



CANCER | April 25–27, 2016 PARTNERS HEALTHCARE | BOSTON

worldmedicalinnovation.org

OVATION

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Dear Colleagues:

Welcome to the World Medical Innovation Forum. This year we will explore the future of medical innovation in cancer care. Powerful new technologies applied to this large and diverse group of diseases have the potential to profoundly improve health care in the United States and around the globe. Ensuring that patients get the full benefit from those technologies will require an enhanced commitment to innovation and the ability to bring advances in care to patients through translational research.

We come together over the next three days to further our understanding of new modes to diagnose, treat and manage cancer. The World Medical Innovation Forum was established to reaffirm the importance of collaborative innovation – academia, industry and government working jointly to push back historic boundaries. Our goal is to provide the insights and tools needed to deliver the most effective care to every patient during this time of change. Thank you for joining us.

We are grateful to the more than 125 senior executives, investors, clinicians and investigators who made time in their busy schedules to speak at the Forum; many traveling from a great distance. In total, more than 1000 industry, investment, government, clinical and research leaders are attending. We are pleased that so many of our faculty from Brigham and Women's Hospital and Massachusetts General Hospital are participating. They and their colleagues conduct more than \$1.5 billion in research annually, which includes funding that drives historic advancements in cancer care. We also welcome many outstanding faculty from Dana-Farber Cancer Institute.

I thank the many sponsors representing some of the most innovative companies in healthcare. Without their support, this World Forum would not have been possible. Thank you to the Steering Committee and Planning Team for their outstanding contributions and especially to Anne Klibanski, MD, Chief Academic Officer, and Chris Coburn, Vice President, Innovation, for the vision, resourcefulness and commitment that has resulted in the 2016 World Medical Innovation Forum. We hope that many of you will join us here at the Westin Copley next year, May 1-3, 2017, when we will reconvene the World Medical Innovation Forum and focus on the newest technologies and challenges in cardiovascular care.



David Torchiana, MD President and CEO, Partners HealthCare

We Welcome You.

Dear Medical Innovation Leaders,

Innovation in Cancer is accelerating rapidly with new capabilities and technologies. The pipeline of development across diagnosis, treatment and management brings game changing products to patients in ways never before possible.

At the same time, never have the human and economic burdens of cancer been so large. Cancer causes 1 in 7 deaths worldwide. The global cancer burden is expected to increase from 14 million new cases and 8 million cancer-related deaths worldwide to 22 million cases and 13 million deaths by 2030.

The World Medical Innovation Forum highlights emerging cancer innovations in immunotherapy, epigenetics, early diagnosis, combination therapies, as well as curative drugs, cancer markets, the role of patients in innovation, cancer as a chronic disease and investment strategies. Over the next three days, we will bring together the clinicians, scientists, executives and investors shaping the future of the field to explore the most promising technology and care in this field. This Forum is brought to you by Innovation, the arm of Partners HealthCare charged with the commercial application of the breakthroughs of its faculty and staff into patient benefiting technologies, therapeutics, and procedures.

We would like to express our deep appreciation to the many individuals who made this Forum possible. We are particularly grateful to our speakers—including CEOs and top executives of global medical companies, investors, media leaders, and scientific experts—for sharing their substantial expertise and unique perspectives. Generous support provided by our leading sponsors—Novartis, Bristol-Myers Squibb, Takeda Oncology, Amgen, Astellas, AstraZeneca, General Electric, Ipsen, MacDougall Biomedical Communications, McCall & Almy, Mintz Levin, Ropes & Gray, STAT and Vertex –contributed to making this a world class event.

Finally, we want to recognize the Steering Committee, especially cochairs Monica Bertagnolli MD and Daniel Haber MD, PhD, whose insights and standing in the field made the Forum possible. We are grateful to the Planning Team whose dedicated work over the last 18 months shaped every aspect of this undertaking.

Enjoy the Forum!



Christopher Coburn Vice President, Innovation, Partners HealthCare



Anne Klibanski, MD Chief Academic Officer, Partners HealthCare







Changing the practice of medicine

At Novartis, we harness the innovation power of science to address some of society's most challenging healthcare issues.

Our researchers work to push the boundaries of science, broaden our understanding of diseases and develop novel products in areas of great unmet medical need.

We are passionate about discovering new ways to extend and improve patients' lives.



Breakthrough Technologies

First Look The Next Wave of Cancer Breakthroughs

FIRST LOOK

The Next Wave of Cancer Breakthroughs Monday Morning | 8AM – 12PM

Highly creative young investigators describe their most promising commercially related research. Rapid-fire presentations by two dozen early-career Harvard Medical School faculty will highlight compelling new discoveries and insights that will be the cancer care products of the future. These young stars from Brigham and Women's Hospital, Massachusetts General Hospital and Dana-Farber Cancer Institute will each describe their work in highly organized 10-minute sessions. This session will take place in the Takeda Ballroom. Presenters will be available immediately following their talk in the third floor GE Foyer.



Cyril Benes, PhD | MGH

Modeling Cancer Therapeutic Response In Vitro; Personalized Therapies and Potential of Functional Diagnostics to Complement Molecular Profiling of Tumors



Priscilla Brastianos, MD | MGH Shifting Clinical Paradigms in Primary and Metastatic Brain Tumors: Unleashing the Power of Genomics to Clinical Care



Mark Cobbold, MD, PhD | MGH Tumor Antigens in Cancer and How to Manipulate Antigens to Stimulate Immunity



Ryan Corcoran, MD, PhD | MGH Tumor Heterogeneity and Acquired Resistance to Targeted Therapy



Shawn Demehri, MD, PhD | MGH

Tumor Immunity against Early Stages of Cancer Development



Daniela Dinulescu, PhD | BWH

Opportunities and Challenges for a New Era in Translational Cancer Research



Wilhelm Haas, PhD | MGH **Defining Functional Protein Networks** with High-Throughput Proteomics



Lida Hariri, MD, PhD | MGH High Resolution Optical Imaging for Early Detection and Diagnosis of Cancer



Aditi Hazra, PhD | BWH

Precision Prevention of Invasive Breast Cancer









Hakho Lee, PhD | MGH

New diagnostic platforms with wide-reaching applications in medicine and life sciences, including biosensors, particularly optimized for on-site, near-patient operation

Alexander Lin, PhD | BWH Making the Virtual Biopsy a Reality: Advances in MR Spectroscopy of Cancer





Sandra McAllister, PhD | BWH

New Diagnostic and Therapeutic Opportunities

Q

Mikael Pittet, PhD | MGH Manipulating Cancer/Immune Cell Interactions



Miguel Rivera, MD | MGH In-situ RNA Diagnostics



Sandro Santagata, MD, PhD | BWH What's In That Tissue? Powerful New Tools Allow Tissue Molecular Imaging



Shiladitya Sengupta, PhD | BWH Associate Bioengineer, BWH, Assistant Professor of Medicine, HMS

Supramolecular Therapeutics: Next-generation Technology for Focal Modulation of the Tumor Immune Contexture



Paul Shyn, MD | BWH

Costs of Managing Bleeding Risks Before and After Image-guided Biopsies: An Inexpensive Solution?



Matthew Steinhauser, MD | BWH

Multi-isotope Imaging Mass Spectrometry: Leveraging Metabolic Interrogation of Tumors at Subcellular Resolution for Precision Medicine



Shannon Stott, PhD | MGH Microfluidic Technology for Isolation of Exosomes From Cancer Patients



Mario Suva, MD, PhD | MGH Redefining the Cellular Architecture of Human

Gliomas Through Large-scale Single-cell Analyses



David Ting, MD | MGH

Disrupting Endogenous Retroviruses as Novel Anti-Cancer Therapeutics

All speakers are affiliated with Harvard Medical School



Breakthrough Technologies

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a World Medical Innovation Forum Event

DISCOVERY CAFÉ LUNCH

Lunch with Top Cancer Leadership from across Partners HealthCare and Dana-Farber

Monday Lunch | 12PM – 1:30PM

Top Harvard Medical School faculty from Brigham and Women's Hospital, Massachusetts General Hospital and Dana-Farber Cancer Institute will host intimate lunch discussions on developments in their field and their own research. These internationally renowned leaders will engage on cutting edge research and new trends in their clinical and research domain. Seating is reserved based on prior registration. Please check at registration for any availability.



Kenneth Anderson, MD

Combination Targeted and Immune Therapies for Multiple Myeloma



Monica Bertagnolli, MD Cancer Clinical Trials to Address

Tumor Genomic Subsets Joan Brugge, PhD



Cancer Therapy Resistance

Brian Crompton, MD

Breakthrough Cancer Technologies in Next Decade



George Demetri, MD

Mission Control from V-2 to Apollo: Overcome Cancer Resistance



Don Dizon, MD

Women's Cancer and Survivorship



David Fisher, MD, PhD

Lessons from Melanoma

Boosting Cancer Immunotherapy:



Keith Flaherty, MD Precision Medicine Challenges for Targeted Therapy



Levi Garraway, MD, PhD

through "Precision Medicine"

Jeffrey Golden, MD

Improving Cancer Treatment







Cancer Diagnostics Daniel Haber, MD, PhD

Blood Based Liquid Biopsies



Elizabeth Henske, MD

Tuberous Sclerosis/mTOR Signaling Pathway and New Developments Related to the Therapy of TSC, Lymphangioleiomyomatosis (LAM), and Other Rare Tumor Syndromes



Theodore Hong, MD

Advanced Radiation Therapy and other Technologies in Cancer Care



John lafrate, MD

Molecular Diagnostics: Technology, Regulation, Reimbursement



Keith Joung, MD, PhD

CRISPR-Cas9 Genome Editing Technologies for Research and Therapeutics



Cigall Kadoch, PhD

Mammalian SWI/SNF (BAF) Complex Structure



Jeannie Lee, MD, PhD Epigenetic Regulation and Intervention

by Long Noncoding RNAs

Massimo Loda, MD

Novel Techniques in Molecular Pathology



Jay Loeffler, MD

Introduction of New Technologies in Radiation Oncology: No Data, No Problem



Robert Martuza, MD

Oncolytic Viral Therapy of Cancer



Marcela Maus, MD, PhD

Cellular Immunotherapies

Ann Partridge, MD

Innovations in Cancer Survivorship



Scott Rodig, MD, PhD

Deciphering Bases of Anti-tumor Immunity through the Analysis of Primary Human Tumor **Biopsy Specimens**



Deborah Schrag, MD

Innovations in M-Health and E-health and Cancer Care: Realizing the potential of smart-trackers, smart-dispensers and smart-phones to deliver better cancer care



Arlene Sharpe, MD, PhD

Leader, Cancer Immunology BWH, DFCI, George Fabyan Professor of Comparative Pathology, HMS Cancer Immunotherapy



Julie Silver, MD

Prehabilitation and Rehabilitation

in High-Quality Cancer Care

Kimberly Stegmaier, MD

Toward More Precise Therapy for Children with Cancer: From Discovery to Translation



Guillermo Tearney MD, PhD



In Vivo Microscopy Technologies for Cancer Diagnosis and Treatment







Johnathan Whetstine, PhD

Cancer Exosome Analysis

Epigenetics, Tumor Heterogeneity and Acquired Resistance

All speakers are affiliated with Harvard Medical School

Bristol-Myers Squibb. Research that leads the way in Immuno-Oncology.

I MAY BE LEADING THE WAY IN FIGHTING MY CANCER.

What if you could help the body's own immune system combat cancer? Bristol-Myers Squibb is researching ways to make this possible.

At Bristol-Myers Squibb, we're committed to Immuno-Oncology (I-O), a rapidly evolving field that enlists the immune system in the fight against cancer. As we learn more about how cancer evades the immune system, the growing potential of Immuno-Oncology continues to drive our research efforts.

Immuno-Oncology

To find out more about Immuno-Oncology and our leading-edge research, visit ImmunoOncologyHCP.com.



LEADING THE WAY.

2016 WORLD MEDICAL INNOVATION FORUM STEERING COMMITTEE



Monica Bertagnolli, MD | Forum Co-Chair Chief, Division of Surgical Oncology, Brigham and Women's Hospital

Joan Brugge, PhD Professor, Director, Ludwig Center, Harvard Medical School

Bruce Chabner, MD Clinical Director Emeritus, Cancer Center, Massachusetts General Hospital

Duke Collier President and CEO, The Braxton Companies

George Demetri, MD Director, Center for Sarcoma and Bone Oncology, Senior Vice President for Experimental Therapeutics, Institute Physician, Dana-Farber Cancer Institute

Jean- François Formela, MD Partner, Atlas Venture

Briggs Morrison CEO, Syndax Pharmaceuticals

Jesus Gomez-Navarro, MD Vice President, Head of Oncology Clinical Research and Development, Takeda Oncology Daniel Haber, MD, PhD | Forum Co-Chair Director, Cancer Center, Massachusetts General Hospital

Theodore Hong, MD Director, Gastrointestinal Radiation Oncology, Massachusetts General Hospital

Anne Klibanski, MD Chief Academic Officer, Partners HealthCare

Massimo Loda, MD Senior Pathologist, Principal Investigator, Brigham and Women's Hospital, Dana-Farber Cancer Institute

Amir Nashat, PhD Managing Partner, Polaris Partners

Henri Termeer

Ralph Weissleder, MD, PhD Director, Center for Systems Biology

The Numbers

CANCER STATISTICS

\$88,700,000,000°

Direct medical costs for cancer in the US in one year (total of all health care costs)



14.1

1,658,370° New cancer cases in 2015

Today, cancer accounts for about 1 in every 7 deaths worldwide°

million cases of cancer diagnosed around the world (2012)°

million cancer deaths (2012)°

39.6%

Men and women will be diagnosed with cancer at some point during their lifetimes (based on 2010-2012 data)[®]

Most Common Cancers

2015 projected ⁿ

breast, lung and bronchus, prostate, colon and rectum, bladder, melanoma, non-Hodgkin lymphoma, thyroid, kidney and renal pelvis, endometrial, leukemia, and pancreatic

2015 FORUM

8.2



Image: Colored scanning electron micrograph (SEM) of a lung cancer cell.

oncology focus

One focus: a shared commitment to improve the lives of cancer patients everywhere.

At **Takeda Oncology**, we endeavor to deliver novel medicines to patients with cancer worldwide through our commitment to science, breakthrough innovation and passion for improving the lives of patients.

This singular focus drives our aspirations to discover, develop and deliver breakthrough oncology therapies. By concentrating the power of leading scientific minds and the vast resources of a global pharmaceutical company, we are finding innovative ways to improve the treatment of cancer.

We've built a portfolio of paradigm-changing therapies and a leading oncology pipeline. Though we've made great strides in our fight against cancer, we are determined to do more – to work harder and to reach higher. We continue to seek our aspirations with the same passion, agility and entrepreneurial spirit that has sustained our patient-centric culture and has made us the leaders in oncology that we are today.

We know that our mission is not a quick or simple one, but we are up for the task: **we aspire to cure cancer.**

To learn more, visit us at **takedaoncology.com.**@TakedaOncology



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Driving Cancer Care to New Limits



ΒY

Monica Bertagnolli, MD | World Forum Co-Chair Chief, Division of Surgical Oncology, BWH Professor of Surgery, Harvard Medical School



AND

Daniel Haber, MD, PhD | **World Forum Co-Chair** Director, Cancer Center, MGH Isselbacher/Schwartz Professor of Oncology, Harvard Medical School

In the last decade, cancer treatment has been transformed. The dream of tailoring a therapy to the individual patient and subtype of cancer has become, in many cases, a reality. Precision medicine enables physicians to profile tumor cells and select agents that target the cancer more effectively and with less toxicity than conventional approaches.

Physicians and researchers at Partners HealthCare—including Brigham and Women's Hospital (BWH) and Massachusetts General Hospital (MGH) and collaborators at Dana-Farber Cancer Institute (DFCI), lead the field in discovering new strategies for combating cancer. Of our many important discoveries in cancer in the past year, here are just a few examples.

Novel Molecular Approaches and Immunotherapy

By enlisting the body's natural defenses, immunotherapies enable cancer cells to be targeted directly, sparing normal cells and significantly reducing side effects. Monoclonal antibodies have become a powerful tool in precision cancer treatment. Recent developments include cancer vaccines, synthetic T-cell receptors, and other immune-based strategies.

- Chimeric antigen receptors (CARs) are synthetic molecules designed to redirect T cells to specific antigens. At MGH, a program directed by Marcela Maus, MD, PhD, aims to produce next-generation CAR-T cells as immunotherapy for patients with cancer. Dr. Maus and collaborators recently generated a CAR-T cell that targets a mutant form of the epidermal growth factor receptor (EGFR) expressed in roughly 30 percent of glioblastomas. These results have led to initiation of a Phase I clinical study to test CAR-T cells in patients with glioblastoma.
- At MGH, a scientific team led by Nir Hacohen, PhD, is developing new strategies for understanding how the immune system responds to cancer. Based on the finding that patients develop immunity against tumor-derived mutated neoantigens, a personalized tumor vaccine is being tested in collaboration with Catherine Wu, MD, of DFCI. The vaccine is based on computational analysis of each patient's genome, so that each patient is vaccinated against his or her own specific tumor.
- At the DFCI/BWH Cancer Center, discoveries about the fundamental workings of the immune system, including the PD-1 protein, by a team led by Gordon Freeman, PhD have led to the clinical development of therapeutic antibodies with broad efficacy. In work led by F. Stephen Hodi, MD, a PD-L1 checkpoint blocker achieved impressive shrinkage of kidney, melanoma, and lung tumors. Based on the finding that a novel antigen produced on the surface of stressed cells down-regulates the immune response, Kai Wucherpfennig, MD, and colleagues are developing methods to isolate and screen powerful anti-tumor antibodies from patients.

Diverse molecular approaches are being developed to study and treat cancer, and Partners scientists are at the forefront of innovation.

- MGH researchers led by Robert Martuza, MD, and Samuel Rabkin, PhD, developed oncolytic herpes simplex virus (oHSV), a therapeutic agent designed to selectively replicate in and kill cancer cells. In a mouse model for malignant peripheral nerve sheath tumors, injection of oHSV significantly inhibited tumor growth and prolonged survival. The researchers are currently testing oHSV in combination with conventional treatments.
- Epigenetics has revolutionized the fields of cell biology and genetics by providing a missing link between environmental stimuli and disease. Cigall Kadosh, PhD, at the DFCI found that the BAF chromatin remodeling complex, which exhibits both cancer-protective and oncogenic mutations, is altered in at least 20 percent of human cancers. Adding a deformed subunit of BAF to normal cells is sufficient to cause transformation. At MGH, Jeannie Lee, MD, PhD, studies the Xist RNA, which initiates X-chromosome inactivation. Deletion of Xist from mouse blood cells results in a highly lethal blood cancer. Johnathan Whetstine, PhD, at MGH investigates the role of methylation dynamics in differentiation and tumorigenesis. This group identified molecular and physiological conditions that modulate copy gain and selection of drug-resistant regions of the genome across cancer types.
- The development of the bacterial CRISPR-Cas system may make the dream of correcting genetic defects in patients a reality. MGH's Keith Joung, MD, PhD, in collaboration with Randall Peterson, PhD, and Martin Aryee, PhD, recently engineered a high-fidelity CRISPR-Cas9 variant with exceptional precision and potential therapeutic application. They have created multiple tools for manipulating the genome, including artificial customizable transcription factors that regulate the expression of endogenous human genes and recombinant enzymes that can alter specific targets within the epigenome.
- Jonathan Fletcher, MD and colleagues at DFCI/BWH Cancer Center established models of pediatric and adult sarcoma to discover vulnerabilities for targeted therapies. They demonstrated the first PDGFRA oncoproteins in human cancer, the first ALK oncoproteins in sarcomas and renal cancer, and the mechanisms of imatinib response and resistance in gastrointestinal stromal tumor, or GIST, all of which have led to new targeted therapies.

• Work led by Jon Aster, MD, PhD, at BWH has provided the rationale for multiple clinical trials of Notch pathway inhibitors in leukemias and solid tumors in which Notch has oncogenic roles, including leukemia trials led by Dan DeAngelo, MD, PhD, at DFCI. In studies with Birgit Knoechel, MD, PhD at DFCI and Brad Bernstein, MD, PhD, at MGH, response and resistance to Notch pathway inhibitors was associated with differing chromatin states around Myc and other key genes. These observations have spurred work to develop new clinically applicable biomarkers to predict response to therapies directed at regulators of chromatin.

New Tools for Big Data Analysis

Precision medicine relies on vast amounts of data that describe a patient's genome, epigenome, transcriptome, proteome, and metabolome. A multidisciplinary team of scientists led by Sridhar Ramaswamy, MD, and collaborators at MGH develops custom tools to analyze the large data sets generated from high-throughput techniques spanning the technological spectrum, including next-generation sequencing, microarrays, proteomics, RNAi, chemical screens, and high-throughput microscopy. A team led by Gad Getz, PhD, of MGH has pioneered the genome-wide computational analysis of large numbers of tumors, cataloguing changes that occur during the clonal evolution of cancer and describing the mutagenic effects of particular environmental exposures.

- Data sets obtained from high-throughput techniques have dramatically expanded the landscape of clinical decision-making, but no standard procedure exists for integrating this information into the framework of traditional pathology. David Louis, MD of MGH and Jeffrey Golden, MD, of BWH have described a new framework termed "computational pathology" to utilize this vast amount of data. By moving pathology to a discipline that integrates big data analysis, this should enable physicians and patients to optimize decision-making.
- Developments in mass spectrometry have made it possible to comprehensively survey the large number of proteins and post-translational modifications that characterize cancer, with all of their intra- and inter-patient heterogeneity. Wilhelm Haas, PhD, and colleagues at MGH are using tandem MS and quantitative proteomics to characterize the cancer proteome. This approach has revealed proteomic subtypes of melanoma and triple-negative breast cancer, which should enable advances in cancer detection, monitoring, and drug design.

Groups led by John Iafrate, MD, PhD, at MGH and Neal Lindeman, MD, and William Hahn, MD, PhD, at DFCI/BWCC have developed highly complex molecular analyses of tumor genetic for clinical use. At MGH, the SNaPshot genotyping assay detects over 100 recurrent cancer mutations and has enabled the widespread application of personalized cancer medicine. Through a tumor genotyping program named Profile, the DFCI/BWCC team has performed broad-based genomic analysis, under CLIA, on tumor samples from over 11,000 cancer patients. The Profile program analyzes entire coding regions for 300 genes that are important in cancer biology, plus selected introns from 36 cancer-related genes, and reports alterations involving single nucleotide substitutions, insertions/deletions, copy number changes, and structural variants. Results from both of the Snapshot and Profile are currently utilized in patient care, discovery research, and identification of patients for clinical trials.

• The newly formed MGH Clinical Data Science Center has the potential to revolutionize cancer diagnosis and treatment through the use of cognitive computational algorithms, such as machine learning and artificial neural networks. Only recently has computer software and hardware advanced enough to perform computations that rival the human brain's neural network.



Devices for Cancer Detection and Tracking

Advances in cancer research frequently rely on technological breakthroughs. At Partners, multidisciplinary teams design and build devices that bridge the gap between discovery and clinical application.

- Microfluidic technology is revolutionizing medicine by enabling small numbers of rare cells to be isolated and sorted from blood. MGH researchers consisting of a cancer genetics team led by Daniel Haber, MD, PhD; bioengineers and chemists led by Mehmet Toner, PhD, and Shannon Stott, PhD; the molecular biology group of Shyamala Maheswaran, PhD; and the MGH Cancer Center clinical disease centers has developed a microfluidic device capable of isolating rare circulating tumor cells (CTCs) in the blood of patients with cancer. Recently, David Miyamoto, MD, PhD, and others used this device to enrich CTCs from prostate cancer patients. Single-cell RNA sequencing of the enriched CTCs revealed a possible mechanism underlying the resistance of some cancers to androgen-targeted therapy. This new technology may enable early invasive cancer detection, effective monitoring to detect and treat drug resistance, and an enhanced understanding of how cancer spreads through the blood.
- Exosomes, small vesicles released by living cells, show potential for cancer diagnostics because they contain molecular contents of their source cells. A study led by MGH researchers Ralph Weissleder, MD, PhD, and Hakho Lee, PhD described a high-throughput approach for quantitative analysis of exosomes called nano-plasmonic exosome (nPLEX) technology. In February, this team published a compact, portable sensor technology, called iMEX, for rapid, on-site exosome screening and used it to isolate and screen exosomes in plasma samples from ovarian cancer patients, demonstrating its potential as a diagnostic tool.
- Although dysregulation of transcription factors is implicated in several cancers, oncogenic transcription factors are often deemed "undruggable" by conventional methods. Recently, the availability of small-molecule microarray (SMM) technology has made it possible to screen thousands of diverse molecules for the ability to bind proteins. Using an SMM screen, a group led by Levi Garraway, MD, PhD, of DFCI/BWH identified a small molecule that binds directly to an oncogenic transcription factor and leads to its degradation. This approach may discover small molecules capable of disrupting transcription factor oncoproteins.



Lung Cancer

Lung cancer is the leading cause of cancer death. Thanks to breakthroughs in genetics and targeted therapies, many of which were accomplished at Partners, available therapies have evolved dramatically in the last decade. Both MGH and DFCI/BWH have become referral centers for "non-smoker" types of lung cancer, and about half of all lung patients treated at both institutions are now cared for with targeted drugs.

- The most common mechanism of acquired resistance to EGFR inhibitors in patients with EGFR-mutant lung cancer is the development of the EGFR T790M mutation. At the DFCI, investigators Nathanael Gray, PhD, and colleagues discovered a novel class of EGFR inhibitors able to overcome T790M-mediated resistance. Two pivotal clinical trials were copublished in NEJM in 2015: Pasi Jänne, MD, PhD, from DFCI led the first human clinical trial of AZD9291 (osimertinib) and Lecia Sequist, MD, PhD, from MGH led the first human clinical trial of CO-1686 (rociletinib), both of which were highly effective in patients with EGFR T790M mediated drug resistance. Osimertinib was granted accelerated regulatory approval in the US in 2015 and in Europe in 2016 and rociletinib is being considered by both FDA and EMA.
- The liquid biopsy, which enables blood-based genotyping from cell-free (cf) DNA, is rapidly emerging as a non-invasive method for tracking genomic changes that occur in a patient's lung cancer during the course of therapy. Investigators Geoffrey Oxnard, MD and Cloud Paweletz, PhD of DFCI developed droplet digital PCR to identify EGFR mutations (including the T790M drug resistance mutation) from cfDNA. At the BWH, Lynette Sholl, MD, and Neal Lindeman, MD, are applying this technology in patients to identify candidates for EGFR-based therapies, and at MGH, Tilak Sundaresan MD, and Daniel Haber MD, PhD, are comparing cf-DNA and circulating tumor cell assays for T790M genotyping.
- Crizotinib is a powerful therapy for non-small-cell lung cancers that carry rearrangements in the gene encoding the ALK tyrosine kinase. However, most patients develop resistance to crizotinib. Jeffrey Engelman, MD, PhD, Alice Shaw, MD, PhD, and colleagues at MGH found that the drug ceritinib potently overcomes crizotinib-resistant mutations. Based on this result, ceritinib has entered clinical use for the treatment of patients with ALK-mutant NSCLC.
- Adrian Sacher, MD, of BWH and colleagues found that young patients with NSCLC have a distinct form of the disease, both genetically and biologically, that is more likely to be targetable with current therapies than that of older patients with NSCLC. As a result, in an international study led by Geoffrey Oxnard, MD, of BWH, researchers are offering advanced genetic sequencing to all patients under the age of 40 with lung cancer.



Cancers of Blood and Bone Marrow

At the DFCI/BWH, a large international team of investigators led by Kenneth Anderson, MD, and colleagues works to rapidly translate laboratory discoveries into the clinical setting to combat multiple myeloma.

- A three-drug cocktail of Revlimid (lenalidomide), Velcade (bortezomib), and dexamethasone, which combines immunomodulatory drugs with a proteasome inhibitor, caused all signs of myeloma to vanish in half of patients with newly diagnosed cancer. Recently, this drug combination was found to be effective in patients with relapsed and/or refractory multiple myeloma. Given these results, a Phase II study to test this combination in older, transplant-ineligible patients has been launched.
- Three studies led by DFCI investigators found that new drug combinations slow progression of multiple myeloma in patients with relapsed or treatment-resistant disease. Patients received standard chemotherapy in combination with one of three new agents. Daratumumab, a targeted antibody that was tested in a combined Phase I/Phase II study, conferred partial remission in 93 percent of cases. Based on results from the Phase III trial of ixazomib, a second-generation proteasome inhibitor, the FDA approved this drug for treatment of multiple myeloma in patients with refractory disease.
- Standard therapy for acute myeloid leukemia (AML) has not changed in 30 years. The drug midostaurin targets the FLT3 protein, which is mutated in one-third of patients with acute AML. In the RATIFY trial conducted last year, an international alliance of academic and industrial researchers from seven countries led by DFCI's Richard Stone, M, found that adding midostaurin to standard chemotherapy improved overall survival in patients with FLT3-mutated acute AML. In February, the Food and Drug Administration granted breakthrough therapy designation to midostaurin for use in patients with newly-diagnosed FLT3-mutated acute AML.
- In December, investigators from DFCI/Boston Children's Cancer and Blood Disorders Center reported significant progress in identifying potential targets for acute myeloid leukemia. Studies led by Kimberly Stegmaier, MD, found that AML cell growth could be blocked in vitro by drugs that inhibit two different aspects of cellular metabolism and identified a metabolic protein that is overproduced in a high-risk subtype of AML. A. Thomas Look, MD, and colleagues tested the drug KPT-8602, which is a selective inhibitor of nuclear export (SINE), in patients with relapsed or refractory AML. Preclinical studies suggest that KPT-8602 may outperform Selnixor, a SINE drug currently in clinical trials.
- Hodgkin lymphoma (HL) is one of the most frequent cancers in children and young adults. In patients with relapsed or treatment-resistant HL, DFCI researchers Margaret Shipp, MD, Phillipe Armand, MD, PhD, and colleagues found that activation of cancer-fighting T cells with the PD-1-blocking monoclonal antibody nivolumab led to complete or partial remission in 87 percent of patients. The Food and Drug Administration granted breakthrough therapy designation to nivolumab for treating patients with relapsed HL. A large, multinational Phase 2 trial is currently underway.



Breast and Ovarian Cancer

A woman living in the U.S. has a 1 in 10 lifetime risk of being diagnosed with invasive breast cancer. Research underway at Partners aims to increase the odds of survival by using state-of-the-art tools and precision therapy to improve diagnosis, detection, and treatment.

- The drug T-DM1 mounts a targeted attack on HER2-positive cancer cells by conjugating a potent chemotherapy drug to an antibody that delivers the drug directly to cells carrying the HER2 protein. In the international TH3RESA drug trial, Ian Krop, MD, PhD, at DFCI and colleagues found that T-DM1 extended survival time 44 percent in patients with HER2-positive metastatic breast cancer and caused fewer severe side effects than other drugs. Based on these results, T-DM1 is now the standard of care for patients whose cancer has progressed despite HER2-directed treatment.
- A large percentage of breast cancer patients treated with breast conserving surgery need to undergo multiple surgeries due to positive margins found post-operatively. Guillermo Tearney, MD, PhD, Dongkyun Kang, PhD, and colleagues at MGH found that use of Spectrally Encoded Confocal Microscopy (SECM) can improve the accuracy of breast cancer detection in excised tissue. Their results support development of SECM into an intraoperative tool for margin assessment, to enable complete removal of carcinomas during the initial surgery.
- MGH investigators Dejan Juric MD, and Aditya Bardia MD, have led studies of mechanisms by which breast cancers acquire resistance to PI3K inhibitors, as well as estrogen receptor inhibitors. Using both tumor biopsies, rapid autopsy protocols and ex vivo culture of circulating tumor cells, these investigators have defined genetic mechanisms that underlie specific resistance to targeted therapies and may offer new therapeutic approaches.
- BWH and DFCI researchers Dipanjan Chowdhury, PhD, Panos Konstantinopoulos, MD, PhD, and colleagues have discovered a new mechanism by which ovarian cancers gain resistance to a class of drugs called PARP inhibitors, which target a DNA repair pathway essential to certain cancer subtypes. The researchers found that cancers can become resistant to PARP inhibitors by overexpressing a microRNA that influences the choice of DNA repair pathway. This discovery provides a new therapeutic target for a subgroup of drug-resistant ovarian cancers.
- At MGH, Erica Boswell, BS, and Don Dizon, MD, offered strategies for treating sexual dysfunction in women undergoing therapy for breast cancer. A group led by Ann Partridge, MD, at MGH analyzed the decision-making process that influences a woman's choice of whether to undergo contralateral prophylactic mastectomy or breast-conserving surgery.



Changing Tomorrow, Together

At Astellas, we believe we can make a real impact on the future.

That's why we are fully committed to developing medicines that make a difference where they're needed most, in areas like oncology, urology, cardiology and transplant. It's also why we focus on bringing together a diverse group of people with a common goal: to help transform lives. Whether it's in the office, the laboratory or the community, **we're working together to change tomorrow.**



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Agenda

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MONDAY, 25^{TH}

7:00 am | Continental Breakfast

- 8:00 am IPSEN FOYER
- 7:00 am | Registration Opens
- 8:00 am IPSEN FOYER

8:00 am | First Look: The Next Wave of Cancer Breakthroughs 12:00 pm TAKEDA BALLROOM

Highly creative young investigators describe their most promising commercially related research. Rapid-fire presentations by two dozen early-career Harvard Medical School faculty will highlight compelling new discoveries and insights that will be the cancer care products of the future. These young stars from Brigham and Women's Hospital, Massachusetts General Hospital and Dana-Farber Cancer Institute will each describe their work in highly organized 10-minute sessions. This session will take place in the Takeda Ballroom. Presenters will be available immediately following their talk in the third floor GE Foyer.

12:00 pmDiscovery Café: Enjoy Lunch with Top Cancer Leadership1:30 pmfrom across Partners HealthCareBRISTOL-MYERS SQUIBB BALLROOM

Top Harvard Medical School faculty from Brigham and Women's Hospital, Massachusetts General Hospital and Dana-Farber Cancer Institute will host intimate lunch discussions on developments in their field and their own research. These internationally renowned leaders will engage on cutting edge research and new trends in their clinical and research domain. Seating is reserved based on prior registration. Please check at registration to find if there is open table availability.

1:45 pm | Forum Opening and Announcements

1:55 pm

NOVARTIS BALLROOM

INTRODUCTION BY

Anne Klibanski, MD, Chief Academic Officer, Partners HealthCare, Laurie Carrol Guthart Professor of Medicine, Harvard Medical School

David Torchiana, MD, CEO, Partners HealthCare



agenda | monday





1:55 pm | 2:20 pm

A War or Moonshot: Where Do We Stand? NOVARTIS BALLROOM

Forum Co-Chairs Dr. Bertagnolli and Haber provide perspectives on the coming era of cancer research and care.

MODERATOR

Nancy Snyderman, MD, Medical Advisor, GE Healthymagination

Monica Bertagnolli, MD, Chief, Division of Surgical Oncology, BWH, Professor of Surgery, Harvard Medical School

Daniel Haber, MD, PhD, Director, MGH Cancer Center, Kurt J. Isselbacher/Peter D. Schwartz Professor of Oncology, Harvard Medical School



2:20 pm | 3:10 pm

Creating a Disruptive Cancer Pipeline NOVARTIS BALLROOM

Some companies characterize creating a successful pipeline of disruptive cancer therapies as an engineering challenge, others describe arranging building blocks or integrating capabilities from the marketplace – for many it is all of the above. Considerations include discovering novel targets, novel single agent drugs and emerging novel mechanisms, new pathways and/or mechanisms of action, new molecular entities and technology acquisition strategies, among others. The panel, corporate officers, investors and academic experts pulls back the curtain to discuss the considerations in pipeline development, the tradeoffs and what it takes to maintain success over time.

MODERATOR

Robert Tepper, MD, Partner, Third Rock Ventures, Adjunct Professor, Harvard Medical School

James Bradner, MD, President, Novartis Institutes for BioMedical Research George Demetri, MD, Director, Center for Sarcoma and Bone Oncology, Senior Vice President for Experimental Therapeutics, Institute Physician, DFCI Keith Flaherty, MD, Director, Clinical Research, MGH Cancer Center, Associate Professor of Medicine, Harvard Medical School Sean Harper, MD, Executive Vice President, Research and Development, Amgen



3:10 pm |Curative Therapies: The Economics of Game Changing Science4:00 pmNOVARTIS BALLROOM

Novel, potentially curative, cancer therapies are coming to market. Recent experience in Hepatitis C therapy raises the question as to whether a new approach is needed to design a pricing model that better balances resulting cost pressure across the delivery system. While most acknowledge systemic cost effectiveness curative therapies also present many challenges to payers – e.g. a spike in patient volume and cost as these therapies are introduced. A broad ranging dialogue has emerged in the cancer community that includes incorporating cost effectiveness as part of the regulatory approval, shifting incentives for oncologists, increasing emphasis on early detection, integrating billing codes, bundled payments and management fees and many others. The panel with top executives from the pharma, foundation, pharmacy and provider sectors will share insights on this crucially important topic.

INTRODUCTION BY

Gregg Meyer, MD, Chief Clinical Officer, Partners HealthCare

MODERATOR

Sue Siegel, CEO, GE Ventures and Healthymagination

Troyen Brennan, MD, Executive Vice President and CMO, CVS Health Paul Hudson, President, AstraZeneca US, Executive Vice President, AstraZeneca North America Betsy Nabel, MD, President, Brigham and Women's Hospital, Professor of Medicine, Harvard Medical School Gary Reedy, CEO, American Cancer Society Peter Slavin, MD, President, Massachusetts General Hospital, Professor of Healthcare Policy, Harvard Medical School



Winning Portfolio Strategy NOVARTIS BALLROOM

4:00 pm

4:50 pm

The many considerations involved in managing a cancer portfolio are among the most important for company vitality and also play a principal role in determining the breadth and rate that new therapies reach patients. Considerations include drug categories (current or potential), use of approved drugs on new tumor types, product life extension, concentrating on call point strengths vs broadening into new cancers, technology category strength – e.g. small molecule vs emerging ones like CAR-T, product lifecycle status, competitive agents, possible portfolio swaps (e.g. NVS/GSK) and shareholder scrutiny . Panel members from the highest ranks of the industry -- large and emerging companies -- will discuss their strategic approach to balancing considerations they can influence and those that they can't.

MODERATOR

Thomas Lynch, MD, CEO, Mass General Physician's Organization

Francis Cuss, MD, Executive Vice President and Chief Scientific Officer, R&D, Bristol-Myers Squibb

Peter Lebowitz, MD, PhD, Global Therapeutic Area Head, Oncology, Janssen R&D , J&J

Briggs Morrison, MD, CEO, Syndax Pharmaceuticals

Alessandro Riva, MD, Global Head, Oncology Development and Medical Affairs, Novartis Oncology

Phil Rowlands, PhD, Interim Head, Oncology, Therapeutic Area Unit, Takeda



VGENDA | MONDAY



4:50 pm 5:40 pm

Early Detection and Prevention of Cancer NOVARTIS BALLROOM

The prevention of cancer and the development of new strategies to detect cancer precursors and early-stage malignancies when treatment may be most effective - clinically and financially — are critical research goals. Our panel of experts reviews powerful imaging modalities, single-cell analysis of the tumor microenvironment and next-generation cancer models. Circulating tumor DNA testing to monitor response to treatment and emergence of cancer resistance—with the objective of early cancer diagnosis before symptoms appear—will also be detailed.

MODERATOR

David Louis, MD, Pathologist-in-Chief, MGH, Benjamin Castleman Professor of Pathology, Harvard Medical School

Andy Chan, MD, Program Director, Gastroenterology Training Program, MGH, Associate Professor of Medicine, Harvard Medical School William Hait, MD, PhD, Global Head, Janssen Research & Development, J&J Krishna Kumar, CEO, Emerging Businesses, Philips Massimo Loda, MD, Senior Pathologist, Principal Investigator, BWH, DFCI, Professor, Department of Pathology, Harvard Medical School



Innovation Break: Announcing the C³ Prize from Astellas Oncology and the World Medical Innovation Forum NOVARTIS BALLROOM

- 5:55 pm | Ropes & Gray Welcome Reception 6:45 pm GENERAL ELECTRIC FOYER
- 6:45 pm | **Ropes & Gray Dinner Program** Fireside Chat: Richard Gonzalez, CEO, AbbVie **BRISTOL-MYERS SOUIBB BALLROOM**

INTRODUCTION BY

Edward Lawrence, Retired Partner, Ropes & Gray

MODERATOR

Nancy Snyderman, MD, Medical Advisor, GE Healthymagination Richard Gonzalez, CEO, AbbVie





AGENDA | TUESDAY, 26TH

7:30 am Continental Breakfast 8:15 am IPSEN FOYER

Opening NOVARTIS BALLROOM

Chris Coburn, Vice President, Partners Innovation



8:15 am |Global Cancer Markets9:05 amNOVARTIS BALLROOM

Cancer causes 1 in 7 deaths worldwide. If rates don't change, the global cancer burden is expected to increase from 14 million new cases and 8 million cancer related deaths worldwide to 22 million cases and 13 million deaths by 2030. The panel will discuss how approaches to deliver innovative technologies differ in different international markets, what the respective drivers are, as well as requirements and challenges. Expert panelists from leading international companies and key governmental entities, including the famed NICE from the UK NHS, will consider strategies and key trends.

MODERATOR

Sheila Dharmarajan, Head of Business Development, Zelnick Media Capital

Newton Crenshaw, Vice President of North America Oncology,

Eli Lilly and Company Marc de Garidel, Chairman and CEO, Ipsen Gillian Leng, MD, Deputy Chief Executive, Director of Health and Social Care, National Institute for Health and Care Excellence James Robinson, President, Americas Operations, Astellas Bruno Strigini, President, Novartis Oncology



9:05 amEpigenetics and Novel Cancer Targets9:55 amNOVARTIS BALLROOM

The initiation and progression of cancer is controlled by both genetic and epigenetic events. Epigenetics, the study of changes that influence how DNA does its job, is one of the fastest-moving fields in cancer research. Expert corporate and academic panel members will discuss the promise of epigenetics. They will describe translating basic epigenetic research into cancer diagnostics and therapies, emphasizing market opportunities and competitive advantages.

MODERATOR

Pat Fortune, PhD, Senior Market Sector Leader, Partners Innovation

Robert Copeland, PhD, President of Research and Chief Scientific Officer, Epizyme Keith Dionne, PhD, CEO, Constellation Pharmaceuticals, Inc. Cigall Kadoch, PhD, Assistant Professor, DFCI, Harvard Medical School Jeannie Lee, MD, PhD, Professor of Genetics, MGH Nancy Simonian, MD, CEO, Syros Pharmaceuticals Johnathan Whetstine, PhD, Tepper Family MGH Research Scholar, Associate Professor of Medicine, Harvard Medical School



AGENDA | MONDAY/TUESDAY



WORLD MEDICAL INNOVATION







McLean Host



4







Networking Break IPSEN FOYER 10:25 am

9:55 am

11:05 am

12:00 pm

10:25 am Fireside Chat: Robert Bradway, CEO, Amgen 11:05 am NOVARTIS BALLROOM

INTRODUCTION BY

Cathy Minehan, Dean, School of Management, Simmons College MODERATOR

Caroline Chen, Reporter, Bloomberg Business

Robert Bradway, CEO, Amgen



Immunotherapy I: Checkpoint Activation and Cancer Vaccines NOVARTIS BALLROOM

Among the most promising approaches to activating therapeutic antitumor immunity is the blockade of immune checkpoints. Checkpoint blockade, prevention of inhibitory signaling that limits activation or function of tumor antigen-specific T cells responses, is revolutionizing the treatment of many poor-prognosis malignancies. Expert panelists discuss significant long-term cancer remissions, potential cures – in some cases – and how boosting the body's own defenses is producing stunning results when combined with standard anticancer therapies and other immunotherapies. They will also detail the experimental accines in development that are designed to "wake up" the immune system so it will trigger reliable and effective attacks on cancer cells.

MODERATOR

Nir Hacohen, PhD, Immunologist, MGH Center for Immunology and Inflammatory Diseases, MGH Research Scholar, Associate Professor, Medicine, Harvard Medical School

Thomas Daniel, MD, Chairman, Celgene Research Glenn Dranoff, MD, Global Head of Exploratory Immuno-Oncology, Novartis Institutes for Biomedical Research Robert Mulroy, President and CEO, Merrimack Pharmaceuticals David Reese, MD, Senior Vice President, Translational Sciences, Amgen Scott Rodig, MD, PhD, Associate Professor, BWH Arlene Sharpe, MD, PhD, Leader, Cancer Immunology, BWH, DFCI, George Fabyan Professor of Comparative Pathology, Harvard Medical School



Lunch **BRISTOL-MYERS SQUIBB BALLROOM**

Fireside Chat: Andy Slavitt, Acting Administrator, CMS **BRISTOL-MYERS SOUIBB BALLROOM**

INTRODUCTION BY

David Torchiana, MD, CEO, Partners HealthCare **MODERATOR** Meg Tirrell, Biotech and Pharma Reporter, CNBC

Andy Slavitt, Acting Administrator, CMS



12:00 pm 12:30 pm

12:30 pm 1:00 pm

1:00 pm |Fireside Chat: Giovanni Caforio, MD, CEO, Bristol-Myers Squibb1:30 pmBRISTOL-MYERS SQUIBB BALLROOM

INTRODUCTION BY

Thomas Lynch, MD, CEO, Mass General Physician's Organization MODERATOR Meg Tirrell, Biotech and Pharma Reporter, CNBC Giovanni Caforio, MD, CEO, Bristol-Myers Squibb



1:40 pm | 2:10 pm

Fireside Chat: Patients Driving Innovation NOVARTIS BALLROOM

MODERATOR

Nancy Snyderman, MD, Medical Advisor, GE Healthymagination Kathy Giusti, Founder, Multiple Myeloma Research Foundation and Multiple Myeloma Research Consortium



2:10 pm |Immunotherapy II: Cell Based Therapies3:00 pmNOVARTIS BALLROOM

Oncology sits on the cusp of a new revolution thanks to the use of human cells as versatile therapeutic engines. By modifying T cells to express chimeric antigen receptors (CARs) that recognize cancer-specific antigens, our expert panelists describe how they have been able to prime cells to recognize and kill tumor cells that would otherwise escape immune detection. They also detail the various "living drugs" that kill cancer cells and could replace standard oncology treatments in the future.

MODERATOR

David Fisher, MD, PhD, Chief, Dermatology Service, Director, Melanoma Program, Director, Cutaneous Biology Research Center, MGH Cancer Center, Edward Wigglesworth Professor of Dermatology, Harvard Medical School

Usman (Oz) Azam, MD, Global Head, Cell & Gene Therapies Unit, Novartis Mark Frohlich, MD, Executive Vice President, Portfolio Strategy, Juno Therapeutics Marcela Maus, MD, PhD, Director of Cellular Immunotherapy, MGH, Assistant Professor, Harvard Medical School

Chuck Wilson, PhD, CEO, Unum Therapeutics



3:00 pm | 3:50 pm

Financing Breakthrough Cancer Companies NOVARTIS BALLROOM

The global market for oncology therapies is currently more than \$100 billion annually, and could reach \$147 billion by the end of the decade. Panel experts discuss the most compelling technologies, trends driving investment considerations, new models, pricing considerations and strategies they use as leading oncology investors in both early stage and established companies.

INTRODUCTION BY

Roger Kitterman, Managing Partner, Partners Innovation Fund, Partners Innovation

MODERATOR

Meg Tirrell, Biotech and Pharma Reporter, CNBC

Jean-François Formela, MD, Partner, Atlas Ventures Jonathan Leff, Partner, Deerfield Management Amir Nashat, PhD, Managing Partner, Polaris Partners Christopher Viehbacher, Managing Partner, Gurnet Point Capital



FOCUS SESSIONS

4:00 pm | 4:50 pm

Arms Race in Radiation ASTELLAS BALLROOM

The Holy Grail of radiation therapy is to maximize the effectiveness of killing cancer cells while minimizing the effect on neighboring tissue. Technology meets modern cancer care with the integration of technologies that offer enormous benefits to the cancer patient in improved quality of life and increased likelihood of cure. Expert panelists will highlight current benefits of radiation therapies, the increasing use of hypofractionated radiation therapy and describe future tools in development that will have the potential to dramatically improve outcomes.

INTRODUCTION BY

Jonathan Behr, PhD, Market Sector Leader, Partners Innovation

MODERATOR

Jay Loeffler, MD, Chair, Radiation Oncology, MGH

Daphne Haas-Kogan, MD, Chair, Department of Radiation Oncology, BWH, DFCI, Professor of Radiation Oncology, Harvard Medical School Theodore Hong, MD, Director, Gastrointestinal Radiation Oncology, MGH, Associate Professor of Radiation Oncology, Harvard Medical School Joseph Jachinowski, CEO, Mevion Medical Systems Dow Wilson, CEO, Varian Medical Systems



4:00 pm | 4:50 pm

pm |Breakthrough Devices to Treat CancerpmBRISTOL-MYERS SQUIBB BALLROOM

The increasing demand for early diagnosis of cancer and the growing prevalence of metastatic brain, lung, breast, prostate and other cancers is driving the oncology device market. Our experts zero in on innovative technologies that will address challenges in cancer surgery and pain management.

INTRODUCTION BY

Monica Bertagnolli, MD, Chief, Division of Surgical Oncology, BWH, Professor of Surgery, Harvard Medical School

MODERATOR

Antonio Chiocca, MD, PhD, Chairman, Neurosurgery, BWH, Professor of Surgery, Harvard Medical School

Maurice Ferre, MD, CEO, Insightec

David Lee, CEO, Lumicell

Amy Pollack, MD, Chief Medical Officer and Vice President of Global Medical Affairs for the Early Technologies Business Group/Minimally Invasive Technology Innovations (MITG), Medtronic

Ralph Weissleder, MD, PhD, Director, Center for Systems Biology, MGH, Professor, Radiology and Systems Biology, Harvard Medical School



4:50 pr

4:00 pm Study Designs to Meet the Challenges of Personalized Cancer Medicine 4:50 pm NOVARTIS BALLROOM

Cancer biology indicates that cancer is a large number of niche diseases that may be targeted with therapies against specific molecular alterations common to multiple tumor types. This model creates challenges for both drug development and patient care with implications for initial indication selection and design and execution of clinical trials – from first in human through post marketing studies. Among the topics the panel will address:

- The availability of biomarkers to stratify trials, select patients and monitor drug response can improve both trial speed and cost, as well as enable development of companion diagnostics but at the same time present more complex validation requirements.
- Design of trials using surrogate end points holds great promise but validation of such endpoints is a regulatory challenge. Adaptive trial designs for dose response, pK/PD and efficacy hold promise but adoption of such approaches has been slow.
- Cancer immunotherapies create a significant opportunity for development of combination therapies but the cost of acquiring the approved drug can significantly increase the cost of clinical trials. This may necessitate new approaches to late preclinical development as well as biomarkers that are early and accurate indicators of drug response for incorporation in the clinical trial in Phase I/II.
- The cost of current and next generation cancer drugs will require measuring clinical and econometric outcomes in order to justify reimbursement. This may mandate larger post marketing clinical studies, including observational trials.

INTRODUCTION BY

Pat Fortune, PhD, Senior Market Sector Leader, Partners Innovation

MODERATOR

Gideon Gil, Managing Editor, STAT

Julia Beaver, MD, Acting Clinical Team Leader,

Division of Oncology Products 1, CDER, FDA

Maria Koehler, MD, PhD, Vice President, Strategy, Innovation and Collaborations, Pfizer Oncology Business Unit

Deborah Schrag, MD, Chief, Division of Population Sciences, Medical Oncology, DFCI, Professor of Medicine, Harvard Medical School

Mike Vasconcelles, MD, CMO, Unum Therapeutics



4:00 pm | 4:50 pm

Surviving Cancer: New Realities, New Needs

TAKEDA BALLROOM

Extraordinary treatment advances have turned many cancers from apparent death sentences into manageable chronic illnesses with extraordinary consequences for the entire health care system. In the United States, there are approximately 14 million cancer survivors, up from just three million four decades ago. Those survivors have unique care requirements, that will put enormous stress on the system -- calling out for new technology solutions. The panel will discuss requirements technologies and approaches that can help monitor, guide, and connect patients.

INTRODUCTION BY

Trung Do, Executive Director, Business Development, Partners Innovation

MODERATOR

Tim Ferris, MD, Senior Vice President of Population Health Management, PHS

Jani Ahonala, CEO, Noona Healthcare

Don Dizon, MD, Clinical Co-Director, Gynecologic Oncology, Founder and Director, The Oncology Sexual Health Clinic, MGH, Associate Professor of Medicine, Harvard Medical School Ann Partridge, MD, Director, Adult Survivorship Program, Program for Young Women with Breast Cancer, DFCI, Associate Professor of Medicine, Harvard Medical School Claire Thom, Senior Vice President, Global Oncology Development, Astellas



5:00 pm | 6:30 pm

Attendee Reception GENERAL ELECTRIC FOYER

Dinner on your own



7:30 am | 8:30 am

Continental Breakfast

Opening NOVARTIS BALLROOM

Chris Coburn, Vice President, Partners Innovation

8:10 am | 9:00 am

Combination Cancer Therapies: Drug Resistance and Therapeutic Index NOVARTIS BALLROOM

Study Designs to Meet the Challenges of Personalized Cancer Medicine Game changing modern cancer therapies—immunotherapies and targeted therapies, among others—do not by themselves meet the needs of many patients who require alternative strategies to achieve optimal therapeutic benefit. Panel experts will describe combining these therapies with other drugs, challenges and the path forward.

MODERATOR

Jens Eckstein, PhD, President, SR One

Kenneth Anderson, MD, Director, Jerome Lipper Multiple Myeloma Center, Kraft Family Professor of Medicine, Harvard Medical School

Jeffrey Engelman, MD, PhD, Director, Thoracic Oncology and Director, Molecular Therapeutics, Medical Oncology, MGH, Laurel Schwartz Associate Professor of Medicine, Harvard Medical School Jamie Freedman, MD, PhD, Senior Vice President, Global Clinical Development, Medimmune David Schenkein, MD, CEO, Agios Pharmaceuticals William Sellers, MD, Vice President and Global Head of Oncology,

Novartis Institutes for BioMedical Research



9:00 am | 9:40 am

Fireside Chat: Joseph Jimenez, CEO, Novartis NOVARTIS BALLROOM

MODERATOR

Gregg Meyer, MD, Chief Clinical Officer, Partners HealthCare **Joseph Jimenez**, CEO, Novartis

9:40 am | 10:30 am

Cancer Diagnostics: New Uses, New Reimbursements? NOVARTIS BALLROOM

Advances in genetics, genomics and proteomics are driving advances in identifying and treating disease. Use of genetic testing and molecular diagnostics is rapidly expanding in clinical practice, creating a new, personalized approach to medicine. Panelists describe key new technologies and how they will be fully integrated into the delivery of care.

MODERATOR

Jeffrey Golden, MD, Chair of Pathology, Brigham and Women's Hospital, Ramzi S. Cotran Professor of Pathology, Harvard Medical School

Helmy Eltoukhy, PhD, CEO, Guardant Health, Inc.
Marc Grodman, MD, CEO, BioReference Laboratories
John Iafrate, MD, PhD, Associate in Pathology, Medical Director, Center for Integrated Diagnostics, MGH, Professor of Pathology, Harvard Medical School
Neal Lindeman, MD, Associate Pathologist, BWH, Associate Professor, Pathology, Harvard Medical School
Michael Pellini, MD, CEO, Foundation Medicine
Risa Stack, PhD, General Manager, New Business Creation, GE Ventures

AGENDA | WEDNESDAY, 27TH

10:30 am |New Philanthropy: Patients Driving Innovation11:20 amNOVARTIS BALLROOM

Philanthropy's role in driving improved cancer care has evolved rapidly over the last decade. Disease foundations have become active in nearly every phase of the care spectrum supporting innovations in the lab, clinic, patient engagement, and regulatory approval among others. Senior philanthropic leaders will describe how the foundation community is redefining roles and finding new ways to help patients as they seek to drive breakthroughs in understanding and care.

INTRODUCTION BY Scott Sperling, Co-President Thomas H. Lee Partners

MODERATOR

Mallika Marshall, MD, Health Reporter, WBZ-TV/CBS Boston

Louis DeGennaro, PhD, President and CEO, The Leukemia & Lymphoma Society Judy Salerno, MD, President and CEO, Susan G. Komen for the Cure Billy Starr, Founder and Executive Director, Pan-Mass Challenge

11:25 am |Disruptive Dozen12:25 pmNOVARTIS BALLROOM

Cancer faculty from the Brigham and Women's Hospital, Massachusetts General Hospital, and Dana-Farber Cancer Institute nominated dozens of technologies that will have the greatest impact on cancer care in the next decade, and then compiled a ranking of the 12 most disruptive technologies. A panel of experts will announce and discuss each of the technologies chosen. This intriguing, informative and fun session will let you in on how the experts view the future in their field.

Monica Bertagnolli, MD, Chief, Division of Surgical Oncology, BWH, Professor of Surgery, Harvard Medical School Daniel Haber, MD, PhD, Director, MGH Cancer Center, Kurt J. Isselbacher/Peter D. Schwartz Professor of Oncology, Harvard Medical School

- 12:25 pm |Boxed Lunches Available12:45 pmIPSEN FOYER
- 12:25 pm |Forum Closing12:35 pmNOVARTIS BALLROOM

Anne Klibanski, MD, Chief Academic Officer, Partners HealthCare, Laurie Carrol Guthart Professor of Medicine, Harvard Medical School AGENDA | WEDNESDAY

At A Glance – The Last Year

PARTNERS INNOVATION

enable future collaborations.

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INNOVATION

DECEMBER 2015

Ariadne Labs, a joint center of Brigham and Women's Hospital and The Harvard T.H. Chan School of Public Health led by Dr. Atul Gawande, formed a collaboration with a major academic medical center to be the first hospital system to implement the Ariadne Serious Illness Program.

Collaboration agreement reached between MGH's Center for Human Genetic Research and PTC Therapeutics for the treatment of rare genetic disorders resulting from premRNA splicing defects.

8 projects funded/selected at MGH and BWH under the Sanofi iAwards program.

2016

FEBRUARY 2016

MGH spin off and PIF portfolio company Editas Medicine is inaugural IPO of 2016 and becomes first 'pure play' in CRISPR market.

QPID Health, MGH spin-off and PIF portfolio company committed to streamline EHR acquired by eviCore.

Innovation deal making team relocates to Cambridge's Kendall Square landmark Athenaeum building.

Boston Nano, MGH driven commercialization company based on microfuidics and related diagnostic capability, launched with \$35 million series A financing.

APRIL 2016

PHS wholly owned spin-off GeneInsight acquired by SunQuest to further advance precision medicine and clinical genetics IT platform.

Entrepreneur in Residence program launched to accelerate creation of hospital driven spin-off PIF portfolio companies.

ImmuneXcite receives \$8.6 million financing to develop cancer immunotherapies.

NVIDIA is named a founding technology partner of the MGH Clinical Data Science Center.

2016 World Medical Innovation Forum.

JANUARY 2016

Partners Innovation Fund expanded to \$100 million.

2016 Innovation Discovery Grant \$1 million Program launched to accelerate commercialization of PHS innovations. Will make 10 awards.

MARCH 2016

Syntimmune, BWH spinout developing treatments for immunological disorders, receives second tranche of i\$26 million financing.

MGH launches Clinical Data Science Center to promote clinical application of machine learning and decision support to improve detection, diagnosis, treatment, and management of disease throughout PHS.

Wellman Fund, exclusively targeted on investment opportunities emerging from MGH's Wellman Center for Photomedicin has first close at \$50 million. 10% of fund to support pre-commercial research.

Caroline, still as style-conscious as ever...

.....and Ipsen played an important part in keeping it that way. For Caroline, who suffers from a debilitating disease, challenging her friends to an off-road bike race is priceless.

Each year, Ipsen invests ~15% of its sales in R&D to further its expertise in three specialty care areas: oncology, endocrinology and neurology. Ipsen sells more than 20 drugs in more than 115 countries. Ipsen employees devote their energy and skills to developing innovative therapeutic solutions for debilitating diseases and improving the quality of life of patients. www.ipsenus.com

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Pushing the boundaries of science to deliver life-changing medicines

We believe the best way we can help patients is to focus on breakthrough science in order to uncover disease mechanisms and develop novel, targeted therapies that interact with them. This is at the heart of our purpose as a company: to push the boundaries of science to deliver life-changing medicines. We invest in distinctive science in three main therapy areas where we believe we can make the most meaningful difference to patients:

oncology; cardiovascular and metabolic disease; and respiratory, inflammation and autoimmunity. Our science exploits our rare combination of capabilities in small molecules and biologics, immunotherapies, protein engineering technologies and devices. These are reinforced by a strong focus on translational science and personalized healthcare capabilities. We build on our our own capabilities by collaborating with

world-renowned scientists and academic institutions and partner with like-minded science-led companies. Through leading in science, we are confident that we can transform the lives of patients around the world.

For more information, please visit astrazeneca-us.com

Oncology combination therapies

AstraZeneca is investigating combinations of biologic and small-molecule therapies for the treatment of cancer. These combinations target the tumor directly and some help boost the body's own immune system to potentially induce cell death.

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PRESENTING

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Astellas Oncology is driven to enhance the lives of people impacted by cancer by developing novel, targeted therapies for hard-totreat cancers with few therapeutic options and support promising research to discover new care pathways. We also collaborate with all members of the cancer community to nurture advocacy, education and caregiver support efforts. As part of a global network of nearly 18,000 employees that have been dedicated to changing patients' lives for more than 120 years, Astellas Oncology is advancing science to transform lives.

www.astellasoncology.com/us

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The Innovation Advisory Board provides Partners HealthCare with independent guidance on commercial strategy, market potential and collaborative opportunities

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Barbara Lubash Managing Director, Versant Ventures

Amir Nashat, PhD Managing Partner, Polaris

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Russ Richmond, MD CEO, APS

Sue Siegel CEO, Market Innovations, GE Ventures, healthymagination & Idea Works

Steve Weinstein Managing Director, Novartis Venture Fund

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Associate Director, Center for Engineering in Medicine, MGH and Shriners Hospital for Children; Professor of Surgery, HMS

Howard Weiner, MD Founder and Director, PHS Multiple Sclerosis Center; Robert L. Kroc Professor of Neurology, HMS

Information and Events

REGISTRATION HOURS

Monday, April 25 – 7:00am – 5:30pm Tuesday, April 26 – 7:00am – 4:30pm Wednesday, April 27 – 7:00am – 11:00am

NAME BADGES

Name badges will be provided at registration. On-site registration is available on the 4th floor outside the Novartis Ballroom during the hours noted above. Name badges must be worn during all events including meals and receptions. Please return your badge to the registration desk prior to your departure for recycling.

IMPORTANT LOCATIONS

Registration Desk and Information Ipsen Foyer, 4th Floor

Forum Luncheons and Dinner Bristol-Myers Squibb Ballroom, 3rd Floor

Continental Breakfast – Daily Ipsen Foyer, 4th Floor

Monday Evening Ropes & Gray Welcome Reception General Electric Foyer, 3rd Floor

Tuesday Evening Attendee Reception General Electric Foyer, 3rd Floor

WIRELESS ACCESS

Complimentary Internet access is available to all Forum attendees. To connect to the internet:

STEP 1: Access your computer's Wireless Network connection

STEP 2: Click/connect to the network "Westin Meeting Room" from the list of available networks

STEP 3: Open your Internet browser

STEP 4: The login page will ask for Password, first and last name, and you will have to accept the Westin's terms and conditions.

Password is: NOVARTIS

If you have an iPhone or iPad you must set your browser to "allow cookies" or "Block Cookies NEVER".

Thank you for attending the 2016 World Medical Innovation Forum. We look forward to seeing you in 2017. Clinical Focus: **Cardiovascular**, **May 1-3**, **2017**

Register Today at: worldmedicalinnovation.org

CONNECTIONS

We are pleased to announce Partnering via our Connections website at this year's World Forum. The Connections website provides scheduling solutions for registrants. Guests can log into the site, create a user profile, and then search a database of attendees and request meetings with other attendees. For additional information, users should check their inboxes for login information, or inquire at the registration desk.

worldforum.pathable.com

AUDIENCE RESPONSE SYSTEM

During this year's Forum we will utilize the Connections website for audience engagement. Please create a profile to participate interactively during the meetings. A link to the system is available at: worldforum.pathable.com

To ask questions please follow the following instructions:

- 1. Enter the presented code in the website address section
- 2. If not signed-in, press the "Sign In" button
- 3. Enter question into field then press "Submit"

Day codes are:

- Monday: ptbl.co/NA9yVa
- Tuesday: ptbl.co/3wwyyr
- Wednesday: ptbl.co/Y9uSl4

SPECIAL EVENTS

All World Medical Innovation Forum attendees are invited to join us at these special events.

Monday Evening Ropes & Gray Welcome Reception and Dinner Program

Meet up with Forum attendees during our Welcome Reception in the General Electric Foyer, immediately followed by the dinner program in the Bristol-Myers Squibb Ballroom, 3rd Floor.

Tuesday Evening Attendee Networking Reception

Join us for a glass of wine and a bite to eat and continue the conversation. The Reception will be held in the General Electric Foyer, 3rd Floor.

SPEAKER BIOS

A complete list of speakers and their bios are available online via the agenda page of our website at: worldmedicalinnovation.org/speakers

ROPES & GRAY IS PROUD TO SPONSOR THE 2016 WORLD MEDICAL INNOVATION FORUM.

We share the Forum's commitment to collaborative innovation. Our multidisciplinary team of health care, life sciences, FDA regulatory, intellectual property and government enforcement attorneys regularly works with health care and life sciences industry leaders to help drive the changes that are transforming today's global health care landscape.

ROPES & GRAY

Collaborating to Improve the Health of the World.

Mintz Levin is proud to support the World Medical Innovation Forum in its commitment to discovering and sharing new treatment options, medical devices, and technology to improve the lives of patients.

2016 WORLD MEDICAL INNOVATION FORUM PLANNING COMMITTEE

A special thanks to the Planning Committee staff for their unstinting commitment over the last 18 months to create the 2016 World Medical Innovation Forum.

P L A N N I N G C O M M I T T E E

Greg Brace Intelligence Analyst

Gerald Couzens (not pictured)

Michael Freeman

Beth Mollineaux General Manager, Strategic Marketing

Brandon Sarmas Program Manager

Diana Schwartzstein Director of Administration

CANCER MARKET SECTOR

Pat Fortune, PhD Senior Market Sector Leader

Dan Castro Director, Business Strategy and Licensing

Jeanette Fiala, PhD Licensing Manager (not pictured)

Sunil Gangadharan, PhD Licensing Manager

Leon Hebert, Jr, PhD Senior Licensing Manager

Rebecca Listfield, PhD Licensing Manager

Christine Taft, PhD Licensing and Alliance Manager

EVENT TEAM

Jamie Belkin Eric Castle Deb Costa Meaghan Doherty Jerry Mizer Greg Mueller Lisa Savin Taryn Westerkamp

Innovation Fellows Program

The Innovation Fellows Program is a new PHS wide initiative to increase collaboration between the PHS community and industry. It is a two-way training opportunity where personnel are exchanged between the PHS core hospitals - Brigham and Women's Hospital, Massachusetts General Hospital and McLean Hospital -- and participating companies and investment funds. The Innovation Fellows program matches interested Partners staff and participating companies who make a commitment to host at least one Innovation Fellow in a structured fellowship. The primary purpose of the Innovation Fellows program is to provide an on-site experiential posting that can enhance the skills of the participants with the goal of expanding overall PHS workforce capabilities to advance transactional research and industrial collaboration. It will also offer some the possibility of an alternative career path. On a selected basis it additionally offers companies the opportunity to place employees in labs with the Partners hospitals.

For additional information, please contact Anika Heavener, Senior Alliance Manager, Partners Innovation at phsstrategicalliances@partners.org

Innovating Cardiac Care On A Global Scale.

Next year's World Medical Innovation Forum focuses on cardiovascular disease – the world's leading cause of death. At the 2017 World Medical Innovation Forum, the industry's leading CEOs, Harvard faculty, VCs, investors and deal makers will come together to discuss the best in science, groundbreaking innovations in the detection of heart disease as well as the development and implementation of innovative cardiovascular treatments. These international experts will be joined by 1,100 attendees from the senior ranks of the biotech, pharma, government and health care investment communities, as well as top Partners HealthCare faculty and trainees.

Join Us Next Year.

Special discounted pricing is available for registrants who sign up during this year's Forum. Visit the website or registration desk to take advantage of this special program. Please note that the World Forum will run concurrently with the American Association for Thoracic Surgery annual meeting (April 29 - May 3, 2017) which will be held in the Hynes Convention Center – adjacent to the Westin Copley.

www.worldmedicalinnovation.org

CARDIOVASCULAR MAY 1–3, 2017

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