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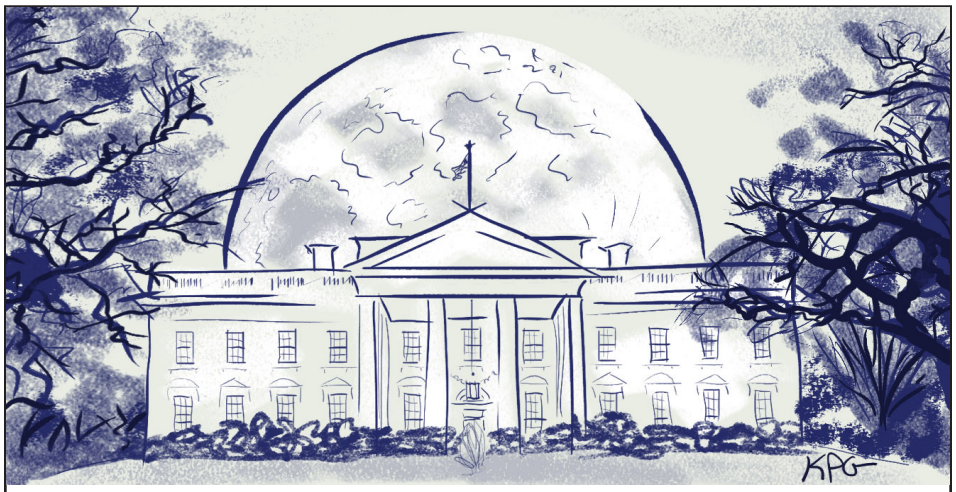

Jacks, Jaffee, Singer Named Co-Chairs of NCI's Moonshot Blue Ribbon Panel

By Matthew Bin Han Ong

NCI announced a panel of advisors to inform the scientific direction and goals of Vice President Joe Biden's National Cancer Moonshot Initiative.

The 28-member Blue Ribbon Panel, a committee of scientific experts, cancer leaders, and patient advocates, will serve as the working group of the National Cancer Advisory Board and provide scientific guidance from opinion leaders in the cancer community.

(Continued to page 2)

FDA Allows Containment Bags for Power Morcellators; Paper Reports Leakage

By Matthew Bin Han Ong

FDA granted permission to an Irish company to market the "PneumoLiner," a first-of-its-kind containment system indicated for isolating and containing uterine tissue during a minimally invasive hysterectomy or myomectomy. The agency announced its action April 7.

Gynecologists will soon be able to use the containment system—designed to prevent dissemination of potentially cancerous tissue—with specific models of power morcellators to conduct laparoscopic surgery in a limited population of women.

(Continued to page 4)

ORIEN Partners with Pharma Companies To Develop Precision Medicines with Big Data

The Oncology Research Information Exchange Network and M2Gen formed a bioinformatics collaboration with Celgene Corp.

(Continued to page 7)

NCI Announces Members of Moonshot Advisory Panel

(Continued from page 1)

The panel's three co-chairs are:

• **Tyler Jacks**, chair of the National Cancer Advisory Board, and director of the Koch Institute for Integrative Cancer Research at MIT.

• **Elizabeth Jaffee**, professor and deputy director for translational research at the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins University.

• **Dinah Singer**, acting deputy director of NCI and director of the Division of Cancer Biology.

"This Blue Ribbon Panel will ensure that, as NIH allocates new resources through the Moonshot, decisions will be grounded in the best science," Biden said in a statement April 4. "I look forward to working with this panel and many others involved with the Moonshot to make unprecedented improvements in prevention, diagnosis, and treatment of cancer."

Over the next several months, the panel will draw plans to advance the following themes: development of cancer vaccines, highly sensitive approaches to early detection, advances in immunotherapy and combination therapies, single-cell genomic profiling of cancer cells and cells in the tumor microenvironment, enhanced data sharing, and new approaches to the treatment of pediatric cancers.

"Thanks to advances in science, we are now in a historically unique position to make profound improvements in the way we treat, detect, and prevent cancer," said NIH Director Francis Collins. "The vice president's deep personal commitment to this noble cause will make a tremendous difference in our ability to lift the terrible burden of cancer. His call to action, including the establishment of this panel, comes at just the right time for all the right reasons."

The panel's findings will be reported to NCAB, which in turn will make recommendations to NCI.

"The vice president's enthusiasm about this effort is welcomed by the community of researchers, health professionals, and patients who share his passion and belief that great things are possible by accelerating cancer research with leadership and resources," said NCI Acting Director Douglas Lowy. "We are committed to breaking down silos and stimulating the groundbreaking work already underway. To be successful, we must hear a broad range of perspectives to take full advantage of the exceptional current opportunities in cancer research."

NCAB is expected to deliver its recommendations—based on the panel's advice—to Lowy later this summer. A final report by the White House Cancer Moonshot Task Force, chaired by Biden, will be produced and delivered to President Barack Obama by Dec. 31.

Revolutionizing Data Sharing

In "Aiming High—Changing the Trajectory for Cancer" published in the New England Journal of Medicine, Lowy and Collins said that the moonshot will focus on aligning the goals of government, industry, academic, philanthropy, and patient groups.

"Data and technology innovators will help to revolutionize the ways in which cancer-related data are shared and used to achieve new breakthroughs, and the federal government may seek ways to facilitate data sharing among researchers who are currently reluctant to disseminate their data and results," Lowy and Collins wrote. "The NCI's Cancer Genomic Data Commons and Cancer Genomics Cloud Pilots are both examining new methods to facilitate sharing of data, novel algorithms, software, tools, and annotations, and they provide ways of measuring the impact of such sharing."

The moonshot, announced by Obama Jan. 12, aims to double the progress of cancer research over the next five years—primarily by breaking down data siloes and facilitating the creation of a central bioinformatics database for oncology (The Cancer Letter, Jan. 22).

The administration's $1 billion proposal establishes a game plan for how the funds will be spent: the moonshot initiative will begin with $195 million in cancer research at NIH in fiscal 2016, according to the White House.

Though initial funding is relatively modest by comparison with the overall federal spending on

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biomedical research, the moonshot is shaping up as a broad-based research and public health initiative.

The FY2017 budget proposes to allocate $755 million in mandatory funds for new cancer-related research activities—$680 million for NIH and $75 million for FDA. The remaining $50 million is expected to fund Centers of Excellence in the Departments of Defense and Veterans Affairs.

NCI's preparations for the moonshot dollars were the subject of last week's meeting of its Board of Scientific Advisors (The Cancer Letter, April 1).

The Blue Ribbon Panel members represent a spectrum of scientific areas, including biology, immunology, genomics, diagnostics, bioinformatics, and cancer prevention and treatment. Scientific members also include investigators with expertise in clinical trials and cancer health disparities. Members of cancer advocacy groups and pharmaceutical and biotechnology companies will be represented on the panel and its working groups.

To meet its milestones, the panel will begin its work immediately, convening its first meeting in the coming weeks. The panel will also consider public comments over the next several months prior to making its recommendations.

Members of the research community and the public can engage in the initiative initially by subscribing to updates on their website or by emailing the panel at cancerresearch@nih.gov. In addition, an online forum for submitting scientific ideas and comments to the panel will be available on the site in the coming weeks.

The remaining members of the panel are:

• **Peter Adamson,** professor and director of Experimental Therapeutics in Oncology at The Children's Hospital of Philadelphia

• **James Allison,** professor and chair of immunology at MD Anderson Cancer Center

• **David Arons,** CEO of the National Brain Tumor Society

• **Mary Beckerle,** CEO and director of the Huntsman Cancer Institute

• **Mitch Berger,** professor and chair of the Department of Neurological Surgery at the University of California, San Francisco

• **Jeff Bluestone,** executive vice chancellor and provost of University of California, San Francisco

• **Mikael Dolsten,** president of Pfizer Worldwide Research and Development and executive vice president of Pfizer Inc.

• **James Downing,** president and CEO of St. Jude Children's Research Hospital

• **Levi Garraway,** associate professor of medicine at Harvard Medical School and assistant professor of medicine at Dana-Farber Cancer Institute,

• **Gad Getz,** director of the Cancer Genome Computational Analysis Group at the Broad Institute of MIT and Harvard

• **Laurie Glimcher,** professor of medicine and dean of the Weill Cornell Medical College, and incoming president and CEO of Dana-Farber Cancer Institute

• **Lifang Hou,** associate professor of preventive medicine at the Northwestern University Robert H. Lurie Comprehensive Cancer Center

• **Neal Kassell,** professor of neurosurgery at the University of Virginia

• **Maria Elena Martinez,** professor of family medicine and public health at the UC San Diego Moores Cancer Center

• **Deborah Mayer,** professor of adult and geriatric health at the University of North Carolina School of Nursing, and director of cancer survivorship at UNC Lineberger Comprehensive Cancer Center

• **Edith Mitchell,** professor of medical oncology and associate director for diversity services at the Sidney Kimmel Cancer Center at Thomas Jefferson University

• **Augusto Ochoa,** professor of pediatrics and director of the Stanley S. Scott Cancer Center at Louisiana State University

• **Jennifer Pietenpol,** professor of oncology and biochemistry and director of Vanderbilt-Ingram Cancer Center

• **Angel Pizarro,** technical business development manager at Amazon Web Services Scientific Computing and Research Computing

• **Barbara Rimer,** alumni distinguished professor and dean of the University of North Carolina Gillings School of Global Public Health

• **Charles Sawyers,** chair of the Human Oncology and Pathogenesis Program at Memorial Sloan Kettering Cancer Center, and an investigator at the Howard Hughes Medical Institute

• **Ellen Sigal,** founder and chair of Friends of Cancer Research

• **Patrick Soon-Shiong,** founder, chair, and CEO of NantWorks LLC

• **Chi Van Dang,** professor of medicine and director of the Abramson Cancer Center at the University of Pennsylvania

• **Wai-Kwan Alfred Yung,** professor of neuro-oncology and chair of clinical cancer care at MD Anderson Cancer Center

FDA Allows Containment Bags For Some Power Morcellations

(Continued from page 1)

The device consists of a containment bag and a tube-like plunger, which has been proven to be impermeable to substances that were "similar in molecular size to tissues, cells and body fluids," the agency said.

The power morcellation procedure, which until recently was performed in an estimated 100,000 women annually in the U.S., is the focal point of a two-year debate that has divided the surgical field. When a previously undiagnosed malignant tumor—usually a sarcoma—is present, the procedure spreads the cancerous tissue, upstaging the disease. To date, there isn't a reliable method to determine whether or not a uterine tumor is malignant before it has been removed and fully examined.

Critics say the procedure is avoidable and is a violation of basic principles in surgery, while proponents argue that the majority of women stand to benefit from the minimally invasive procedure, which allows for faster recovery and is safer than the attendant complications of open surgery.

Hooman Noorchashm, a cardiothoracic surgeon who led an aggressive campaign against power morcellation, said FDA's decision is "unacceptable."

"FDA ought to have classified this as a [high-risk] Class III device and taken it through the Premarket Approval process," Noorchashm, wrote in an email to Peter Lurie, the FDA associate commissioner for public health strategy and analysis. "Or, even better would have been to take the device to the FDA's Office of Hematology and Oncology Products for evaluation and input, given the well-established oncological hazard."

"I find it incredible that FDA physicians and leaders are OK with the concept of not knowing the exact oncological risk, yet they release the device into the marketplace to be unleashed on women," wrote Noorchashm, formerly a Brigham & Women's Hospital physician. "Do they expect women to be used as guinea pigs for a device whose oncological hazard is indeterminate, as they fully admit?"

"Or is it that they have faith in 'personal responsibility' on the part of a specialty that suppressed clear information from the FDA for over 20 years?"

It's not publicly known whether FDA units besides the Center for Devices and Radiological Health played a role in the decision to grant this permission.

"This new device does not change our position on the risks associated with power morcellation," William Maisel, CDRH deputy director for science and chief scientist, said in a statement. "We are continuing to warn against the use of power morcellators for the vast majority of women undergoing removal of the uterus or uterine fibroids."

"The PneumoLiner is intended to contain morcellated tissue in the very limited patient population for whom power morcellation may be an appropriate therapeutic option—and only if patients have been appropriately informed of the risks."

In a recently published prospective cohort study that treated 76 women, researchers identified seven instances—9.2 percent of the cases—in which leaks and spills occurred when containment systems were used with power morcellators. The study, published Feb. 16 in the American Journal of Obstetrics and Gynecology, does not identify PneumoLiner as one of the devices used.

FDA: No Data on Risk of Spreading Cancer

FDA classifies the PneumoLiner as a Class II moderate-risk device that is intended for use only in:

• Women without uterine fibroids undergoing hysterectomy, and

• Some pre-menopausal women with fibroids who want to maintain their fertility.

The containment system is manufactured by Advanced Surgical Concepts Ltd. of Bray, Ireland.

The company doesn't manufacture power morcellators, Class II devices that use spinning blades to pulverize tissue into fragments that are then removed through small incisions.

While FDA has approved analogous devices for use in laparoscopic procedures, this is the first time the agency has allowed containment bags to be used with power morcellators.

The announcement comes over a year after the agency's November 2014 guidance on power morcellators, which declared the devices as contraindicated for removal of tissue containing fibroids in the vast majority of women (The Cancer Letter, Nov. 26, 2014).

In April 2014, an FDA advisory discouraged the use of power morcellation, finding that one in 350 women who are undergoing hysterectomy or myomectomy for fibroids is found to have an unsuspected uterine sarcoma.

The PneumoLiner containment system was reviewed through FDA's *de novo* classification process. Since new and novel devices without a predicate device automatically receive a high-risk Class III designation, the *de novo* pathway allows the agency to reclassify

devices considered appropriate for the low and moderate-risk Classes I and II.

By classifying the PneumoLiner as Class II, FDA has determined that general controls and special controls provide reasonable assurance of the safety and effectiveness of the device for its intended use with power morcellators. This means the agency decided that the risk posed by the device, and the level of controls needed to mitigate those risks, aren't high enough to warrant a Class III designation, which would have called for more rigorous premarket testing. A randomized clinical trial would likely have been required.

The full list of special controls, which includes labeling requirements and demonstration of impermeability and non-spillage, is published in FDA's granting order to the company, available here.

"The PneumoLiner is compatible with bipolar or electromechanical laparoscopic power morcellators that are between 15 mm and 18 mm in shaft outer diameter and 135 mm and 180 mm in shaft working length and which have an external component that allows for the proper orientation of the laparoscope to perform a contained morcellation," FDA's granting order states.

According to FDA, the PneumoLiner bag's mechanical strength demonstrated that the device could withstand forces in excess of those expected to occur in actual clinical use.

"Other testing determined that the inflated bag provided adequate space for surgeons to perform morcellation with good visualization," the agency said.

However, FDA requires the manufacturer to warn patients and health care providers that the containment system has not been proven to reduce the risk of spreading cancer during power morcellation.

"We want to be clear that, although the device has been shown to successfully contain morcellated tissue, it has not been proven to reduce the risk of cancer spread during surgery," Maisel said in a statement.

Risks associated with the PneumoLiner device include dissemination of morcellated tissue, injury to surrounding tissues or organs, infections and a prolongation of the surgical procedure.

Also, FDA requires the label to state that only physicians who have successfully completed the company's validated training program can use the device in a clinical setting.

The data used to guide FDA's decision aren't publicly available at this time—most companies choose to withhold raw data, and information from relevant studies may be published in the *de novo* summary. The agency usually publishes the summary a few weeks after the granting order and is considered confidential until the manufacturer has had a chance to review it.

The PneumoLiner is a registered trademark (serial no. 86646099) as of Jan. 26, 2016, but it appears no U.S. patents have been issued for the device. There is no public information on the design or make of the device and how it specifically meets FDA's special controls—it is likely that a patent application is in the works; the pre-grant publication of the application takes up to 18 months from the earliest filing date.

The American Congress of Obstetricians and Gynecologists, a professional association representing 58,000 specialists, declined to comment on the FDA announcement.

"We have not had a chance to review the evidence, so it's not appropriate for us to comment until we do," an ACOG spokesperson said to The Cancer Letter. The American Association of Gynecologic Laparoscopists also declined to comment, citing a short timeline.

Jubilee Brown, a board member of the Fellowship in Minimally Invasive Gynecologic Surgery and director of gynecologic oncology at The Woman's Hospital of Texas, said FDA's support for advances in technology that may improve outcomes of women undergoing minimally invasive surgery is "encouraging."

"The PneumoLiner may provide a way to potentially improve the process of morcellation," Brown, an associate professor in the Department of Gynecology Oncology and Reproductive Medicine and chair-elect of the faculty senate at MD Anderson Cancer Center, said to The Cancer Letter. "Of course, continued outcomes research and optimal training for minimally invasive gynecologic surgeons is essential. I remain convinced that minimally invasive surgery continues to offer significant advantages to open surgery for appropriately selected women."

Company: PneumoLiner is Safe

The use of containment systems with morcellators dates back to June 1990, when Ralph Clayman—now emeritus dean of the Department of Urology at University of California, Irvine—performed the first laparoscopic power morcellation procedure on a diseased kidney at Barnes Hospital, Washington University in St. Louis (BMJ, Volume 307, Dec. 4, 1993).

"This practice [of contained morcellation] was largely abandoned for open abdominal morcellation, which has led to the dilemma we face today," Frank Bonadio, CEO of Advanced Surgical Concepts, said at an advisory meeting of the FDA Obstetrics and Gynecological Medical Device Advisory Committee July 10, 2014.

The panel was convened in response to mounting evidence that power morcellation—at the time considered a standard of care surgical procedure in gynecology—posed a public health threat to a large population of women.

The panel expressed low confidence in power morcellation as a treatment for uterine fibroids, and focused on alternative procedures, concluding that there was insufficient data on whether the dissemination risk can be reduced using containment systems (The Cancer Letter, July 25, 2014).

In his presentation to the panel, Bonadio described how the PneumoLiner provides total containment.

"In 2011, Dr. Tony Shibley had the idea to take a containment bag in the same way Dr. Clayman did, but make one simple methodological change," Bonadio said. "ASC has been working with Dr. Shibley to develop a product that is easy to deploy, easily encapsulates the uterus, and establishes insufflation pressure allowing vision and a larger working space and, most significantly, complete containment."

Shibley, an obstetrics and gynecology specialist at Fairview Physician Associates in Minnesota, described a contained morcellation procedure performed in 2014 on a 56-year-old woman with no detectable malignancy.

"On April 18th of this year, she underwent a primary procedure by my partner using my contained morcellation technique," Shibley said to the advisory panel members. "The patient had a supracervical hysterectomy, meaning, the uterus was amputated from the cervix, placed within the containment bag, the bag was insufflated, and morcellation was carried out. The pathology report surprisingly and unsuspectingly was leiomyosarcoma."

It is not publicly known whether, at the time, Shibley received an Investigational Device Exemption, FDA's license that allows testing of devices that have not been approved for a potentially high-risk indication.

After diagnosis of malignancy, Shibley's patient underwent a secondary surgery on June 2, 2014, to ascertain whether any dissemination occurred and to reduce the risk of upstaging the disease if the integrity of the containment bag had been compromised.

"This surgery included removing the cervix, taking biopsies from throughout the abdomen, obtaining pelvic fluid, and abdominal washings from throughout the abdomen," Shibley said. "All of those findings were negative for any malignant cells."

This means that the containment system was successful, Shibley said.

"This confirms that contained morcellation within an insufflated bag does not increase the patient's risk and in fact gives many benefits for our patients, including allowing them to continue to receive the benefits of minimally invasive surgery, but adding the safety features," Shibley said. "I think this is the natural progression in medicine, if we're doing medicine right."

Brigham Trial: 9.2% of Cases Had Leakage

Manufacturers of power morcellators and minimally invasive gynecologists had been aware of the hazards of "open" unbagged morcellation years before two high-profile cases—Amy Reed and Erika Kaitz—at Brigham & Women's Hospital drew FDA's attention to the issue (The Cancer Letter, Dec. 18, 2015).

Brigham is a member institution of Partners HealthCare, a Harvard hospital network.

Johnson & Johnson subsidiary Ethicon—the largest manufacturer of the devices—said it didn't know of the dangers of power morcellators prior to December 2013, when Reed and her husband Noorchashm filed a Medical Device Report to FDA. Whistleblower Robert Lamparter, a retired pathologist from central Pennsylvania, disagreed, and produced documents from 2006 proving that he had reported to J&J a near-miss case as well as risk estimates similar to FDA's numbers (The Cancer Letter, Nov. 20, 2015).

In November 2014, The Cancer Letter first reported on Brigham's role in upstaging Erica Kaitz's leiomyosarcoma via power morcellation performed in 2012. Kaitz died on Dec. 7, 2013, nearly two months after Reed received her cancer diagnosis at Brigham (The Cancer Letter, Nov. 21, 2014).

FDA said it did not receive any reports of adverse outcomes from manufacturers and hospitals prior to December 2013—this has become the focus of probes by FBI, Government Accountability Office, and Congress (The Cancer Letter, Dec. 18, 2015).

In a study by Brigham physicians Michael Muto and Michael Seidman published November 2012 in PLOS ONE, the authors identify four patients—out of 1,091 patients—who showed evidence of peritoneal dissemination of leiomyosarcoma after undergoing power morcellation. Three of the four patients died, with an average post-diagnosis survival of 24.3 months.

It is not publicly known where the four patients were treated.

In 2013, Muto, director of the Gynecologic Oncology Fellowship Program at Brigham and an associate professor of obstetric, gynecology and reproductive biology at Harvard Medical School, referred Reed for a minimally invasive operation which

he knew would likely involve power morcellation in 2013, according to Noorchashm.

Reed, at the time an anesthesiologist at Beth Israel Deaconess Medical Center, signed a consent form, which does not mention morcellation or the accompanying risk of dissemination of occult sarcoma. The form can be downloaded here.

In 2014, Brigham conducted a prospective study focused on using power morcellators inside containment bags. Jon Einarsson, chief of the Division of Minimally Invasive Gynecology at Brigham, was the lead investigator for the single-arm study, which was designed to enroll 400 patients across several partner institutions. Einarsson is the Brigham surgeon who performed the unbagged version of the procedure on Kaitz.

The study was suspended in November 2014, after The Cancer Letter reported that Brigham did not apply for an Investigational Device Exemption to obtain permission from FDA to conduct the high-risk study (The Cancer Letter, Nov. 26, 2014).

It is not publicly known whether the study was resumed under an IDE, but the results of the study were published February 2016 in the American Journal of Obstetrics and Gynecology.

The study enrolled 89 patients from Brigham, Faulkner Hospital, Massachusetts General Hospital, Newton-Wellesley Hospital, and Lahey Hospital and Medical Center. The paper doesn't specify whether the patients were treated before or after the suspension.

Brigham officials did not respond to questions about the study from The Cancer Letter.

Of the 76 patients that successfully underwent the contained power morcellation protocol, there were seven observed instances of fluid or tissue leakage—9.2 percent, or a nearly 1 in 10 rate.

"Given the lack of existing data on the incidence of leakage with contained tissue extraction, a formal power analysis was not performed," the authors wrote. "The enrollment goal was set at 400 patients in an attempt to comprehensively evaluate this technique, with plans for interim analyses.

"Specifically, a plan was outlined to halt the study at the time of interim analysis if any complications related to the use of the containment bags were noted or if blue dye leakage was observed in greater than 5 percent of cases."

However, the containment bags were visually intact, and the final pathological diagnosis was benign in all cases, the authors note. The PneumoLiner containment system is not identified as being used in this study.

"Specimen containment bags used for this purpose included the following: EcoSac (Espiner Medical, North Somerset, United Kingdom), 50 x 50 cm isolation bag (3, St Paul, MN), Anchor tissue retrieval system (Anchor Products Co, Addison, IL), and Endocatch (Covidien, Minneapolis, MN)," the authors wrote. "These containment bag options were chosen from among hospital stock, and the use of a particular bag type was based on surgeon preference."

It is unclear whether the tissue and fluid leakage observed in the study—seven of 76 patients—is clinically significant, the authors wrote.

"These instances do represent potential opportunities for tissue dissemination," the authors wrote. "Even in cases of open surgery and intact specimen extirpation, there may be uterine tissue disruption and fluid spread, particularly in cases of supracervical hysterectomy or myomectomy."

"Regardless, the authors decided to close the study at the time of interim analysis to allow for further refinements in technique, which may minimize such concerns and enhance reproducibility."

"Despite the instances of tissue or fluid leakage that were observed in this study, our results provide additional support for the feasibility of contained tissue extraction and justify continued efforts toward improving such a system. Further refinements of the technique and equipment available for this process will afford additional advantages in efficiency and system integrity."

ORIEN Partners with Pharma To Develop Precision Medicines

(Continued from page 1)

The partnership, announced April 7, is called the ORIEN Avatar Research Program. The initiative is managed by M2Gen and is designed to generate large amounts of genetic and clinical information on patients consenting to the Total Cancer Care Protocol, a standard operating protocol used by ORIEN member institutions.

Celgene will serve as the founding industry member of a network of participants joining the program, which will have a subscription service for pharmaceutical companies.

In collaboration with M2Gen and ORIEN, de-identified patient information generated through the program will be provided to the pharmaceutical partners, which in turn can search for eligible individuals to participate in biomarker-driven clinical trials. Patients identified will have access to therapies in development that are most suited for their specific type of cancer and

the unique molecular features of their disease.

"This innovative collaboration creates a pre-competitive space for pharmaceutical companies and prominent cancer centers nationwide that will benefit all participants involved," ORIEN officials said in a statement. "Patients gain access to new trials and investigational treatments, pharmaceutical companies are provided with unique data analytics to assist them in the development of treatments through this targeted data access approach, and cancer centers can share data to accelerate discovery and expand the clinical trial options for patients while providing critical research in the overarching mission to better understand, treat and ultimately cure cancer."

The ORIEN Avatar Research Program will focus on patients with advanced primary or metastatic disease, patients with limited treatment options, as well as patients who are likely to develop progressive disease.

"Together, we are creating a unique resource by partnering with multiple stakeholders including patients who consent to be followed throughout their lifetime so that we can ultimately provide patients with more options with unequalled precision," said William Dalton, founder and CEO of M2Gen, and founding director of Moffitt Cancer Center's DeBartolo Family Personalized Medicine Institute, which created the TCC Protocol and database. "The ORIEN Avatar Research Program represents a collaborative space within the healthcare community to drive new discoveries and shorten clinical development timelines by proactively matching patients to trials.

"This means we are able to identify the most in-need, underserved patients, anticipate their needs, and match them to cutting-edge trials. The result: more options for patients, and a more effective means to drive the development of life-saving treatments."

The program aims to solve a systemic challenge in pharmaceutical research and development by dramatically increasing the patient population that can be screened for clinical trials.

"The ORIEN Avatar program will use an in-silico analysis approach to better design clinical trials and match patients to promising clinical trials to achieve their accrual targets so that new and improved treatments can be brought to market more rapidly, and help millions of patients worldwide," Dalton said.

According to ORIEN, the cost of bringing a drug to market averages $2.6 billion, and it takes about 10-15 years to do so—causing research projects to fold when investigators cannot identify a large enough patient sample size for a trial.

"The ORIEN Avatar program is a standout in its approach to patient information gathering and sharing to form a more efficient system," said Michael Pehl, president of hematology and oncology at Celgene. "This wealth of clinical and molecular data will potentially lead to a better understanding of molecular properties that are involved in a patient's disease and what treatment designs might be most successful in battling their cancer. Building this resource in a multi-partner collaboration creates a wealth of data, which will potentially lead to better outcomes for patients."

Cancer research and treatment have been hampered "for far too long…by an industry standard of individualism," said Michael Caligiuri, CEO of the James Cancer Center at the Ohio State University, which co-founded ORIEN with Moffitt Cancer Center.

"We founded ORIEN in 2014 with the intent to break the mold and usher in a new culture of cooperation and collaboration in healthcare," Caligiuri said. "With the data and information provided by the ORIEN Avatar Program, and support from industry leaders such as Celgene, we stand poised to make the promise of the next generation of cancer treatments a reality."

Caligiuri Named AACR President-Elect

Michael Caligiuri was named president-elect by the members of the American Association for Cancer Research. He will officially become president-elect at the AACR's annual meeting in New Orleans, April 16-20, and will assume the presidency at the 2017 annual meeting.

Caligiuri is director of The Ohio State University Comprehensive Cancer Center and CEO of the Arthur G. James Cancer Hospital and Richard J. Solove Research Institute. He holds the John L. Marakas Nationwide Insurance Enterprise Foundation chair in cancer research and is a professor in The Ohio State University College of Medicine Departments of Molecular Virology, Immunology and Medical Genetics and Internal Medicine.

Caligiuri is known for his work in immunology, which is focused on human natural killer cells and their modulation for the treatment of leukemia, myeloma, and glioblastoma.

"This is an especially exciting time as we all work to forge new and innovative models of collaboration between academia, industry, the government and the

community—something I am certain AACR can play a pivotal role in facilitating," said Caligiuri.

Caligiuri has been involved with AACR since 1990, and was elected by the membership to the AACR board of directors in 2013. He has served as chairperson of the Publications Committee and as a member of the Clinical and Translational Cancer Research Committee. He has also served as a member of the Margaret Foti Award for Leadership and Extraordinary Achievements in Cancer Research Committee; Landon Foundation-AACR INNOVATOR Award for Cancer Prevention Research Scientific Review Committee; Pezcoller Foundation-AACR International Award for Cancer Research Selection Committee; chairperson of the Annual Meeting Program Committee; member of the editorial boards of Molecular Cancer Therapeutics and Clinical Cancer Research; and associate editor of Cancer Research.

He is president of the Society of Natural Immunity, chair of the Institute of Medicine's National Cancer Policy Forum, and a member or chair of the external boards for 12 of the nation's cancer centers. He is a past president of the Association for American Cancer Institutes, as well as a former councilor and executive committee member of the American Society of Hematology, past member of the board of scientific advisors and the board of scientific counselors of the NCI, and past vice chair of the scientific advisory board of the Cure for Lymphoma Foundation.

Caligiuri joined Ohio State in 1997. Before that, he served as a professor and medical oncologist at Roswell Park Cancer Institute.

He has received the Director's Service Award and the MERIT Award from NCI, the John Wayne Clinical Research Award from the Society of Surgical Oncologists, and the Emil J Freireich Award in Clinical Cancer Research from MD Anderson Cancer Center. He is an elected fellow of the American Association for the Advancement of Science, the American College of Physicians, and the Alpha Omega Honor Medical Society, as well as an elected member of the Association of American Physicians and the American Society for Clinical Investigation.

The 2016 AACR Fellows

The association also elected 11 fellows of the AACR Academy.

"The amazing scientific contributions made by this year's 11 fellows have not only revolutionized cancer science, but have also provided the scientific foundation for countless other cancer professionals. The collective and exponential impact of their discoveries continues to be felt daily throughout the cancer field," said Margaret Foti, chief executive officer of the AACR.

The AACR will formally induct the class of fellows at its annual meeting.

The members of the 2016 class are:

• **Bruce Alberts**, Chancellor's Leadership Chair in Biochemistry and Biophysics for Science and Education, at the University of California, San Francisco.

• **Clara Bloomfield**, Distinguished University Professor; William G. Pace III Professor of Cancer Research; and cancer scholar and senior advisor at The Ohio State University Comprehensive Cancer Center, James Cancer Hospital and Solove Research Institute.

• **Thomas Cech**, Distinguished Professor of Chemistry and Biochemistry and director of the BioFrontiers Institute at University of Colorado, Boulder.

• **John Dick**, Canada Research Chair in Stem Cell Biology and senior scientist at the Princess Margaret Cancer Centre and McEwen Centre for Regenerative Medicine; director of the Program in Cancer Stem Cells at Ontario Institute for Cancer Research; and professor in the Department of Molecular Genetics, at the University of Toronto.

• **Joe Gray**, Gordon Moore endowed chair in the Department of Biomedical Engineering; director of the Center for Spatial Systems Biomedicine; and associate director for biophysical oncology at the Knight Cancer Institute of Oregon Health & Science University.

• **Rudolf Jaenisch**, founding member and professor of the Whitehead Institute for Biomedical Research and professor of biology at the Massachusetts Institute of Technology.

• **Eric Lander**, professor of biology and systems biology at Harvard Medical School and founding director of the Broad Institute of MIT and Harvard.

• **Sir David Lane**, chief scientist of the Agency for Science, Technology and Research in Singapore, and scientific director of the Ludwig Institute for Cancer Research.

• **Henry Lynch**, the Charles F. and Mary C. Heider Endowed Chair in Cancer Research, professor of medicine, chairman of the Department of Preventive Medicine and Public Health, and director of the Hereditary Cancer Center at the Creighton University School of Medicine.

• **Joan Massagué**, director of the Sloan Kettering Institute at Memorial Sloan Kettering Cancer Center.

• **Joseph Schlessinger**, William H. Prusoff Professor and Chair of Pharmacology at the Yale School of Medicine.

In Brief

Eberlein Elected Chairman Of NCCN Board of Directors

TIMOTHY EBERLEIN was elected chairman of the board of directors of the **National Comprehensive Cancer Network.**

Eberlein previously served as vice chair of the board, and succeeds **Samuel Silver**, of the University of Michigan Comprehensive Cancer Center. The election of new board officers was formalized at the NCCN 21st Annual Conference. Silver served as chairman of the board since 2013 and will remain a member.

Eberlein is director of the Alvin J. Siteman Cancer Center; the Spencer T. and Ann W. Olin Distinguished Professor; and Bixby Professor and chairman of the Department of Surgery at Washington University School of Medicine. Elected to the Institute of Medicine in 2004, Eberlein is a surgical oncologist specializing in breast cancer.

During his tenure with NCCN, Eberlein has held leadership roles on a number of committees, including the Executive Committee, Governance Committee, and NCCN Guidelines Steering Committee.

The following members of the NCCN board were also elected into new offices: **Jan Buckner**, of Mayo Clinic Cancer Center, was elected vice chair; **Lori Pickens**, of the Duke Cancer Institute, was named secretary; and **Dorothy Puhy**, of Dana-Farber/Brigham and Women's Cancer Center and Massachusetts General Hospital Cancer Center, was named treasurer.

THE UNIVERSITY OF WISCONSIN Carbone Cancer Center was elected as the 27th member institution of **NCCN**.

"UWCCC's esteemed cancer center indeed brings unique attributes to the alliance, particularly its comprehensive palliative care program which includes an in-patient unit and consultation service, children's hospital consultative service, and an outpatient onco-palliative care clinic," said Robert Carlson, CEO of NCCN.

The only NCI-designated comprehensive cancer center in Wisconsin, the more than 280 physicians and scientists at Carbone Cancer Center provide care to more than 31,000 patients each year and participate in more than 250 clinical trials annually.

"As one of the original NCI-designated comprehensive cancer centers, we are delighted to have the opportunity to join the esteemed cancer centers of NCCN, which share our devotion to improving the lives of people with cancer through the rapid application of cancer discovery to cancer care and education," said Howard Bailey, director of the UW Carbone Cancer Center.

LARRY KWAK was awarded **the 2016 Ho-Am Prize in Medicine**. Kwak is director of City of Hope's Toni Stephenson Lymphoma Center and the Dr. Michael Friedman Professor in Translational Medicine.

The Ho-Am Prize recognizes people of Korean heritage who have made contributions in clinical and research areas, and is widely considered one of the Nobel Prizes of Korea. Kwak will receive the award at a June 1 ceremony in Seoul.

"The Ho-Am Prize in Medicine recognizes Dr. Kwak's leading-edge research on immunology and therapeutic cancer vaccines, which have greatly advanced this field of study," said Steven Rosen, City of Hope's provost and chief scientific officer. "His dedication to guiding research breakthroughs from the lab to the clinic, particularly in the treatment of lymphoma and other blood and bone marrow diseases, is extremely worthy of such international recognition."

In 2010, Kwak was named to TIME magazine's TIME100 as one of the world's 100 most influential people for his research and commitment to the science of cancer immunotherapy. As head of the Vaccine Biology Section in the NCI Experimental Transplantation and Immunology Branch for 12 years, Kwak and his laboratory team were credited with the bench-to-clinic development of a therapeutic cancer vaccine for B-cell malignancies.

"As a Korean-American, the Ho-Am Prize is particularly significant for me, because it represents years of perseverance working towards a lifelong dream of bringing homegrown laboratory discoveries to impact patients worldwide as rapidly as possible," said Kwak. "There is still much work to be done."

As a leader with City of Hope's Hematologic Malignancies and Stem Cell Transplantation Institute, Kwak sets scientific priorities and guides the development of new approaches to treating lymphoma and related diseases, especially those involving immune-based treatments.

Kwak joined City of Hope in April 2015 from MD Anderson Cancer Center, where he served as chairman of the Department of Lymphoma and Myeloma and as co-director of the Center for Cancer Immunology Research.

JOEL HELMKE was named senior vice president of operations at **City of Hope**.

Helmke served as division administrator of internal medicine and managed four clinical centers and nine academic departments at MD Anderson Cancer Center, where he held leadership positions for 14 years.

In 2014, he was named corporate vice president of oncology services for WellStar Health System.

ANNE JADWIN, vice president of nursing services and chief nursing officer at Fox Chase Cancer Center, has been recognized with the 2016 Outstanding Nurse Award from the Delta Tau Chapter-at-Large: **Sigma Theta Tau International Honor Society of Nursing**.

The award will be announced at the 2016 induction ceremony for the Delta Tau Chapter-at-Large April 10 at Holy Family University. The Delta Tau Chapter-at-Large represents Holy Family University, Neumann University, Eastern University, and Immaculata University. The award recognizes leadership in nursing practice, administration, research and nursing education.

Jadwin has maintained her advanced oncology certification since 1997, and her ANCC certification as a nurse executive since 2002. She has been with Fox Chase since 1999.

PAUL BUSHDID joined **Southern Research** to lead its Developmental & Reproductive Toxicology program.

Previously, Bushdid spent 13 years at GlaxoSmithKline, where he headed an Investigative Developmental Toxicology group, where his work focused on agents that can cause birth defects or halt pregnancies. Bushdid's team was also involved in DART assessments of traditional Chinese medicines, study designs needed for cell and gene therapy products, and data requirements for the use of nanomaterials in non-clinical development.

DANA-FARBER CANCER INSTITUTE and the **ONTARIO INSTITUTE FOR CANCER RESEARCH** joined the **OHSU Knight Cancer Institute** and **Intel Corporation**'s Collaborative Cancer Cloud system, a distributed precision medicine analytics platform.

The Collaborative Cancer Cloud works to determine how genes interact to drive disease in individual patients. The system is designed for secure, aggregated computation across distributed sites without loss of local control of the data, ensuring an institution's ability to maintain proper custody of its datasets and protecting patient privacy and any institutional intellectual property that may result.

"Through Dana-Farber's 'Profile' project, we have created one of the world's largest databases of genetic abnormalities that drive cancer, with over 15,000 genetic profiles of patients' tumors, adding about 400 each month to the database," said Barrett Rollins, chief scientific officer at Dana-Farber Cancer Institute. "We are excited to be part of the Collaborative Cancer Cloud and are convinced that the innovative data sharing structure developed by Intel and our academic partners will accelerate the delivery of better treatments to our patients."

"To understand the causes of cancer and to develop more effective methods of prevention, detection and treatment, cancer researchers need access to rich molecular and clinical data sets," said Lincoln Stein, director of the Informatics and Bio-computing program at the Ontario Institute for Cancer Research, and professor, department of molecular genetics at the University of Toronto. "However the information is often siloed and unmanageably large, rendering it effectively inaccessible. Projects like the Collaborative Cancer Cloud overcome the barriers to working with these data sets by allowing multiple institutions to pool their data and to provide researchers with the computer power needed to work on the data remotely. We're very eager to begin collaborative cancer research with these other leading institutions."

RARECYTE Inc. signed a Cooperative Research and Development Agreement with **NCI** for a three-year collaboration to investigate the use of RareCyte's technology to identify, characterize, capture and analyze rare immune cell populations as well as individual circulating tumor cells derived from preclinical and clinical studies conducted by the NCI.

The specific goals of the CRADA include the detection, characterization, single cell retrieval, and analysis of rare circulating immune cells, such as natural killer T cells and antigen-specific conventional T cells, and CTCs derived from preclinical and clinical studies conducted by the NCI and the development of assays showing response to immunotherapy and the extent of cancer progression.

The study will be led by NCI principal investigator **Jay Berzofsky**, chief of the Vaccine Branch of the NCI. He and **Masaki Terabe**, deputy section chief and

head of the Cancer Immunology Unit, focus on T cell immunology and tumor immunology and translation of basic immunological research to strategies to develop vaccines. Joining them will be **Lauren Wood**, clinical director of the NCI Vaccine Branch, who has done clinical research in cancer and HIV infection and clinical translation of therapeutic vaccine platforms into first-in-human trials. The group will also collaborate with **Jane Trepel** who heads the Preclinical Development Core within the NCI Developmental Therapeutics Branch.

"With advances in cancer immunotherapy, a significant challenge remains in identifying immunologic responses that correlate with beneficial clinical outcomes," said **Eric Kaldjian**, chief medical officer of RareCyte and CRADA collaborator principal investigator. "The ability to characterize the immune response is an important aspect of personalized approaches for patients undergoing cancer immunotherapy."

IBM announced plans to launch its first **Watson Health European Center of Excellence in Milan** near the Human Technopole Italy 2040 research campus, supporting the government of Italy's initiative to establish an international hub for the advancement of genomics, big data, aging, and nutrition.

The center is part of a long-term collaboration between IBM and the government of Italy. IBM plans to invest up to $150 million over the next several years. IBM data scientists, engineers and programmers are expected to work in collaboration with organizations across Europe to create a new class of cloud-based solutions.

SCHULMAN IRB was selected as the national IRB for the **Cancer MoonShot 2020 program**.

"We are honored to be a part of this momentous initiative," said Michael Woods, president and CEO of Schulman IRB. "Schulman's IRB members and staff are excited to partner with leaders in the oncology field in these landmark studies, and we look forward to contributing to the next generation of cancer therapies."

While not directly affiliated with Vice President Joe Biden's national cancer initiative, the Cancer MoonShot 2020 program plans to design, initiate and complete randomized clinical trials at all stages of cancer in up to 20 tumor types in as many as 20,000 patients in multiple phase I-III trials by the year 2020.

Drugs and Targets

EU Approves Gardasil 9 Two-Dose Schedule

The European Commission approved a two-dose schedule for Gardasil 9, for adolescent girls and boys aged 9 to 14, in the 31 countries regulated by the European Medicines Agency.

This new schedule brings the label in line with recommendations in several European countries that opted for two-dose schedules in routine vaccination of adolescents in this age group, enabling Gardasil 9 to be considered in national vaccination programs.

Gardasil 9, a nine-valent Human Papillomavirus vaccine, has been licensed in Europe since June 2015 with a three-dose schedule for active immunization of individuals from the age of 9 years against cervical, vulvar, vaginal and anal cancers causally related to vaccine HPV types, and genital warts causally related to vaccine HPV types. It has been available in the United States since early 2015, with 7 million doses now distributed, according to Sanofi Pasteur MSD, the vaccine's sponsor.

Gardasil 9 was approved in the U.S. under a three-dose regimen in December 2014.

Halaven (eribulin) received a positive opinion from the European Medicines Agency's Committee for Medicinal Products for Human Use, to extend Halaven's license to include patients with unresectable liposarcomas who have received prior anthracycline containing therapy for advanced or metastatic disease.

The opinion is based on phase III data demonstrating a median 7.2 month increase in overall survival compared to dacarbazine (15.6 months versus 8.4 months, HR = 0.511; 95% CI 0.346-0.753; P=0.0006) for people with unresectable advanced or metastatic liposarcomas.

Eribulin is the first and only single agent therapy to show a significant survival advantage in this type of soft tissue sarcoma, according to Eisai, the drug's sponsor.

Eribulin is a microtubule-dynamics inhibitor, structurally modified analogue of halichondrin B, originally isolated from the marine sponge Halichondria okadai. Its mode of action is distinct from other tubulin inhibitors and involves binding to specific sites on the growing positive ends of microtubules to inhibit their growth, according to Eisai. Eribulin also induces vascular remodeling, suppresses migration and

invasion of cancer cells, and reverses the epithelial-to-mesenchymal transition in many cancer cell lines.

Sysmex Inostics, a subsidiary of Sysmex Corp., announced that its OncoBEAM RAS CRC test was granted CE mark approval. The CE mark is a mandatory conformity marking for certain products sold within the European Economic Area.

The test, developed by Sysmex Inostics GmbH in collaboration with Merck, can now be accessed by patients with metastatic colorectal cancer across Europe. The assay has been shown to have similar performance to conventional tissue-based testing and can be used to determine which patients would benefit from anti-EGFR therapies, such as Erbitux, as demonstrated by recent data, according to the company.

The University of Chicago and **Evelo Biosciences** entered into a license agreement to develop and commercialize a microbiome-based cancer immunotherapy.

The cancer therapy, developed in the laboratories of UChicago researcher Thomas Gajewski, employs select gut microbes to boost the immune system's attack on cancer cells and improve the efficacy of anti-cancer drugs.

"This is the first license for the University in the area of microbiome immune-oncology, and one of the first of its kind nationwide," said Alan Thomas, associate vice president and director for UChicagoTech, the University's Center for Technology Development and Ventures, which negotiated the license. "Immunotherapy is a rapidly growing field with huge potential and the University is at the forefront of oncobiome research."

Gajewski's team showed that the introduction of a particular strain of bacteria into the digestive tracts of mice with melanoma boosted the ability of the animal's immune systems to attack tumor cells. Gajewski's research was reported in the journal Science.