Immuno-oncology Drug Development Workshop
Hyatt Regency Washington on Capitol Hill
Columbia A&B Ballroom
Washington, DC
October 13-14, 2016

Purpose: The goal of this workshop is to develop a path forward for evaluating an immuno-oncology focused nonclinical and clinical development paradigm. Ideally, this workshop will redefine biological outcome measures and clinical endpoints, leading to innovative clinical trial designs and statistical methods in the development of immuno-oncology clinical trials.

Workshop Co-Chairs:

- **Maitreyee Hazarika, MD**, *Medical Officer, Division of Oncology Products 2, Office of Hematology Oncology Products, Center for Drug Evaluation and Research, FDA*
- **Marc Theoret, MD**, *Lead Medical Officer, Division of Oncology Products 2, Office of Hematology Oncology Products, Center for Drug Evaluation and Research, FDA*
- **Suzanne L. Topalian, MD**, *Member, AACR Regulatory Science and Policy Subcommittee; Professor, Surgery and Oncology, Johns Hopkins University School of Medicine; Director, Melanoma Program, Johns Hopkins Kimmel Cancer Center; Associate Director, Bloomberg-Kimmel Institute for Cancer Immunotherapy*
- **Jedd D. Wolchok, MD, PhD**, *Lloyd J. Old/Virginia and Daniel K. Ludwig Chair in Clinical Investigation Chief; Melanoma & Immunotherapeutics Service Director; Parker Institute for Cancer Immunotherapy at MSK; Associate Director, Ludwig Center for Cancer Immunotherapy; Member, Ludwig Cancer Research; Professor of Medicine, Weill Medical College of Cornell University; Memorial Sloan Kettering Cancer Center*

AGENDA
THURSDAY, OCTOBER 13, 2016

8:00 AM	**Welcome and Introduction** **Marc Theoret, MD**, *FDA*
8:15 AM	**Cancer Immunobiology: Principles and Practice** **Suzanne Topalian, MD**, *Johns Hopkins Kimmel Cancer Center*
9:00 – 11:30 AM	**SESSION I: CONSIDERATIONS IN THE PRECLINICAL EVALUATION OF I-O PRODUCTS** **Moderator: Whitney Helms, PhD,** *CDER, FDA*
	Considerations in the Nonclinical Evaluation of Immuno-Oncology Products **Whitney Helms, PhD**, *FDA*
	Checkpoint Inhibitor Induced Autoimmunity in a Humanized Mouse Model **Kristina Howard, DVM, PhD**, *CDER, FDA*
	Activity and Safety of Immunomodulatory Antibodies in Preclinical Models **Alan Korman, PhD**, *Bristol-Myers Squibb*
9:45 – 10:00 AM	**BREAK**

	Cancer Immunotherapy: Beyond NOAEL for First in Human Dose Selection **Rodney Prell, PhD**, *Genentech*
	Nonclinical Safety Assessment for T-cell Therapies **Timothy MacLachlan, PhD, DABT**, *Novartis Institutes of Biomedical Research*
	Development of a Vaccine Based Immunotherapy Regimen **David Clarke, PhD, DABT**, *Pfizer*
11:00 – 11:30 AM	**PANEL DISCUSSION and AUDIENCE Q&A**
	SESSION I SPEAKERS AND THE FOLLOWING ADDITIONAL PANELISTS: • **Danuta Herzyk, PhD**, *Merck Research Laboratories* • **Janis Taube, MD, MSc,** *Johns Hopkins University School of Medicine* • **Allen Wensky, PhD,** *CBER, FDA*
11:30 – 12:30 PM	**LUNCH (on your own)**
12:30 – 2:30 PM	**SESSION IIA: CONSIDERATIONS FOR DOSE-FINDING** **Moderator: Geoffrey Kim, MD**, *CDER, FDA*
	Introduction **Geoffrey Kim, MD**, *FDA*
	Approaches to Dose-Finding for Immuno-Oncology Agents and Combinations **Eric Rubin, MD**,*Merck Research Laboratories*
	Challenges in IO-IO Combination Dose Finding: A Case Study of Ipilimumab/Nivolumab in NSCLC **David Feltquate, MD, PhD,** *Bristol-Myers Squibb*
	Randomized Dose-Escalation and Dose-Ranging Trial Designs **Mark Ratain, MD,** *The University of Chicago*
	Regulatory Considerations - Optimizing Dose Selection for Immuno-Oncology Products **Hong Zhao, PhD**, *CDER, FDA*
2:00 – 2:30 PM	**PANEL DISCUSSION and AUDIENCE Q&A**
	SESSION IIA SPEAKERS AND THE FOLLOWING ADDITIONAL PANELISTS: • **Stephanie L. Goff, MD**, *National Cancer Institute, NIH* • **Samir Khleif, MD**, *Georgia Cancer Center*
2:30 – 2:45 PM	**BREAK**
2:45 – 4:45 PM	**SESSION IIB: EVALUATION OF IMMUNE-MEDIATED ADVERSE EVENTS** **Moderator: Jedd D. Wolchok, MD, PhD**, *Memorial Sloan Kettering Cancer Center*
	Pathophysiology of Immune-Mediated Adverse Events **David Berman, MD, PhD**, *MedImmune*
	Adverse Events in Immuno-Oncology: Academic Perspective **Mario Sznol, MD**, *Yale University School of Medicine*
	Unique Aspects of Immune-mediated Adverse Events: A Regulatory Perspective **Diko Kazandjian, MD**, *CDER, FDA*
	Complications of CAR T Therapy **David Porter, MD**, *University of Pennsylvania*
	CAR T-cell Toxicities - A Regulatory Perspective **Ke Liu, MD, PhD**, *CBER, FDA*

	A Global Picture of Immuno-Oncology Adverse Events **Elad Sharon, MD, MPH**, *CTEP, NIH*
4:15 – 4:45 PM	**PANEL DISCUSSION and AUDIENCE Q&A**
4:45 PM	**DAY 1 SUMMARIZING REMARKS**
	Jedd D. Wolchok, MD, PhD, *Memorial Sloan Kettering Cancer Center*
5:00 PM	**ADJOURN**

FRIDAY, OCTOBER 14, 2016

8:00 AM	**Introduction** **Suzanne Topalian, MD**, *Johns Hopkins Kimmel Cancer Center*
8:15 AM	**Regulatory Pathways for Approval, Considerations for Alternate Endpoints** **Maitreyee Hazarika, MD**, *FDA*
8:30 AM	**Challenges in Interpreting Results Based on Traditional Endpoints** **Rajeshwari Sridhara, PhD**, *CDER, FDA*
9:00 – 11:15 AM	**SESSION IIIA: ENDPOINTS FOR I-O PRODUCTS: CONSIDERATIONS FOR UNIQUE EFFICACY BASED ON UNIQUE BIOLOGY OF CHECKPOINT INHIBITORS** **Moderator: Renzo Canetta, MD**, *Bristol-Myers Squibb (Retired)*
	Traditional Endpoints, Introduction: An Historical Perspective **Renzo Canetta, MD**, *Bristol-Myers Squibb (Retired)*
	Imaging Response Assessment with Immunotherapy **Lawrence Schwartz, MD**, *Columbia University*
	Tumor Measurement Based Endpoints: Lesson Learned from the RECIST Database Experience **Sumithra Mandrekar, PhD**, *Mayo Clinic, Mayo Clinic Cancer Center*
	Immunotherapy Clinical Endpoints: Challenges and Opportunities **Axel Hoos, MD, PhD**, *GlaxoSmithKline Pharmaceuticals*
10:00 – 10:15 AM	**BREAK**
	Estimating Survival Benefit in the Presence of Non-proportional and Complex Hazard Functions **Nicholas Latimer, PhD**, *University of Sheffield*
10:45 – 11:15 AM	**PANEL DISCUSSION and AUDIENCE Q&A**
	SESSION IIIA SPEAKERS AND THE FOLLOWING ADDITIONAL PANELIST: • **Shenghui Tang, PhD**, *CDER, FDA*
11:15 – 12:15 PM	**LUNCH (on your own)**
12:15 – 2:45 PM	**SESSION IIIB: USE OF ALTERNATE EFFICACY ENDPOINTS WITH I-O PRODUCTS** **Moderator: Marc Theoret, MD**, *FDA*
	Modified Progression-free Survival as a Potential Surrogate for Survival in Immunotherapy Trials **Srisha Mushti, PhD**, *CDER, FDA*
	Exploration of a Novel Intermediate Endpoint in Immunotherapy Clinical Studies **Xin Gao, PhD**, *CDER, FDA*

	How We Assess Benefit from Immuno-Oncology Agents **Antoni Ribas, MD, PhD**, *University of California, Los Angeles*
	Milestones for Survival: Overall Survival versus Earlier Endpoints **Jan Bogaerts, PhD,** *EORTC*
	Non-Classical Response Patterns, Immune-Modified RECIST and Immune-Modified PFS **Daniel S. Chen, MD, PhD,** *Genentech/Roche*
	Immune-related Response and Survival **Keaven Anderson, PhD,** *Merck Research Laboratories*
	Alternative Survival Endpoints **Tai-Tsang Chen, PhD,** *Bristol-Myers Squibb*
1:45 – 2:45 PM	**PANEL DISCUSSION and AUDIENCE Q&A**
	SESSION IIIB SPEAKERS AND THE FOLLOWING ADDITIONAL PANELIST: • **Kun He, PhD**, *CDER, FDA*
2:45 – 3:00 PM	**BREAK**
3:00 – 4:30 PM	**SESSION IV: CONSIDERATIONS FOR NOVEL TRIAL DESIGNS** **Moderator: Rajeshwari Sridhara, PhD**, *FDA*
	Phase III Design Considerations for Agents with a Potential Predictive Biomarker **Ed Korn, PhD**, *National Cancer Institute, NIH*
	Immuno-oncology Combinations – Clinical Trial Design Considerations **Lillian Siu, MD**, *Princess Margaret Cancer Centre, University of Toronto*
	New More Rapidly Informative Approaches to Development of Improved Therapy for Advanced Unresectable and High Risk Operable Melanoma **John Kirkwood, MD**, *University of Pittsburgh*
	Designing Late-Stage Randomized Clinical Trials with Cancer Immunotherapy: Can We Make It Simple? **Tai-Tsang Chen, PhD,** *Bristol-Myers Squibb*
	Assay Design: Special Considerations for Immuno-Oncology Companion Diagnostic Tests **David Rimm, MD, PhD**, *Yale University School of Medicine*
4:00 – 4:30 PM	**PANEL DISCUSSION and AUDIENCE Q&A**
4:30 PM	**WORKSHOP CONCLUDING REMARKS**
	Maitreyee Hazarika, MD, *FDA*
5:00 PM	**ADJOURN**