The Role of Companion Animals as Sentinels for Predicting Environmental Exposure Effects on Aging and Cancer Susceptibility in Humans: A Workshop

Committee

Linda S. Birnbaum

Chair

Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S., is the former Director of the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health, and the National Toxicology Program (NTP). After retirement, she was granted scientist emeritus status and still maintains a laboratory. As a board-certified toxicologist, Birnbaum served as a federal scientist for 40 years. Prior to her appointment as NIEHS and NTP Director in 2009, she spent 19 years at the U.S. Environmental Protection Agency (EPA), where she directed the largest division focusing on environmental health research. Birnbaum has received many awards and recognitions. In 2016, she was awarded the North Carolina Award in Science. She was elected to the Institute of Medicine of the National Academies, one of the highest honors in the fields of medicine and health. She was also elected to the Collegium Ramazzini, an independent, international academy comprised of internationally renowned experts in the fields of occupational and environmental health and received an honorary Doctor of Science from the University of Rochester and a Distinguished Alumna Award from the University of Illinois. She has also received Honorary Doctorates from Ben-Gurion University, Israel, and Amity University, India; the Surgeon General's Medallion 2014; and 14 Scientific and Technological Achievement Awards, which reflect the recommendations of EPA's external Science Advisory Board, for specific publications. Birnbaum is an active member of the scientific community. She was vice president of the International Union of Toxicology, the umbrella organization for toxicology societies in more than 50 countries, and former president of the Society of Toxicology, the largest professional organization of toxicologists in the world. She is the author of more than 1000 peer-reviewed publications, book chapters, abstracts, and reports. Birnbaum's own research focuses on the pharmacokinetic behavior of environmental chemicals, mechanisms of action of toxicants including endocrine disruption, and linking of real-world exposures to health effects. She is an adjunct professor in the Gillings School of Global Public Health, the Curriculum in Toxicology, and the Department of Environmental Sciences and Engineering at the University of North Carolina at Chapel Hill, as well as in the Integrated Toxicology and Environmental Health Program at Duke University where she is also a Scholar in Residence. A native of New Jersey, Birnbaum received her M.S. and Ph.D. in microbiology from the University of Illinois at Urbana-Champaign.

Matthew Breen

Member

Dr. Matthew Breen is a Professor of Genomics and the Oscar J. Fletcher Distinguished Professor of Comparative Oncology Genetics in the Dept. of Molecular Biomedical Sciences at the NC State University College of Veterinary Medicine. He received his PhD in Genetics from the University of Liverpool in the UK in 1990. He is a Chartered Biologist and a Fellow of the Royal Society of Biology. Dr. Breen's primary research focus over the past 30 years has been on genomics, genome mapping, and the comparative aspects of canine cancer. His group is now also investigating the role of the pet dog as a sentinel species. In collaboration with colleagues at Duke University, Dr Breen recently published a study to demonstrate how our pet dogs could shed light on the health impacts of daily chemical exposure in the domestic environment. This study was featured by the NIEHS and National Geographic. Dr. Breen is internationally recognized as a pioneer in comparative oncology research. He has published around 200 peer reviewed research papers, and presented his work at over 150 scientific meetings around the world. He serves on numerous advisory boards for the government, not-for-profit foundations, and industry. Dr. Breen is a member of the NCSU Research Leadership Academy, the NCSU Comparative Medicine Institute, the NCSU Center for Human Health and the Environment, the Duke Cancer Institute, and the Cancer Genetics Program at the University of North Carolina's Lineberger Comprehensive Cancer Center.

Myrtle A. Davis

Member

Dr. Myrtle Davis is the Executive Director for Discovery Toxicology in the Pharmaceutical Candidate Optimization (PCO) organization. Myrtle is currently responsible for leading the scientific efforts in Discovery Toxicology to provide target and molecular hazard identification and risk assessments for issues identified in discovery research. She also leads and oversees the investigative toxicology efforts needed to support mechanistic understanding of compound- or target-mediated toxicities in discovery and development. Myrtle joined BMS from the National Cancer Institute where she was the Chief of the Toxicology and Pharmacology Branch of the Developmental Therapeutics Program. Myrtle has previous experience as a Research Advisor in the Drug Safety group of Eli Lilly Research Laboratories. In both roles, she contributed critical expertise to the advancement of several drugs candidates and to the understanding of toxicological mechanisms. She also has several years of academic experience as an Associate Professor in the Department of Pathology in the School of Medicine at the University of Maryland. Myrtle is a Fellow of the Academy of Toxicological Sciences, an active member of the Society of Toxicology (recently elected as Vice President elect for the Society). Myrtle previously served as is Editor-in-Chief of the ILAR Journal (Institute for Laboratory Animal Research of the National Academy of Sciences) and was a member of ILAR.

Nicole C. Deziel

Member

Nicole C. Deziel, Ph.D., M.H.S., is an Associate Professor in the Department of Environmental Health Sciences at the Yale School of Public Health with expertise in exposure science and interdisciplinary training in epidemiology, biostatistics, and industrial hygiene. Her research involves applying existing and advanced statistical models, biomonitoring techniques, and environmental measurements to provide comprehensive and quantitative assessments of exposure to combinations of traditional and emerging environmental contaminants. Dr. Deziel's exposure assessment strategies aim to reduce exposure misclassification for epidemiologic studies, advancing understanding of relationships between exposure to environmental chemicals and risk of cancer and other adverse health outcomes. Dr. Deziel is also leading an interdisciplinary team of investigators on a project entitled "Drinking water vulnerability and neonatal health outcomes in relation to oil and gas production in the Appalachian Basin." In addition, Dr. Deziel is an investigator for an NIMHD-funded project examining how environmental and social stressors jointly contribute to health disparities in elderly populations. She received the 2017 Joan M. Daisey Outstanding Young Exposure Scientist from the International Society for Exposure Science and the 2021 Yale Cancer Center Population Science Research Prize. She obtained a Master's of Industrial Hygiene and Doctorate in Environmental Health from the Johns Hopkins Bloomberg School of Public Health. She has served on the National Academies of Sciences Standing Committee on Emerging Science for Environmental Health Decisions since January 2020.

William H. Farland

Member

Dr. William Farland is retired and is an independent consultant in toxicology and environmental and public health, and a Professor Emeritus in Environmental and Radiological Health Sciences, School of Veterinary Medicine and Biomedical Sciences, Colorado State University (CSU). Formerly, he served as Vice President for Research from 2006-2013 at CSU. Prior to that, he served as Deputy Assistant Administrator for Science in the U.S. Environmental Protection Agency's Office of Research and Development (ORD) from 2001-2006. His 27-year federal career at the USEPA was characterized by a commitment to the development of national and international approaches to research, testing and assessment of the fate and effects of environmental agents. Dr. Farland holds a Ph.D. (1976) from UCLA in cell biology and biochemistry.

Roy A. Jensen

Member

Roy A. Jensen, M.D. was born in Kansas City, Kansas and earned his bachelor's degree in Biology and Chemistry from Pittsburg State University in 1980. He graduated from Vanderbilt University School of Medicine in 1984 and remained there to complete a residency and clinical fellowship in anatomic pathology before accepting a research fellowship at the National Cancer Institute. He returned to Vanderbilt in 1991 and was appointed to the faculty. In 2004 Dr. Jensen was appointed the William R. Jewell, M.D. Distinguished Kansas Masonic Professor, the director of The University of Kansas Cancer Center, and the director of the Kansas Masonic Cancer Research Institute. In 2012 he successfully led the effort to obtain National Cancer Institute designation for The University of Kansas Cancer Center. He served as president of the Association of American Cancer Institutes from 2018-2020 and has served on the National Cancer Policy Forum since 2018.

Daniel Promislow

Member

Dr. Daniel Promislow is a Professor in the Department of Biology and the Department of Lab Medicine & Pathology at the University of Washington. Since receiving his D.Phil. in 1990 at the University of Oxford, he has focused on the study of aging. His research uses evolutionary genetics and systems biology approaches to understand how genes and environment shape aging and age-related disease in natural populations. In addition to his lab-based research in Drosophila, Dr. Promislow is Principal Investigator of the Dog Aging Project, an NIH/National Institute on Aging U19-funded nationwide research program to understand the determinants of healthy aging in tens of thousands of companion dogs.

Wendy C. Shelton

Member

Wendy Shelton, DVM, MPH, brings experience in clinical medicine, medical device, drug development, business development, public health, government policy and project management. She provides strategic expertise regarding the interrelationships of these sectors. Dr. Shelton began her professional life as a practicing veterinarian after graduating from the University of California at Davis School of Veterinary Medicine in 1981. She was a small animal practitioner and small business owner for over 12 years. In 1993, Dr. Shelton accepted a position on the Board of Directors of Integrated Surgical Systems, developers and manufacturers of the world's first computer guided surgical robot, ROBODOC®. She stayed with the company in numerous capacities (VP, Research and Development; VP, Medical Affairs; acting CEO) until it went public. There she gained experience: preparing applications for FDA approval, conducting animal and human clinical trials, creating an iso9000 manufacturing facility, and developing a European market for the device. The company was the recipient of the Computerworld-Smithsonian Award for Excellence in Medical IT, and the device was collected by the museum.

Dr. Shelton subsequently spent several years combining part-time equine practice and new therapeutic product development, and then earned her Master of Public Health degree from the UC Davis School of Medicine. A brief position at the California Department of Health Services, Department of Infectious Diseases, Office of the Public Health Veterinarian, working on West Nile virus surveillance systems followed. Dr. Shelton was a fully funded Congressional Fellow, sponsored by the American Veterinary Medical Association (AVMA) and placed by the American Association for the Advancement of Science (AAAS) in the office of Senator Joseph Lieberman of Connecticut in 2004-2005. While in the Senator's office, she participated in the genesis of Senate Bill 975, or BioShield II, the massive legislative initiative designed to create a countermeasures industry to address both bioterror and naturally occurring public health threats, and was primary author of several titles. From Capitol Hill, Dr. Shelton was recruited to Fabiani & Company, a DC lobbying firm where she helped build a practice that matched growing life sciences companies with government funding sources. She advised dozens of healthcare, drug, device, and product companies and academic institutions regarding government and business relations and helped secure over $250 million in grants and contracts over five years. More recently, Dr. Shelton worked in Silicon Valley developing veterinary applications for in silico biosimulation models. She served as Vice President of Corporate Communications, Government Relations, and Veterinary Applications at Entelos Holding Corporation in San Mateo for over two years - engaging Mars Petcare to create a virtual dog. Dr. Shelton is the founding principal of Virtual Beast Consulting (VBC) based in Truckee, California. Areas of focus include promotion of the study of companion animals as research models to improve understanding of human and animal diseases and treatments – the embodiment of the One Medicine/One Health concept. An example of this is the National Cancer Policy Forum's 2015 workshop entitled "The role of Clinical Studies for Pets with Naturally Occuring tumors in Translational Cancer Research" initiated by VBC's principal on behalf of the flint Animal Cancer Center at Colorado State University (CSU). Dr. Shelton continues to consult with CSU providing strategic support for Comparative Oncology and One Health, actively representing Flint in the recently formed CORC – the Comparative Oncology Research Consortium that pairs Veterinary Schools and National Cancer Institute(NCI) Designated Cancer Centers for research funding, and is now collaborating with the National Academies on another workshop: "The role of Companion Animals as Sentinels for Predicting Environmental Exposure Effects on Aging and Cancer susceptibility in Humans". Dr. Shelton also represents CSU with the CTSA One Health Alliance, chairing the Advocacy Subcommittee.

Cheryl L. Walker

Member

Cheryl Lyn Walker, Ph.D., is Director of the Center for Precision Environmental Health at Baylor College of Medicine, where she holds the Alkek Presidential Chair and is a Professor in the Departments of Molecular & Cell Biology and Medicine. She also directs the NIEHS Center for Translational Environmental Health Research, and serves on the Board of Scientific Advisors for the National Cancer Institute. Dr. Walker is an international leader in environmental carcinogenesis and the elucidation of molecular mechanisms of disease. Her studies on the role of the epigenome in gene-environment interactions have yielded significant insights into mechanisms by which early life exposures influence health and disease across the life course. Her work has also led to the discovery of new tumor suppressor functions in the cell, and a dual role for the cell’s epigenetic machinery in regulating both chromatin and the cytoskeleton. She has been recognized with the Dallas-Ft. Worth Living Legend Faculty Achievement Award in Basic Research from MD Anderson Cancer Center, the Cozarrelli Prize from the National Academy of Sciences, the 2015 Outstanding Distinguished Scientist Award from Sigma Xi and the 2016 Leading Edge in Basic Research Award from the Society of Toxicology. Dr. Walker is a fellow of the Academy of Toxicological Sciences and the AAAS, and in 2016 was elected to National Academy of Medicine. She is a past-President the Society of Toxicology, past-President of Women in Cancer Research of the AACR, and has participate on committee for the Institute of Medicine and National Research Council. Dr. Walker earned her Ph.D. in 1984 in Cell Biology from the University of Texas Southwestern Medical School, with additional post-doctoral training as a Staff Fellow at National Institute of Environmental Health Sciences.