC, in 1973. Prior to coming to the EPA, she was a Research Associate in the Biochemistry Department at Duke University School of Medicine, Durham, NC, from 1977 to 1980. She was awarded the Silver Medal for Superior Service for research

on diesel emissions and two Bronze Medals for Commendable Service in Indoor Air Research and the Integrated Air Cancer Project. She also received the EPA Excellence in Management Award in 1987 and 1988. She has been appointed a member of four editorial boards, chaired over a dozen major committees within EPA, and served on a variety of national and international review committees, most notably the International Agency for Research on Cancer (IARC) in Lyon, France. She has also published over 100 peer-reviewed journal articles, over 80 book chapters, and edited 6 books. She is a member of numerous professional organizations, and she is an internationally recognized expert in biomarkers of exposure, dosimetry and genotoxic effects of polluted air and complex environmental mixtures.

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ENVIRONMENTAL TOXICOLOGY DIVISION

The Environmental Toxicology Division conducts research to determine the health effects of inhaled environmental pollutants. The research is designed to determine cause and effects relationships at pollutant concentrations which mimic those occurring in the environment. Particular emphasis is placed on the development and application of improved methods which enable significant advancement in the knowledge of the health effects of air pollutants. Intense investigations center on the pulmonary and cardiovascular systems, the immune system, host defense mechanisms against infectious and neoplastic disease and other extrapulmonary systems which are also susceptible to inhaled pollutants. The Division serves as a primary technical resource within the Agency for activities requiring expertise in animal inhalation studies and in the health effects of common air pollutants. Continual efforts are made to improve the correlation between animal and human studies and extrapolation models are developed to enable better risk assessments to be made. These extrapolation models are founded on physiological-based dosimetry models for compounds which have been ingested, inhaled, or dermally applied. Methods for the isolation and identification of chemicals and metabolites in tissues and biological fluids are developed and then applied in experimental dosimetry research programs. Issues such as route-to-route, acute-to-chronic, and animal-to-man extrapolation are addressed. The pharmacokinetic and toxicodynamic research of the Division is capable of addressing problems relevant to all decision units which provide resources to HERL. Multidisciplinary teams comprised of scientists with and external to the Division are integral to the Division successfully fulfilling its research mission.

BIOGRAPHICAL SKETCHES OF MANAGERS

Linda S. Birnbaum

Director of the Environmental Toxicology Division. Dr. Birnbaum received her Ph.D. in Microbiology from the University of Illinois at Urbana in 1972, with a minor in Biochemistry. Prior to her work at EPA, she was Head of the Chemical Disposition Group at NIEHS. She became certified as a Diplomate from the American Board of Toxicology in 1982. Dr. Birnbaum is on the editorial board of Toxicology and Applied Pharmacology, Environmental Health Perspectives, Journal of Toxicology and Environmental Health and AGE. She currently also serves on the faculty of the University of North Carolina at Chapel Hill as an Adjunct Professor in the School of Public Health and on the Executive Committee of the Toxicology Curriculum. Dr. Birnbaum is on Scientific Advisory Committees for EPA, NIOSH, CIIT and IPCS. She has presented more than 40 national and international invited talks since 1989. She is a member of the Society of Toxicology, the American Society for Pharmacology and Experimental Therapeutics, the American Aging Association, the American Association for the Advancement of Science, and Sigma Xi. She is the past President of the North Carolina Society of Toxicology and of the Mechanisms Section of the Society of Toxicology and a past member of its Education Committee. She has authored more than 180 peer-reviewed publications.

James D. McKinney

Chief of the Pharmacokinetics Branch. Dr. McKinney received his Ph.D. in Organic Chemistry from the University of Georgia in 1968, with minors in biochemistry and inorganic chemistry. Prior to his work at EPA, he was a Research Chemist in the Office of the Senior Scientific Advisor, Office of the Director, and Chief of the Laboratory of Environmental Chemistry, Division of Intramural Research, National Institute of Environmental Health Sciences. Dr. McKinney is on the editorial review board of Environmental Health Perspectives. He currently serves as an Adjunct Professor at Duke University Medical Center. He is the author of over 100 articles in peer-reviewed journals.

Daniel L. Costa

Chief of the Pulmonary Toxicology Branch. Dr. Costa earned an Sc.D. in Physiology from the Harvard University School of Public Health in 1977, an M.S. in Physiology from Harvard in 1973, and

an M.S. in Environmental Sciences from Rutgers University in 1973. He is a member of the American Association for the Advancement of Science, the American Thoracic Society, the American Men and Women of Science, Sigma Xi and the Society of Toxicology. He is a Past-President of the American Board of Toxicology, is Vice President of the Inhalation Specialty Section of the SOT, and is chair of the Long-Range Planning Committee of the Environmental Occupational Assembly of ATS. He is the author of 57 journal articles, 7 symposium articles, 7 book chapters and the editor of 2 books. His research interests are in lung biology and mechanisms of air pollutant induced pathophysiology.

MaryJane K. Selgrade

Chief of the Immunotoxicology Branch. Dr. Selgrade received a Ph.D. in Medical Microbiology from the University of Wisconsin, Madison, in 1973. After a National Research Council Associateship at the Naval Medical Research Institute, Bethesda, MD, a postdoctoral fellowship at the University of North Carolina at Chapel Hill, and a visiting Assistant Professorship at North Carolina State University, Raleigh, she joined EPA in 1978. Her research interests center around the interactions between xenobiotics and the immune system and consequent effects on susceptibility to infectious, neoplastic, and allergic disease. Disease models currently in use in her laboratory include mouse and rat models for cytomegaloviruses, influenza, aerosolized streptococcus and dust mite allergy. Methods for assessing chemically-induced contact and pulmonary hypersensitivity are also being developed. Some of the above models are specifically designed to assess immune defense mechanisms in the lung following chemical exposure by inhalation. Dr. Selgrade has recent publications dealing with the effects of air pollutants on host defenses against infectious disease, the effects of xenobiotics on natural killer cell activity and susceptibility to cytomegalovirus, the pathogenesis of and immune response to cytomegalovirus, the effects of viral infection on xenobiotic metabolism and the use of immunotoxicity data in risk assessment. She recently served on work groups for the World Health Organization which produced an Environment Criteria document on the Health Effects of Ultraviolet Radiation.

PUBLICATIONS

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HUMAN STUDIES DIVISION

The Human Studies Division conducts clinical and epidemiological investigations to improve the understanding of human health risks associated with environmental pollution. Clinical studies are conducted for research questions which are best approached experimentally by monitoring or administering exposures under highly controlled laboratory settings or where the evaluation of effects requires complex laboratory procedures. Epidemiologic investigations study humans in less rigidly controlled, more natural settings by field studies or analysis of existing data. Laboratory analyses are used to improve assessments of exposure, biologically relevant doses, adverse biological or health effects, as well as to investigate mechanisms linking these phenomena. Studies are frequently designed and analyzed so as to characterize the similarities or differences between effects observed in humans and animals or in vitro systems; the data are then used by the Agency for risk assessment in the absence of human data. Investigations conducted by this division frequently involve collaborations within and outside the Agency, and emphasize interdisciplinary approaches that integrate complex data from existing records, questionnaires, clinical, and laboratory studies.

BIOGRAPHICAL SKETCHES OF MANAGERS

Hillel S. Koren

Director of the Human Studies Division. Dr. Koren received his undergraduate degree (M.Sc.) in microbiology from Tel-Aviv University and his graduate degree in immunology at the Max Planck Institute for Immunobiology and the University of Freiburg (FRG) in 1971. For his post doctoral training, Dr. Koren spent two years at the University of California in Berkeley and two years at the National Cancer Institute in Bethesda, Maryland as a Fogarty Fellow working on Tumor Immunology. He then served on the faculty of the Department of Microbiology and Immunology at Duke University from 1975-1985. During his tenure at Duke he was recipient of NIH grants and a Research Career Development Award. Dr. Koren joined EPA in 1985 as Chief of the Cell and Molecular Biology Section at the Clinical Research Facility in Chapel Hill, NC. His current major research interests are in the area of human pulmonary host defenses and inflammation as they relate to inhaled pollutants. Dr. Koren has published extensively in the areas of tumor immunology, cell-mediated immunity and immunotoxicology. Dr. Koren is on the editorial board of various journals, a member of several national and international advisory and review groups and professional societies in his areas of interest. He is author of 124 journal articles and 39 book chapters.

Robert Devlin

Acting Chief of the Clinical Research Branch. Dr. Devlin received his Ph.D. degree in developmental biology from the University of Virginia in 1976. He performed three years of postdoctoral research at the University of Virginia studying factors which control the developmental expression of muscle-specific genes. He served on the faculty at Emory University from 1979-86, where he was the recipient of numerous NIH and NSF grants, and was a Basal O'Conner Young Investigator awardee from the March of Dimes. Dr. Devlin joined the EPA in 1986 as a research scientist in the Cell and Molecular Biology Section of the Clinical Research Branch. His current research interests are in the area of biochemical and molecular responses of human respiratory tract cells to inhaled pollutants, in which he uses a combination of in vitro toxicology, in vivo human exposure, and epidemiological approaches. He has been awarded both level I and level III EPA Scientific and Technological Achievement awards for his research. Since joining the EPA in 1986, he has authored more than 50 journal articles and has given more than

20 invited seminars at research institutions or international meetings. He also reviews articles for several journals, reviews research grants for several agencies, and is a member of several advisory panels, review groups, and professional societies in his areas of interest.

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NEUROTOXICOLOGY DIVISION

The Neurotoxicology Division is the focal point for planning, conducting, coordinating, supporting and evaluating a program aimed at studying the effects of physical and/or chemical agents on the nervous system. The overall objective of the Neurotoxicology Division is to provide the scientific basis and technological means to enable the prediction of whether or not an environmental agent will produce neurotoxicity in humans. A major research goal is to minimize the uncertainty of such predictions. The general approach is to model human neurotoxic disease in laboratory animals and then use data collected in animals to make predictions about possible neurotoxic risks in humans. Scientific investigation proceeds at all levels of neural organization, including neurobehavioral, neurochemical, neurophysiological and neuroanatomical, and uses whole animal (in vivo), cellular and molecular techniques.

The Neurotoxicology Division has responsibility for planning and developing methodology for and participating in laboratory and, where possible, clinical and field studies designed to quantitate and characterize the neurotoxicity of chemicals. The program includes both intramural investigations and extramural arrangements with universities, industry, private research institutions and other governmental agencies. The Division also provides staff support to the Office of Research and Development, including controlled correspondence, public testimony, service on special task forces, and reviewing various documents.

In developing the necessary multidisciplinary approach to study neurotoxicology, the Division addresses the objectives of the health research program of the Environmental Protection Agency, including: 1) determining whether there is a causal relationship between an environmental contaminant and adverse health effect, 2) elucidating the relationship between dose and biological response, and 3) providing relevant toxicological data on specific environmental agents or mixtures of agents of immediate importance to the Agency. Research in the Division focuses on six specific areas: 1) methods development and validation, including evaluation of existing methods, design and evaluation of new methods, and development of testing strategies; 2) determination of the significance of variables that influence risk assessment based on animal data, including environmental and organismal variables; 3) developmental neurotoxicology, which evaluates the effects of developmental exposure on structure and function of the nervous system; 4) research leading to a reduction in uncertainties associated with quantitative dose-response determinations, including exposure scenarios, compensation or adaptation during repeated dosing; 5) research leading to a greater conceptual understanding of neurotoxicology, including mechanism of action and a clear understanding of the neural substrate underlying neurobiological endpoints; and 6) studies on specific neurotoxic agents, including heavy metals, pesticides, industrial chemicals, and hazardous air pollutants.

BIOGRAPHICAL SKETCHES OF MANAGERS

Hugh A. Tilson

Director of the Neurotoxicology Division and Acting Chief of the Cellular and Molecular Toxicology Branch. Dr. Tilson received a Ph.D. in Psychopharmacology in 1972 from the University of Minnesota. Prior to joining EPA, Dr. Tilson was head of a behavioral toxicology and neurobiology laboratory at the National Institute of Environmental Health Sciences (NIEHS) in Research Triangle Park, NC. Dr. Tilson is an active member in a number of professional societies, including the Society of Toxicology. Dr. Tilson has served as a consultant to the International Programme on Chemical Safety of the World Health Organization. He serves as Associate Editor for Neurotoxicology and is an associate editor for Toxicology and Applied Pharmacology. Dr. Tilson has published several book chapters on topics dealing with neurotoxicology and has co-edited four books. He has published more than 200 papers in peer-reviewed journals.

William K. Boyes

Chief of the Neurophysiological Toxicology Branch. Dr. Boyes earned a Ph.D. in Environmental Health from the University of Cincinnati College of Medicine in 1981, and received an M.A. in Physiological Psychology from New Mexico State University in 1976. He is a member of the editorial board of Neurotoxicology and Teratology. He is a member of the Society of Toxicology, the Society for Neuroscience, the Association for Research in Vision and Ophthalmology, and the International Brain Research Organization. Dr. Boyes drafted proposed testing guidelines for the use of sensory evoked potentials in neurotoxicity. He has lectured at universities, and national and international scientific meetings, and has authored or co-authored over 94 journal articles, book chapters and abstracts dealing with neurophysiological aspects of neurotoxicology.

Robert C. MacPhail

Chief of the Neurobehavioral Toxicology Branch. Dr. MacPhail received his Ph.D. in Psychology from the University of Maryland in 1973 and pursued post-doctoral research in Pharmacology at the University of Chicago. He holds memberships in the Society of Toxicology, the American Society of Pharmacology and Experimental Therapeutics, the Society for Neuroscience, the International Neurotoxicology Association, the Behavioral Toxicology Society and the Behavioral Pharmacology Society. Dr.

MacPhail is also currently President of the Behavioral Toxicology Society, Chairman of the Steering Committee for the IPCS Collaborative Study on Neurobehavioral Screening, as well as Research Professor in the Psychology Department and the Neurobiology Curriculum at the University of North Carolina at Chapel Hill. He is also a member of the editorial boards of Fundamental and Applied Toxicology and Neurotoxicology, and has published 70 journal articles and book chapters on his research findings. The recipient of two Bronze Medals for Agency mission support, his current research interests are in neurobehavioral screening, the neurobehavioral effects of pesticides and in quantitative risk analysis.

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MANAGEMENT AND RESEARCH SUPPORT DIVISION

The Management and Research Support Division (MRSD) is responsible for the coordination and staff work on administrative management, data processing, statistical, technical support and scientific activities in support of the research programs and regulatory assistance activities in HERL and the Office of Health Research (OHR).

The MRSD provides administrative management leadership to HERL, provides liaison between HERL and other administrative organizations, and develops HERL administrative policies and interprets those developed by EPA, ORD, or OHR. The MRSD provides advice and consultation on a variety of administrative and program management issues and performs a variety of services for HERL managers, supervisors, and employees. The MRSD prepares, reviews, processes and tracks requests related to personnel, facilities, telephones, property, payroll, procurement, including supplies and equipment and research and development contracts, interagency agreements, and cooperative agreements. This division develops human resource initiatives and strategies and manages and tracks EEO programs and accomplishments for HERL. The MRSD conducts management analyses and special administrative projects. The MRSD has primary responsibility for the development and implementation of internal program planning and budget allocation procedures and the development and implementation of automated management information systems for the entire OHR research program. This Division manages and controls the expenditures of resources.

The MRSD provides OHR-wide ADP support including planning, acquisition, software design and development, maintenance, documentation, and user support for specialized scientific and administrative systems and electronic hardware.

The MRSD provides statistical and mathematical support to all components of HERL and develops new statistical methodology required for the proper analysis of HERL scientific data. The work requires the application of appropriate experimental design and statistical analysis to the epidemiological, clinical, toxicological, and other studies performed by HERL.

The MRSD is responsible for liaison activities which includes communicating both management and scientific information to individuals both inside and outside the Agency, including regions, states, EPA program offices, other offices within ORD, other federal agencies, nongovernmental organizations, and private citizens.

The MRSD is responsible for the HERL quality assurance program, laboratory animal procurement and husbandry, and the management of contracts to support HERL's management and research programs. The MRSD is responsible for developing and implementing procedures to track the status of OHR scientific publications and deliverables and for responding to Freedom of Information Act requests.

The MRSD is responsible for assistance with scientific and technical issues within HERL by undertaking special projects which are of critical importance to the Laboratory on emerging and recurrent technical issues; examining current and future trends which are likely to affect the direction of environmental health research; synthesizing, summarizing and reviewing health effects information especially as it relates to the Agency's programmatic applications; providing expert consultation in health related disciplines to the HERL research staff; and providing staff support to senior HERL management in activities such as researching scientific issues and preparing position papers and briefing materials.

BIOGRAPHICAL SKETCHES OF MANAGERS

Barry Howard

Acting Director of the Management and Research Support Division. Mr. Howard earned his M.S. degree in Environmental Sciences from the School of Public Health, University of North Carolina at Chapel Hill, in 1980. He began working at EPA in 1978 as a Research Biologist in the Genetic Toxicology Division of HERL and was awarded an EPA Scientific and Technological Achievement Award in 1982. Mr. Howard worked as an Environmental Protection Specialist in the Office of Air Quality Planning and Standards from 1984 to 1990, where he was awarded an EPA Bronze Medal in 1988 for his work on developing a computer-based information management system for EPA's Regional Office air programs. Mr. Howard returned to HERL in October 1990 as Branch Chief in this division. He became Acting Director in February, 1995.

John Paul Creason

Chief of the Biostatistics Branch. Dr. Creason received an M.S. in Mathematical Statistics from the University of Missouri at Columbia in 1967 and a Ph.D. in Biostatistics from the University of North Carolina at Chapel Hill in 1978. He received an EPA Scientific and Technological Achievement Award and was awarded a Civil Service Full-Time Training Grant. Dr. Creason holds membership in the American Statistical Association, the Institute of Mathematical Statistics, and the Biometrics Society (ENAR).

Karen F. Dean

Chief of the Program Operations Branch. Ms. Dean received a B.A. in Psychology from Meredith College, Raleigh, NC in 1976. Ms. Dean has been employed by EPA since 1975. She was a Research Psychologist in the Neurotoxicology Division before making a career change in 1989. Prior to her current position, she served as an Administrative Officer for 4 years. She has served on several HERL-wide and divisional committees and workgroups and was HERL's representative to the ORD Streamlining Taskgroup.

Ronald R. Rogers

Acting Chief of the Special Studies and Technical Support Branch. Mr. Rogers earned his M.S. degree in Toxicology from North Carolina State University in 1984, and B.S. degrees in Biology (1977) and Physics (1967) from the University of Tennessee. He began working at EPA in 1979 as a Biologist in the former

Experimental Biology Division, in what was to later become the Immunotoxicology Branch of the Environmental Toxicology Division. In 1989 he joined the Research Support Division and became the Quality Assurance Manager and Technology Transfer Coordinator for HERL. He is currently the QA Manager for NHEERL. He has served on several workgroups to revise and document QA policies and procedures at the Laboratory, ORD, and Agency level. Mr. Rogers is a member of the American Society for Quality Control (ASQC) and the Federal Laboratory Consortium, an organization of technology transfer professionals.

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