FDA-AACR Non-clinical Models for Safety Assessment of Immuno-oncology Products Workshop

September 6, 2018 | Washington, DC

Workshop Cochairs

John K. Leighton, PhD, *U.S. Food and Drug Administration*

Dr. Leighton received his PhD from the Department of Physiology and Biophysics at the University of Illinois, Urbana-Champaign. Dr. Leighton first came to FDA as a pharmacology and toxicology reviewer in the Center for Veterinary Medicine and moved to the Division of Oncology Drug Products (DODP) in CDER as a reviewing pharmacologist, later serving as a supervisory pharmacologist. Dr. Leighton is currently the Director for the Division of Hematology Oncology Toxicology in the Office of Hematology and Oncology Products, where his primary responsibility is providing policy direction and review oversight of non-clinical studies submitted to support IND, NDA and BLA applications for oncology and hematology indications. Dr. Leighton serves as cochair of the PTCC Computational Toxicology Subcommittee. He served as Rapporteur for the ICH S9 Q&A guidance for anticancer pharmaceuticals which was approved by the ICH Assembly in April 2018, and is Deputy Topic Lead for FDA for ICH Q3D, Elemental Impurities.

Haleh Saber, PhD, *U.S. Food and Drug Administration*

Dr. Saber is the Deputy Director in the Division of Hematology Oncology Toxicology (DHOT). In this role, she provides leadership for day-to-day activities, leads and coordinates scientific research, and participates in guidance development. Dr. Saber has extensive industry and regulatory experience. She served as a Subject Matter Expert assisting pharmaceutical companies worldwide in nonclinical drug development and served many roles at the FDA over 14 years. Dr. Saber is recognized for her efforts in establishing acceptable approaches in first-in-human dose selection for new classes of products. She has been the recipient of multiple CDER awards. Dr. Saber received her PhD in Biochemistry from Lehigh University and conducted her post-doctoral studies at Fox Chase Cancer Center.

Julie Schneider, PhD, *U.S. Food and Drug Administration*

Dr. Schneider is a Regulatory Scientist in the Office of Hematology and Oncology Products and Acting Associate Director for Research Strategy and Partnerships for the Oncology Center of Excellence (OCE). She focuses on a range of science policy issues and leads the OCE Science Council, a group of internal FDA experts who identify scientific interest areas to plan seminars, workshops, and encourage new research collaborations. She previously worked as Program Director for the HHS Entrepreneurs-in-Residence Program within the HHS IDEA Lab, and in several roles at the National Cancer Institute (NCI) focused on developing new research funding opportunities, including a ~$20 million US-China Program for Biomedical Research Cooperation co-funded by 5 NIH institutes at the National Natural Science Foundation of China. Before joining NCI as an AAAS Science and Technology Policy Fellow, Julie led research programs at a start-up biotechnology company focused on population genomics. She obtained her doctoral degree in genetics from the University of Oxford and her bachelor's degree in biology from Yale.

Workshop Speakers and Panelists

Gregory L. Beatty, MD, PhD, *University of Pennsylvania Perelman School of Medicine*

Gregory Beatty, MD, PhD, is an Assistant Professor of Medicine at the Perelman School of Medicine at the University of Pennsylvania and in the Division of Hematology/Oncology within the Abramson Cancer Center at the Hospital of the University of Pennsylvania. Dr. Beatty graduated from Bucknell University with a BS in chemical engineering and then received his PhD in Immunology followed by an MD from the University of Pennsylvania Perelman School of Medicine. He went on to complete a residency in Internal Medicine and a fellowship in Medical Oncology at the Hospital of the University of Pennsylvania. Dr. Beatty's research interest is in understanding mechanisms that regulate immunosurveillance in cancer with a focus on immunologically "cold" tumors including pancreatic cancer, colon cancer, esophageal cancer and glioblastoma. Dr. Beatty directs the Translational Research Program in the Pancreatic Cancer Research Center (PCRC) at the University of Pennsylvania. He also directs a discovery laboratory that incorporates the analysis of human tissues and the study of mouse models to inform biology that regulates immunotherapy outcomes in cancer. Dr. Beatty has led several early Phase I clinical studies investigating novel immunotherapeutic approaches for the treatment of cancer. He is a recipient of the Doris Duke Clinical Scientist Development Award, the Damon Runyon-Rachleff Innovator Award and the SU2C Innovation Research Grant. He is chair of the PANCAN Precision Promise Immunotherapy Working Group, and a member of the Pancreatic Cancer Action Network's Scientific and Medical Advisory Board.

Mariam Eljanne, PhD, *National Cancer Institute*

Dr. Mariam Eljanne serves as a Program Director in the Division of Cancer Biology at the National Cancer Institute. In this role, she oversees the scientific progress of grants under different funding mechanisms.

Dr. Eljanne earned a MS. in Microbial Genetics from the University of North Carolina at Charlotte and a PhD in Human Genetics from the University of Pittsburgh. She has broad expertise in basic sciences, translational research, and clinical research. After earning her Master's degree, Dr. Eljanne managed the Molecular Diagnostics laboratory for infectious diseases at the University of Pittsburgh Medical Center. She then joined the Department of Human Genetics at the University of Pittsburgh where she worked on gene therapy, stem cell research, and genomic imprinting. Dr. Eljanne studied the methylation pattern of DNA in the mouse. After earning her PhD, she joined Cytyc Corporation where she worked on breast and cervical cancer diagnostic assay development. In 2004 she moved to Beth Israel Deaconess Medical Center (BIDMC) as a Senior Research Associate where she worked on prostate cancer diagnostic/prognostic assay development and prostate clinical research. With this clinical research experience from BIDMC, Dr. Eljanne joined the Johns Hopkins School of Medicine Lupus Center as a Research Program Manager where she managed several industry-sponsored lupus clinical trials. In 2009 Dr. Eljanne joined the National Institute of Allergy and Infectious Diseases to manage the Vaccine Treatment and Evaluation Units clinical trial contract. Dr. Eljanne's interest lies in translation of basic science into pre-clinical and clinical research.

Helen Haggerty, PhD, *Bristol-Myers Squibb*

Prior to joining Bristol-Myers Squibb in 1993, Dr. Helen Haggerty received her BS in Biology from the University of Richmond and her PhD in Pharmacology/Toxicology from the Medical College of Virginia. She conducted her Postdoctoral Fellowship at the University of Pennsylvania studying B cell biology. Dr. Haggerty is Department Head of Immuno and Molecular Toxicology and Therapeutic Area Head for Immunoscience within Drug Safety Evaluation. Helen provides scientific leadership, oversight and direction for all programs within her therapeutic area and serves as an advisor for biopharmaceuticals and immunotoxicity issues across the portfolio. She previously served as Development Team Leader, responsible for nonclinical research, FIH submission, and initiation and progress of clinical trials through Phase 2 for several immunology drugs and was also responsible for the nonclinical safety evaluation of Orencia and

Nulojix. She served as the PhRMA Deputy Topic Leader for the Expert Working Group that authored the addendum to ICH S6 guidance on the non-clinical safety evaluation of biologics and is a member of the BIOSafe Executive Leadership Committee, ILSI Immunotoxicology Technical Committee, and Society of Toxicology. She has numerous publications in fields of immunotoxicology and drug development.

Danuta Herzyk, PhD, *Merck*

Dr. Danuta Herzyk earned her MS degree in Pharmaceutical Sciences and PhD in Clinical Immunology and Biochemistry from the Medical University of Wroclaw, Poland. She was a postdoctoral fellow at the Ohio State University (with Dr. Richard Mortensen in the Department of Microbiology and Immunology from 1985-1986 and with Dr. Mark Wewers in the Department of Pulmonary and Critical Care Medicine from 1987-1991). Dr. Herzyk joined the Department of Safety Assessment at GlaxoSmithKline R&D in 1992 and overtime became a Director of Immunologic Toxicology Laboratory. Her work involved mainly immunotoxicology testing of immunomodulatory biopharmaceuticals.

In 2007, Dr. Herzyk took a position of Senior Scientific Director in the Department of Safety Assessment at Merck & Co. where her work continued in the preclinical development and safety assessment of biopharmaceuticals and vaccines. Her main role was to oversee all biologic and vaccine programs that needed support from Safety Assessment. In 2013 her role has been transitioned to the Immunology and Oncology Therapeutic Area Leader. Currently, Dr. Herzyk provides guidance and support to SALAR representatives who are core members of development teams working on Immunology as well as Oncology programs.

Dr. Herzyk is author/co-author of over 50 peer-reviewed articles and book chapters, and co-editor of two books, "Immunotoxicology Strategies for Pharmaceutical Safety Assessment" (2008) and “Nonclinical Development of Novel Biologics, Biosimilars, Vaccines and Specialty Biologics” (2013). She serves on the Editorial Board of Journal of Immunotoxicology and is an active member of Immunotoxicology Specialty Section (ITSS) and BioTechnology Specialty Section (BTSS) of the Society of Toxicology.

Sarah Javaid, PhD, *Merck*

Dr. Sarah Javaid earned her B.S in Biology from James Madison University and Ph.D. from the Biophysics program at The Ohio State University. She was a postdoctoral fellow at Massachusetts General Hospital/Harvard Medical School. Dr. Javaid joined the Genetics and Pharmacogenomics department at Merck in 2015. She currently leads a team that interfaces with oncology, immunology and pharmacology for mechanism of action and biomarker studies utilizing mid-density and next-generation sequencing platforms.

Alan Korman, PhD, *Bristol-Myers Squibb*

Alan J. Korman received his PhD degree from Harvard University (Cambridge, Massachusetts, USA) in 1984 and was a Whitehead Fellow at the Whitehead Institute, Massachusetts Institute of Technology (Cambridge, Massachusetts, USA) from 1984 to 1989. He was also a Chargé de Recherche at the Institut Pasteur (Paris, France) from 1990 to 1993. He has worked in the biotechnology and pharmaceutical industry since 1993 and is currently Vice President of Immuno-Oncology Discovery at Bristol-Myers Squibb (Redwood City, California, USA). He initiated the preclinical development of the checkpoint inhibitor antibodies, ipilimumab and nivolumab, as well as their combination.

Amy K. LeBlanc, DVM, *National Cancer Institute*

Amy LeBlanc is board-certified veterinary oncologist and the Director of the intramural National Cancer Institute’s Comparative Oncology Program. In this position she conducts preclinical mouse and translational canine studies that are designed to inform the drug and imaging agent development path for human cancer patients. She also advises leading pharmaceutical companies as well as NCI’s Division of Cancer Treatment and Diagnosis on the inclusion of pet dogs with cancer into the development path of novel approaches for a variety of malignancies, including immunotherapeutics,

targeted small molecules, oncolytic viruses, and cancer imaging agents. She directly oversees the NCI Comparative Oncology Trials Consortium (COTC), which provides infrastructure necessary to connect participating veterinary academic institutions with stakeholders in drug development to execute fit-for-purpose comparative clinical trials in novel therapeutics and imaging agents.

Dr. LeBlanc obtained her veterinary degree from Michigan State University, and completed post-graduate training in small animal medicine, surgery and oncology at Texas A&M University and Louisiana State University. Prior to her appointment at NIH, Dr. LeBlanc was an Associate Professor with tenure and Director of Translational Research at the University of Tennessee College of Veterinary Medicine (CVM) and UT Graduate School of Medicine (GSM). Dr. LeBlanc's group at the University of Tennessee published the first comprehensive studies describing molecular imaging of dogs and cats using PET/CT, focusing on the forward and back-translation of ^{18}F-labelled radiopharmaceuticals.

Robert Li, PhD, DABT, *Genentech*

Dr. Li received his PhD in immunotoxicology from the University of Toronto, followed by a postdoctoral training at Hoffmann-La Roche. Dr. Li is a diplomat of the American Board of Toxicology, with 10 years of biopharmaceutical experience in translational research and toxicology assessment. He is currently a senior toxicologist and pharmacology sub-team leader in Safety Assessment at Genentech. He supports nonclinical safety assessments of both small and large pharmaceuticals spanning a wide range of therapeutic areas including oncology, immunology, and cancer immunology. Prior to Genentech, Dr. Li worked as Senior Research Investigator at Bristol-Myers Squibb to support non-clinical toxicology and immunotoxicology assessment. He is the SOT award recipient of the Outstanding Young Immunotoxicologist in 2017 and the Outstanding Young Investigator in Biotechnology in 2018.

Marcela V. Maus, MD, PhD, *Harvard Medical School, Massachusetts General Hospital*

Marcela Maus, MD, PhD, is the Director of Cellular Immunotherapy at the Massachusetts General Hospital Cancer Center. Dr. Maus was recently recruited to the Massachusetts General Hospital Cancer Center to lead a new program in Cellular Immunotherapy. She is a member of the Center for Cancer Immunology and the Department of Medicine at the MGH, and she is an Assistant Professor at Harvard Medical School. Her laboratory is generating new forms of chimeric antigen receptors directed to new targets and bringing them to the clinical setting to treat patients with hematologic malignancies and solid tumors.

Dr. Maus trained in internal medicine at U. Penn and at Memorial Sloan Kettering as a hematologist and medical oncologist. Her post-doctoral work was with Michel Sadelain and Carl June, where she focused on pre-clinical development and correlative studies relevant to T cell immunotherapies, designing early-phase trials of T cell therapies for multiple myeloma, chronic lymphocytic leukemia, and glioblastoma.

Karolina Palucka, MD, PhD, *The Jackson Laboratory for Genomic Medicine*

Karolina Palucka, MD, PhD is a Professor and Associate Director of Cancer Immunology at The Jackson Laboratory for Genomic Medicine (JAX) in Farmington, CT and also serves as a Professor in the Department of Immunology at the University of Connecticut School of Medicine. She joined JAX in 2014; having previously been at the Baylor Institute for Immunology Research, where she was the Michael A.E. Ramsay Chair for Cancer Immunology Research and director of the Ralph M. Steinman Center for Cancer Vaccines. Dr. Palucka also served as a professor at the Mt. Sinai School of Medicine within the Department of Gene & Cell Medicine. She received her MD from the Warsaw Medical Academy, Poland and her PhD from the Karolinska Institute in Sweden. Dr. Palucka specializes in human immunology, with a focus on experimental immunotherapy, and has pioneered the development of dendritic cell-based vaccines for patients with cancer or HIV. Her research is aimed at understanding, controlling, and manipulating the body's own immune response as the basis for developing new vaccines and immunotherapies against infectious diseases and human cancers. Specifically, her Laboratory is studying the biology of dendritic cells and tissue resident immune cells as well as developing pre-clinical models of the human immune system and human cancer.

Lei Zheng, MD, PhD, *Johns Hopkins University School of Medicine, Sidney Kimmel Cancer Center*

Dr. Lei Zheng is a physician-scientist at the Departments of Oncology and Surgery of Johns Hopkins University School of Medicine and the Sidney Kimmel Cancer Center. He is co-director of the Precision Medicine Center of Excellence for Pancreatic Cancer. He is a laboratory investigator and a translational researcher, whose research is focused on understanding the complex biology of tumor microenvironment by using pancreatic cancer as a research model and developing innovative therapies including targeted therapy and immune-based therapy for pancreatic cancer, colorectal cancer and other gastrointestinal malignancies. He has developed a number of mouse models of pancreatic cancer for dissecting the mechanisms of metastasis and for preclinical developments of innovative immune-based therapies. He developed a neoadjuvant pancreatic cancer treatment research program and conducted retrospective analyses of recurrent/metastatic patterns of resected pancreatic cancer. He also co-developed an innovative multiplex immunohistochemistry tool by using the biospecimens from his neoadjuvant immunotherapy clinical trials. He is a clinical oncologist and clinical investigator, whose primary focuses are on the multidisciplinary cancer management of pancreatic cancer and development of novel therapeutic regimens.