

Division of CANCER MEDICINE

2015–16 Division Report



THE UNIVERSITY OF TEXAS
MD Anderson
Cancer Center

Making Cancer History®

Faculty Leadership

Patrick Hwu, MD

Division Head, Cancer Medicine
Department Chair, Melanoma Medical Oncology
Department Chair, Sarcoma Medical Oncology
Co-Director, Center for Cancer Immunology Research

Robert Wolff, MD

Deputy Division Head for Clinical and Educational Affairs
Program Director, Hematology/Oncology Fellowship Program
Professor, Gastrointestinal Medical Oncology
Sheikh Zayed Bin Sultan Al Nahyan Distinguished University Chair of Medical Oncology

Elizabeth Grimm, PhD

Deputy Division Head for Research Affairs
Waun Ki Hong Distinguished Chair in Translational Oncology
Professor, Melanoma Medical Oncology

Jorge Cortes, MD

Deputy Division Head for Global Oncology
Professor, Leukemia

Administrative Leadership

Martha Salas, MSW, MBA

Division Administrator

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Director, DoCM Administration

Mark Choate, MBA

Associate Director, Information Services

Suzanne Davis, MBA, MMS

Ad interim Executive Director, Office of the Vice Provost, Clinical Research

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Associate Director, DoCM Graduate Medical Education Program

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Note: Leadership and faculty are current as of May 1, 2016. All other data reflect Fiscal Year 2015: Sept. 1, 2014, through Aug. 31, 2015.

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Clinical Center for Targeted Therapy
Clinical & Translational Research Center
Leukemia Center
Bone Marrow Aspiration Clinic
Lymphoma & Myeloma Center
Stem Cell Transplantation & Cellular Therapy Center
Apheresis Center
Supportive Care Center
Integrative Medicine Center
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Experimental Therapeutics
Gastrointestinal Medical Oncology
General Oncology
Genitourinary Medical Oncology
Genomic Medicine
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Leukemia
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A Message from the Division Head



Patrick Hwu, MD

Since taking over the reins of the division in March 2015, I've had one of the most exciting times of my life getting to know where we are now, and establishing where we're headed in the future.

Mission

Our mission is actually quite straightforward: the Division of Cancer Medicine will **provide the best research-driven patient care today, and even better care tomorrow.**

The Listening Tour

The Division of Cancer Medicine has nearly 3,000 people working toward the same goals, all with the same passion. When I first started as division

head, we embarked on a listening tour so I could understand what was going on and try to determine how to crystallize our direction. I wanted to learn how everyone contributes to making us the number one cancer center in the world. We started by attending department faculty meetings, visiting clinics, and conducting a number of focus groups with representative population segments. The listening tour will continue because it's important that we in the division administration hear from the frontlines about what needs to happen to enable everyone to make the greatest impact on cancer care in the world. I start every conversation with the question, "If you were me, what would you want me to know?"

Goals

Based on stakeholder feedback, we decided that our goals would range from world-class research to exceptional clinical care to enhanced communications. We strive to **make connections to promote collaborative research and team science.** The longitudinal samples being gathered by the APOLLO Moon Shot Platform will be incredibly helpful in this arena. The genomic mutations we are seeing in multiple types of cancer are breaking down preconceived disease-site silos. Deep analysis of patient tissue samples has simply transformed our understanding of immunotherapy and targeted agents. The goal is to **learn from every patient** by obtaining and analyzing serial biopsies, and using this wealth of data to individualize care. This is a very special time in oncology, as we are starting to figure out primary and acquired resistance in real time as patients respond to novel drugs and new drug combinations. Only by leveraging these initiatives to move our data forward will we be able to achieve greater outcomes.

The University of Texas MD Anderson Cancer Center is one of the top training programs in the nation, and we are committed to **mentoring the next generation of research scientists and clinicians** to ensure that they have successful careers to make great impact in the field. Our goal has always been to recruit the most promising, world-class candidates to ensure that they are fully prepared to become the leaders of tomorrow.

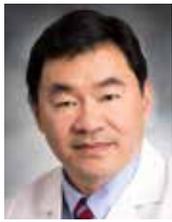
One new and exciting opportunity in the clinical realm is the coordination of care across our Houston-area locations as well as the global Cancer Network. We have a two-pronged goal: to **expand more clinical trials across the Cancer Network**, and to **increase access to the most novel agents** by working with other institutions to bring state-of-the-art science to the world. With the way medicine is changing, we've got to be nimble and smart about the trials we choose to conduct by leveraging the most promising agents through large strategic alliances with the pharmaceutical industry.

Last, but not least, is our goal to **enhance communications across the division.** We are working together to foster an atmosphere of cooperation and integration that focuses on the larger institutional vision of MD Anderson: to be the premier cancer center in the world, based on the excellence of our people, our research-driven patient care, and our science. We are Making Cancer History, and together, we can accomplish great things.

A handwritten signature in black ink, appearing to read "Patrick Hwu". The signature is stylized and fluid.

About Us

Executive Leadership



Patrick Hwu, MD, became division head of Cancer Medicine in March 2015. He continues to serve as chair of Melanoma Medical Oncology, since his recruitment when this department was formed in 2003. He also chairs Sarcoma Medical Oncology. Hwu is an internationally respected physician-scientist with 25 years of experience in the fields of tumor immunology, targeted therapies, and translational studies. His work has been practice-changing as he helped launch the field of gene modified T cells and published the first chimeric antigen receptor (CAR) against cancer. He's investigating the relationship between tumor biology and the immune microenvironment. These studies will lead to rational combinations of targeted and immune therapies and drug development.



Elizabeth Grimm, PhD, professor of Melanoma Medical Oncology, has been deputy division head for research affairs since September 2008. Her responsibilities are to strengthen laboratory and translational research programs, as well as to enhance research education programs within Cancer Medicine. She assists with identifying resources such as lab space and equipment, monitors research progress, helps recruit and mentor faculty, and participates in strategic planning. Grimm's laboratory team investigates melanoma biology and tumor-derived inflammation to develop novel therapeutics. She was the founding director of the Melanoma SPORE, led the first T32 grant for Cancer Biology, and served as the *ad interim* chief scientific officer of the institutional Moon Shots. Grimm also serves on the Women's Faculty and Fellows Advisory Council and mentors candidates in the MD/PhD and Cancer Prevention and Research Institute of Texas TRIUMPH programs.



Jorge Cortes, MD, professor of Leukemia, has been deputy division head for Global Oncology since September 2015. His responsibilities are to provide guidance in clinical operations with partner members of MD Anderson's Cancer Network, which include Houston regional care centers, the Banner MD Anderson Cancer Center in Arizona, the MD Anderson Cancer Center at Cooper in New Jersey, and the Baptist MD Anderson Cancer Center in Florida, with a particular focus on increasing patient access to clinical trials. Cortes will also travel internationally to work with oncologists at our sister institutions in addition to his primary responsibilities of serving as deputy department chair for the Department of Leukemia and as section chief for acute myelogenous leukemia and chronic myelogenous leukemia. Additionally, Cortes directs the department's fellowship program and is chair of the executive Institutional Review Board (IRB).



Robert Wolff, MD, professor of Gastrointestinal Medical Oncology, has been the deputy division head of clinical and educational affairs since October 2006. His primary administrative responsibilities are to establish better guidelines to support clinical research studies, to oversee curriculum development for trainees as director of our Hematology/Oncology Fellowship Program, and to bolster support for academic oncology educators. Wolff played a significant role in helping MD Anderson gain a \$150 million grant from the Sheikh Khalifa Bin Zayed Al Nahyan Foundation. The funds were used as a foundation for the construction of the Sheikh Zayed Bin

Sultan Al Nahyan Building, which houses the Institute for Personalized Cancer Therapy (IPCT) and the Sheikh Ahmed Center for Pancreatic Cancer Research, the area of Wolff's subspecialty. He regularly serves *ad interim* chair for various departments and travels abroad extensively on behalf of MD Anderson.



Martha Salas, MSW, MBA, returned to Cancer Medicine as division administrator in October 2015. Her chief responsibilities are to work with the division head to plan, direct, and implement the division's financial, personnel, patient care, research, and operational activities for 15 departments, 10 patient centers, and other programs. The DoCM contributes about \$3.7 billion in downstream revenue to MD Anderson's bottom line annually. Salas took the reins as the institution launched a paradigm shift in its electronic health record system. She was promoted from Division of Cancer Prevention and Population Sciences, where for four years she provided direction to five departments, multiple patient care centers, two institutes, and more than 600 employees and faculty. She managed a budget of over \$80 million. Other roles at MD Anderson have included that of department administrator and clinical business manager for Genitourinary Medical Oncology, and social work counselor/field instructor.



Florence McKelvey, PhD, MBA, CPA, became the director of administration in January 2016. She previously worked for 10 years as director of Pharmacy Financial Services, where she was responsible for administrative processes for a network of 550 pharmacists, technicians, and support staff. Prior to that job, McKelvey worked for five years as the director of General Accounting at MD Anderson, where she led a team that reconciled every dollar the institution received — about 8 million transactions a month. In her current role, McKelvey will oversee the financial operations for the division, working closely with our departments, clinics, and labs to address operations, finance, and research-related questions. She and her team oversee Cancer Medicine's vast finances through activities that include budgeting, charge capture, and strategic planning/trending.



Sue Davis, MBA, MMS, has been the director of research planning and development since August 2011. Davis assists Cancer Medicine faculty in developing proposals for internal or external funding that articulate the most cutting-edge, clinically applicable research, particularly in the development of large programmatic grants for NIH or CPRIT funding such as T32s, SPOREs, P01s and MIRAs. She also assists in efforts to support and streamline clinical and translational research programs within the division, and oversees the research development aspects of the divisional fellowship program. Since 2012, Davis has served as *ad interim* executive director of the Office of the Vice Provost for Clinical and Interdisciplinary Research.

Tributes for Distinguished Service



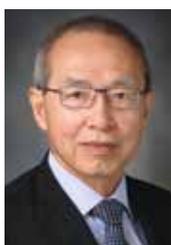
Richard Champlin, MD, chair of Stem Cell Transplantation and Cellular Therapy, was acknowledged for his exemplary service as division head *ad interim* from late August 2014 through March 4, 2016. During this time, he led efforts to help the division's fellowship program earn a perfect score on its T32 grant application, focused on laying the groundwork for more structured programs to encourage senior faculty to mentor junior faculty

and fellows, promoted more clinical research efforts at our Houston-area locations, and enhanced cost-effective measures throughout the division. Champlin's service to the division was recognized at the State of the Division address in December 2015.



Merrill Kies, MD, professor of Thoracic/Head and Neck Medical Oncology, stepped down from his role as deputy division head of Global Oncology in August 2015 following six years of service. He made numerous international trips to provide care for heads of state, including a stay that kept him away from home for four months. Kies also performed executive duties including giving input on operations at our Houston-area, network, and sister locations. He

continues to see a large volume of patients coming to MD Anderson for head, neck, and chest cancers. Kies' contributions to the division were honored at the State of the Division address in December 2015.



W.K. Alfred Yung, MD, professor of Neuro-Oncology, completed 13 years of service as department chair in 2013, and served as *ad interim* chair until October 2015. Accomplishments include expanding the department to 23 faculty members, adding fellowship programs, and overseeing the successful renewal application for a Brain Tumor SPORE in 2013. Yung's research focuses on molecular therapeutic strategies targeting EGFR and PTEN/PI3K pathways. He led a seminal study that resulted in FDA approval of temozolomide for glioblastoma, and co-led the registration study that resulted in FDA approval of bevacizumab for recurrent glioblastoma. Yung was named to Vice President Joe Biden's National Cancer Moonshot Blue Ribbon Panel of scientific experts in 2016. Yung was editor-in-chief of *Neuro-Oncology* for six years, and accepted the division's John Mendelsohn's Lifetime Achievement Award in 2014. He continues his clinical practice.



After serving as division administrator for 18 years, **Wendy Austin, RN, MS, AOCN, NEA-BC, FACHE**, took on a new role as an executive director for Hospital and Clinics on Aug. 1, 2015. She now provides administrative leadership for four divisions: Cancer Medicine, Internal Medicine, Prevention, and Pediatrics. As division administrator, she created the first department administrator role, oversaw clinical research operations, and shepherded a 160%

growth in full-time employees, a 48% increase in professional activity, and a 460% leap in funding. Expansion included information technology (IT), communications, and the fellowship office. Services created by the IT group, such as WebSchedule and Tetris, are frequently requested throughout MD Anderson. Her legacy is felt throughout the division, the institution, and beyond through the numerous health care administrators whom she has mentored into increasingly influential leadership roles. A reception was held in Austin's honor in September 2015.



Candace Baer, MHA, FACHE, originally came to MD Anderson in 1999 for a one-year administrative fellowship and joined the division office in 2005 as a senior management analyst. Her 16 years of service included roles as clinical business manager, where she reversed revenue mapping and charge capture deficiencies, and as department administrator, where she implemented inpatient and outpatient clinical revenue processes that resulted in creating the

largest profit margin of any service line. At the division level, Baer held senior management analyst and project director roles, where accomplishments included budgetary modeling that accurately predicted the division's gross revenues and expenses annually, serving as an advisor for other managers in navigating Resource One, mentoring upcoming financial management standouts, and representing the institution abroad. In addition to receiving the DoCM Distinguished Service Award at the 12th Annual Employee Recognition and Awards Program, her accomplishments were lauded at a gathering in July 2015 before her departure to take on the role of assistant vice president for ambulatory operations at New York University's Langone Medical Center.



Austin, (second from right) celebrates with (from left) **Sheryl Vick**, Thoracic/Head & Neck Medical Oncology department administrator; **Robin Famiglietti** and **Renee Konstanzer**, executive directors of hospital and clinics; **Jasmine Novogradac**, Breast Surgical Oncology department administrator, and **Habib Tannir**, executive director of hospital and clinics.

About Us

Faculty Spotlights

Taking us to the next level

Go-live hero James Yao leads division in Epic effort



Yao (seated at head of table) led daily meetings in advance of go-live and for two weeks afterward to ensure a successful implementation across the division.

The Division of Cancer Medicine salutes **James Yao, MD**, chair of Gastrointestinal Medical Oncology, for his role in helping MD Anderson successfully launch the new Epic electronic health record (EHR).

Yao's involvement began in 2012 when President Ron DePinho, MD, asked faculty, clinic, and executive leaders to consider if the institution should keep spending \$20 to \$30 million annually to update the in-house developed ClinicStation or if MD Anderson should embrace a new, off-the-shelf system that accommodates a faster pace of change for medical record functionality as required by federal mandates. "My view was that it would be difficult for us to expend the amount of resources that an Epic Systems or Cerner Corporation would be able to pour into development. We needed to decide if we were a cancer center or a software builder," Yao said. "We couldn't really take advantage of economies of scale by doing our own updates as a single institution."

When institutional leaders decided in 2013 to go with Epic, Yao began serving on an Executive Core Committee that included a cross-section of faculty and leaders who volunteered to help make decisions and keep their department colleagues informed. When asked if the entire process took more of his time than he ever thought it would, he answered "Oh, yes." In the beginning, Yao spent about 20% of his time on Epic, but that number increased to about 80% by the Friday, March 4, 2016, go-live date. Challenges included responding to the realization that Beacon, a module of verified chemotherapy orders for standard of care and research patients, may not be finished in time. "It was simply the scope — we are the biggest implementation Epic has ever had, and the biggest they anticipate they will ever have," said Yao. He and division leadership responded by arranging a series of face-to-face meetings between content experts throughout MD Anderson and Beacon builders. "We reprioritized protocol builds based on how many patients were going to be affected immediately." Institutional leadership had decided early on to reduce patient appointments by 30% to 50% to accommodate the learning curve. But the Ambulatory Treatment Center (ATC), which is downstream to other areas, still took a hit on go-live. The center where most outpatient



James Yao, MD

infusions are performed was already stretched to capacity, but the stress of a new system magnified previous issues. "I want to give thanks to **Drs. Patrick Hwu** and **Bob Wolff**, as well as Division Administrator **Martha Salas**, ATC Clinical Administrative Director **Brenda Brown**, and department administrators, for helping us reverse the situation from reactive to proactive," Yao said. He added that most Cancer Medicine department chairs spent the weekend following go-live at the ATC command center to review Beacon protocols and contact their faculty members for questions and signatures to reduce bottlenecks for the next several days at the ATC. Hwu commended the entire division for responding cautiously and appropriately to the EHR paradigm shift MD Anderson is experiencing. "We didn't experience any significant patient safety issues, and that's what's most important," the division head said. Yao graduated from Baylor

College of Medicine in 1995, where he remained for his clinical residency, followed by a medical oncology fellowship at MD Anderson. He joined the institution as an assistant professor in 2001, achieved associate professor status in 2007, performed added responsibilities as deputy chair from 2007 to 2015, was elevated to professor status in 2013, and has served as chair since April 2015. He has a unique perspective about technological change at MD Anderson. "I remember the days when we had to transition from Care to ClinicStation. It was revolutionary, for example, in terms of being able to see your films on a computer instead of having to go down to a radiology file room to chase down an order. But the time has come for another change, and I think Epic will take us to the next level."

In addition to his Epic leadership, Yao serves as chair of the division's Rare Tumor Working Group, which launched in September 2015 to focus on raising substantial resources for rare malignancies such as sarcomas, melanomas, and cancers of the thyroid, bile duct, and appendix, as well as rare subtypes of breast and gynecological malignancies. Financial support is needed from both the National Institutes of Health (NIH) — because of the growing number of people being diagnosed with what were once considered orphan diseases — and from industry sources that can provide a means to fast-tracking registration of agents in small, possibly even single-arm trials. Yao says the group is also a forum to share resources and clinical experiences with younger investigators. He's appreciative of excellent support from Cancer Medicine department chairs and Ethan Dmitrovsky, MD, provost and executive vice president, and professor of THNMO. Several proposals with biotechnical and pharmaceutical companies are under discussion.

From following her father's footsteps to international thought leader Shpall continues to blaze trails in transplantation



Shpall, left, with MD Anderson President Ron DePinho, MD, and Champlin at the 2013 ribbon-cutting ceremony for the opening of the Cord Blood Bank.

As a young girl, Dr. Elizabeth Shpall would accompany her father while he performed hospital rounds on weekends.

He was a family practice internist who did everything including delivering babies, and she admiringly refers to him as a great clinician. She followed in his footsteps again by going into medicine. "In the back of my mind, I always knew I wanted to be a doctor," says Shpall, professor of Stem Cell Transplantation & Cellular Therapy (SCT/CT), medical director of the GMP Cell Therapy Laboratory, and director of MD Anderson's Cord Blood Bank.

She found research fascinating and felt compelled to make a difference on a large scale. "When I looked at all the patients with cancer, I realized there was a real need to go into oncology research," she noted. After earning dual degrees in French and Biology from Brown University in 1976, Shpall completed her medical education at the University of Cincinnati College of Medicine in 1980. She was a resident at Beth Israel Medical Center in New York, and a fellow in the Department of Neoplastic Diseases at Mount Sinai Medical Center, also in New York, from 1983 through 1985, serving as chief fellow in her final year. While at Mount Sinai, she met her husband, **Roy Jones, MD, PhD**, also a professor of SCT/CT at MD Anderson, and they opened a small transplant section, which helped direct her future career trajectory. "We began to harness the donor cells, and realized they had an amazing, powerful effect that was more profound than straight chemo. I just thought it was the greatest field," Shpall says.

Before MD Anderson recruited her and Jones in 2002, she was the director of the University of Colorado Health Sciences Center cord blood bank, a program she started and ran for eight years. MD Anderson wanted to purchase the bank in Colorado when she made the move to Houston, but this plan fell through at the last minute and she started over locally with the most modern equipment. "It's so fortunate that our bank is state of the art," she said. (Read more about the Cord Blood Bank on page 23.)

Delays in engraftment have remained a major problem. Shpall found precedent in the literature for adding a sugar molecule, fucose, to cord blood cells to help them home to engraftment sites, hopefully speeding the process. Initial

application of this technique in mice worked so well that she moved on to the first-in-man trial of cord blood cell fucosylation. It worked. "It's one of the coolest things," she said of this breakthrough. She has authored and co-authored hundreds of research abstracts, articles, and editorials, and her 2015 manuscript, "Enforced fucosylation of cord blood hematopoietic cells accelerates neutrophil and platelet engraftment after transplantation," was selected by *Blood* journal editors as one of the top 10 most impactful manuscripts of the year [2015;125(19):2885-92]. She also was one of the inaugural recipients of a new award, the R. Lee Clark Prize, an honor given to faculty members who exemplify the spirit of MD Anderson's first president.

"We're now taking the sugar and putting it on T regs and other cell types, and studying it in NK cells," she said. "There's a lot of areas where it could become very helpful." For example, preliminary work is underway with CD34 cells, T cells and expanded B cells.

"Dr. Shpall has made an enormous impact in the field of hematopoiesis, and transplantation of hematopoietic stem cells and umbilical cord blood," said SCT/CT Department Chair **Richard Champlin, MD**. "She is clearly an international thought leader in this field, and her work has set universal standards for stem cell and cord blood transplantation."

Shpall's landmark 2012 trial demonstrating that co-culturing cord blood cells with mesenchymal cells during *ex vivo* expansion significantly shortened time to neutrophil and platelet engraftment has become standard of care. Further, she is recognized for developing "purging" approaches to eliminate malignant cells from the transplant graft [New England Journal of Medicine 2012;367(24):2305-15].

Shpall's influence in the field of stem cell transplantation reaches far beyond the Texas Medical Center. She is the current vice-president of the Foundation for the Accreditation of Cellular Therapy (FACT), having chaired their Cord Blood Standards Committee since 1999. She was also the founding president and has been a board member of the Foundation for the Accreditation of Hematopoietic Cell Therapy since 1995. MD Anderson became FACT's first accredited institution in 2000 and has earned reaccreditation four times. Internationally, she has been a member of the International Society for Cellular Therapy since 1992 and participated in the International Association for Breast Cancer Research from 1992 to 2000.

Shpall's R01 grant on stem cell expansion has been continuously funded by the NCI for over 21 years, and her renewal for this grant which she now co-leads with **Katy Rezvani MD, PhD**, professor of SCT/CT and director of translational research, scored in the top 3% in 2015. She has received grants from CPRIT, and in collaboration with Rezvani is involved with projects in several moon shot grants including CLL (with **William Wierda, MD, PhD**), AML/MDS and B Cell Lymphoma (with Champlin), Myeloma (with **Nina Shah, MD**) and Brain Tumor (with Amy Heimberger, MD, and Fred Lang, MD). Shpall and **Cassian Yee, MD**, are the scientific directors of the Moon Shot Adoptive Cell Therapy (ACT) Platform. Shpall also is the principal investigator of the National Institutes of Health (NIH)-funded Program Project Grant (P01) "Improving Cord Blood Transplantation."

On the horizon are several protocols with applications in regenerative medicine using bone marrow-derived mesenchymal stem cells, some of which are funded by the Texas Medical Center. "These things are kind of exciting," said Shpall.

About Us

Faculty Spotlights

Faculty members receiving distinguished honors and grants from MD Anderson and beyond include:

Borje Andersson, MD, PhD

Stem Cell Transplantation & Cellular Therapy

Otis W. and Pearl L. Walters Faculty Achievement Award in Clinical Research, MD Anderson

Banu Arun, MD

Breast Medical Oncology

2015 Texas Business Women's Award

Stefan Ciurea, MD

Stem Cell Transplantation and Cellular Therapy

Clinical Innovator Award, MD Anderson

Ethan Dmitrovsky, MD

Thoracic/Head & Neck Medical Oncology

American Society for Clinical Oncology (ASCO)-American Cancer Society Award

Andrew Futreal, PhD

Genomic Medicine

The Jack and Beverly Randall Prize for Excellence in Cancer Research, MD Anderson

Varsha Gandhi, PhD

Experimental Therapeutics

William Randolph Hearst Foundation's Faculty Achievement Award in Education, MD Anderson

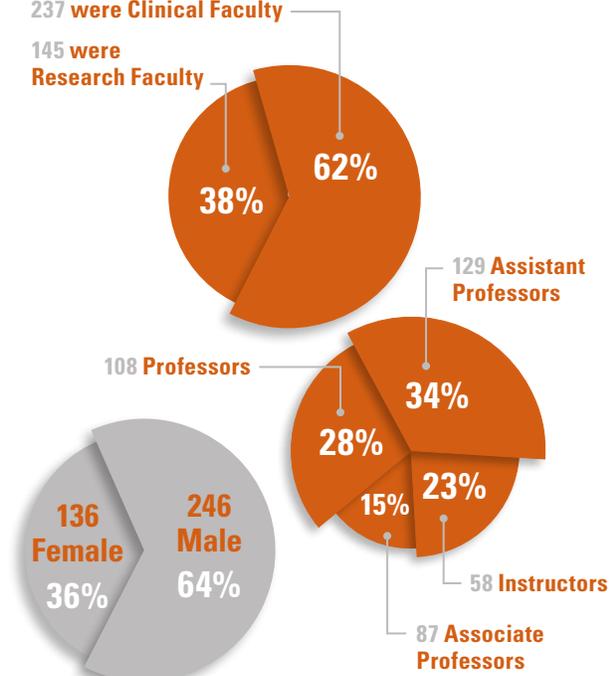
Elizabeth Grimm, PhD

Melanoma Medical Oncology

President's Leadership Award, MD Anderson

Of the **382 Faculty Members** in the Division in 2015,
237 were Clinical Faculty

145 were Research Faculty



FY15 data

John Heymach, MD, PhD

Thoracic/Head & Neck Medical Oncology

Principal Investigator, Stand Up To Cancer (SU2C) Dream Team

Waun Ki Hong, MD

Thoracic/Head & Neck Medical Oncology

Margaret Foti Award for Leadership and Extraordinary Achievements in Cancer Research, American Association for Cancer Research (AACR)

Special Recognition Award, ASCO

Gabriel Hortobagyi, MD

Breast Medical Oncology

Giants of Cancer Care, OncoLive

Wen-Jen Hwu, MD, PhD

Melanoma Medical Oncology

Making Cancer History Patient Care Award, MD Anderson

Christopher Logothetis, MD

Genitourinary Medical Oncology

The Finneran Family Prize in Translational Research, MD Anderson; Charles LeMaistre Outstanding Achievement Award in Cancer, MD Anderson

Sunil Patel, MD

General Oncology

Clinical Innovator Award, MD Anderson

Elisabet Manasanch, MD

Lymphoma/Myeloma

Clinical Innovator Award, MD Anderson

Kanwal Raghav, MBBS, MD

Gastrointestinal Medical Oncology

Clinical Innovator Award, MD Anderson

Elizabeth Shpall, MD

Stem Cell Transplantation & Cellular Therapy

R. Lee Clark Prize, MD Anderson

Donna Weber, MD

Lymphoma/Myeloma

Making Cancer History Patient Care Award, MD Anderson

W.K. Alfred Yung, MD

Neuro-Oncology

Lifetime Achievement Award from the Society for Neuro-Oncology; 2015 Distinguished Service Award, The University of Chicago Medical & Biological Sciences Alumni Association

Donna Zhukovsky, MD

Palliative, Rehabilitation & Integrative Medicine

Clinical Innovator Award, MD Anderson

Financial Snapshot

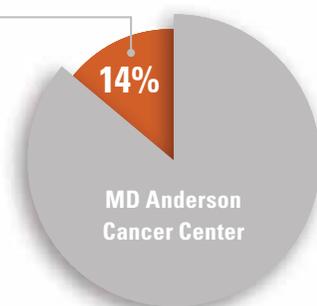
Under the strategic planning and careful stewardship of Cancer Medicine administrative leaders, the division finished the year within 1% of total budgeted expenses. Total operating income increased 33.9% to \$19.9 million, including a 9.4% growth in hospital outpatient revenue. The division set a new record high in gross patient revenue — \$417,298,091, an increase of 5.9% over the previous fiscal year, and total patient volume (new patients and consults) rose by 2.1%. The division patient activity levels grew by 2.8% for professional activity and 3.1% for technical activity, while provider full-time equivalents (FTEs) grew by 5.4%. A standardized model for defining clinical productivity associated with patient care effort was developed and implemented for each department. Total professional and technical patient revenues increased in FY15. A total of \$153.2 million in professional fees was billed in FY15, \$4.3 million more than in the prior fiscal year, and \$264 million in technical fees were billed, \$19.0 million more than in FY14.

Including medical oncology revenue generated by the Houston-area locations, the division contributed \$3.7 billion in downstream revenue to partner divisions at MD Anderson such as Diagnostic Imaging, Pathology and Laboratory Medicine, Internal Medicine, and Pharmacy — a substantial contribution to MD Anderson's bottom line in FY15.

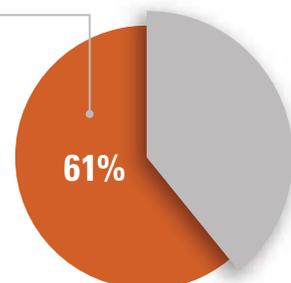
Extramural research funding also contributed \$128.5 million to the division's strong economic base — a slight increase over the previous year.

Impact of the DoCM

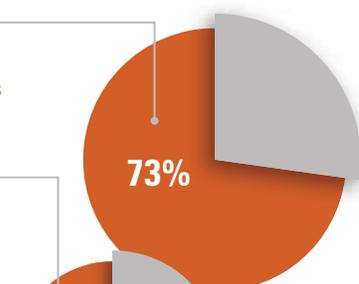
Employs
2,919 of 20,667
of the Institution's Faculty
and Classified Staff



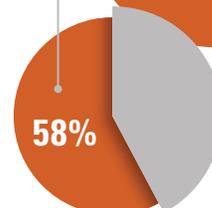
Accounts for
\$3.7B of \$6.0B
of the institution's
Clinical Revenues
(including downstream)



Conducts
525 of 715
of the institution's
Active Therapeutic Trials



Provides
5,435 of 9,402
of the institution's
Total Accrual
to Therapeutic Trials



Patient Care

Quality and Safety Initiative

Quality Officers by Clinical Department



Saroj Vadhan-Raj, MD
Chief Quality Officer
Professor, Sarcoma Medical Oncology
Chief, Section of Cytokines & Supportive Oncology



Carlos Barcenas, MD
Assistant Professor,
Breast Medical Oncology



Rachel Theriault, MD
Assistant Professor,
General Oncology



Rachna Shroff, MD
Assistant Professor,
Gastrointestinal Medical Oncology



Isabella Claudia Glitza Oliva, MD, PhD
Assistant Professor,
Melanoma Medical Oncology



Sudhakar Tummala, MD
Professor,
Neuro-Oncology



Paul Walker, MD
Associate Professor,
Palliative, Rehabilitation & Integrative Medicine

The overarching goal of our newly founded Integrated Quality and Safety Initiative, under the leadership of our division Chief Quality Officer **Saroj Vadhan-Raj, MD**, and our Division Head **Patrick Hwu, MD**, is to provide the highest quality and safest care for our patients. The Division of Cancer Medicine has the largest program for clinical trials within MD Anderson involving many high-risk drugs that are accompanied by elevated potential risk for medication errors. By making patient quality of care and safety our priority and working toward improving our processes to reduce preventable adverse events, **our goal is to reduce unintended patient harm to the lowest possible rate while at the same time enhancing quality of care.**

Vadhan-Raj leads monthly meetings with the quality officers of our individual departments along with other experts from around the institution including representatives from Pain Medicine, Critical Care, Emergency Medicine, Patient Safety & Accreditation, Pharmacy, Benign Hematology, and our institutional Chief Quality Officer Charles Levenback, MD. We have been seeking input from every angle, including nurses, pharmacists, and advanced practice providers.

At our monthly meetings, we review the safety event reports filed in our electronic system, University HealthSystem Consortium (UHC) Safety Intelligence (SI), and discuss how to prevent similar events in the future. Root cause analysis of events involving harm provides insight into how accidents happen from a series of small breakdowns in a complex system, and promotes development of action items that will strengthen our processes to avoid future recurrence. From reviewing

event reports, we have focused our efforts into three main subject areas where the division can potentially provide influence across the institution to reduce medication errors and make treatment safer for our patients: administration of **chemotherapy, pain medications and antidotes, and anticoagulants.**

Our current data is based on voluntary SI reporting, which is a very valuable source of information to benchmark, monitor, learn from and continue to improve upon with the ultimate goal of reducing harm to zero. Therefore, it is essential to create an environment of psychological safety where frontline staff and other care providers feel comfortable reporting errors and communicating openly without fear of retribution. Such an environment will foster identification of near-miss and high-harm events alike, and will help us devise strategies to avoid these errors in the future by closing gaps and standardizing safety processes. We must focus on continuous learning, improvement, and sharing of successes rather than assigning blame.

The ramping up of public reporting and awareness of value-based medicine has raised the bar for us, as payors are looking at documentation of value. Now we are working to raise that value by examining the outcome of our work, which requires analyzing data — a lot of data. This is going to be a very important area for us over the next few years, and it will help us keep in sync with all of these external changes in the health care environment. We are very confident that our patients receive the best care here, but now we have to generate the data to

(Outcome + Quality)

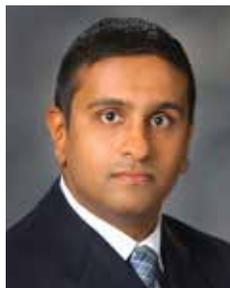
Cost



John Araujo, MD, PhD
Associate Professor,
Genitourinary Medical
Oncology



Siqing Fu, MD
Associate Professor,
Investigational Cancer
Therapeutics



Tapan Kadia, MD
Associate Professor,
Leukemia



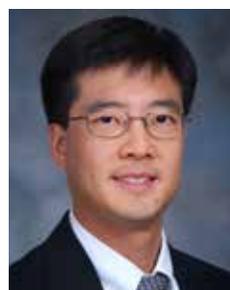
Yasuhiro Oki, MD
Associate Professor,
Lymphoma/Myeloma



Dejka Araujo, MD
Associate Professor,
Sarcoma Medical Oncology



Uday Popat, MD
Professor,
Stem Cell Transplantation
& Cellular Therapy



Charles Lu, MD
Professor,
Thoracic/Head & Neck Medical
Oncology

Central goal:
To provide the
highest quality
and safest care for
our patients

show that we deliver high-value care, where **value** is defined as (Outcome + Quality)/Cost. The Epic electronic health record system will help us align patient outcomes and financial results. The OneConnect initiative and move to Epic is a great start because we will be able to gather data that previously was very difficult to obtain, especially concerning patients on research protocols.

The division's quality committee will develop measurement and evaluation projects that can be realized from the data-driven approach that Epic affords us to improve patient outcomes. With our new system, we are in a good position to utilize data reporting tools to examine and track situations of risk and potential harm, and thus identify initiatives to improve safety and quality.

We are discussing best practices from each department with the goal for all departments to improve quality and safety, and operate at the same exemplary level. This effort will drive processes for the institution and the field that are focused on safety initiatives with measurable outcomes. Once a new process is developed, a multidisciplinary approach will be needed for its implementation.

It is refreshing to see how committed we are to value-based outcomes, quality care, and patient safety. After all, one of the guiding principles derived from the Hippocratic Oath is *primum non nocere*: First, do no harm.

Focus on medication-related events

- Chemotherapy administration
- Use of pain medications
- Use of anticoagulants

Key issues

- Avoiding harm from care that is intended to help
- Establishing a culture of safety
- Promoting continual learning and improvements to minimize harm
- Aligning care with science and evidence for maximum effectiveness
- Focusing on patient-centered and efficient care
- Optimizing benefits and reducing cost

Patient Care

Treatment Centers

Ambulatory Treatment Center



Michael Overman, MD
Center Medical Director



Brenda Brown, RN, MSN, OCN, NE-BC
Clinical Administrative Director

11,604 Follow-ups
377,693 Procedures
118,097 Patient Visits
384 Average patients per **weekday**

The **Ambulatory Treatment Center (ATC)**, with 156 beds and 5 clinical sites, delivers infusion therapy for all of MD Anderson's specialty centers. The ATC provides treatments for the adult patient population, 18 years of age and beyond.

ATC services include:

- Infusions of standard and investigational chemotherapy regimens
- Transfusion of blood products and immunoglobulin infusions
- Administration of fluids and electrolyte replacement
- Injections of all types
- Infusions of antibiotics, anti-fungals and anti-virals
- Infusion pump connections and disconnections

We have seen a steady increase in average daily census with a growth rate of 3.9% from FY14 to FY15.

Clinical Center for Targeted Therapy



David Hong, MD
Center Medical Director



Cheryl Fullmer, RN, MBA
Clinical Administrative Director

The **Clinical Center for Targeted Therapy (CCTT)** is the outpatient arm of the Department of Investigational Cancer Therapeutics (ICT) that screens for eligibility and monitors patients with a wide variety of advanced cancers on early-phase clinical trials for the institution. The center also offers participation in clinical trials for underserved populations that are traditionally excluded from early-phase studies — children, the elderly, patients with active brain metastases, and those with hepatic or renal failure. The center welcomes patient referrals from outside of MD Anderson as well as from physicians throughout the institution.

ICT also operates an inpatient service, mostly for patients on Phase I protocols who require overnight monitoring for high-risk and first-in-human trials, and for patients receiving hepatic arterial infusions. This inpatient care also extends

to any patient who is on or off trial needing inpatient management of treatment side effects, disease complications, or co-morbidities.

2,610 Total patients served
231 New patients
1,594 Consults
1,027 Patients enrolled in clinical trials
106 Number of clinical trials
24,873 Ambulatory care visits

Clinical & Translational Research Center



Daniel Karp, MD
Center Medical Director



Cheryl Fullmer, RN, MBA,
Clinical Administrative Director



Passion Lockett, DrPH
Assistant Director

The **Clinical and Translational Research Center (CTRC)** is a dedicated unit for intensive monitoring of patients participating in complex, early-phase clinical trials. A team of outstanding nurses and other clinical staff implement CTRC-approved protocols. Patients are monitored and evaluated, and interventions are made as needed.

The center also facilitates "basket" trials in which patients across multiple disease sites and types are assigned to a treatment study arm according to their mutations revealed on molecular testing, instead of according to their disease site of origin. More of these protocols are being considered for the coming year.

The **CTRC Laboratory** is housed within the clinic to provide sample collection, processing, storage, and shipping services to support pharmacologic studies. Clinical investigation technicians collect and process primarily blood specimens for the studies. **Passion Lockett, DrPH**, assistant director, oversees data entry into the Lab Tracker system, which improves sample quality and efficiency by electronically tracking every step in the process from collection to testing, storage, and shipping in order to better document specimens used to develop new drugs or new drug combinations.

123 Approved Protocols
101 Activated Protocols
251 Active Protocols

Leukemia Center



William Wierda, MD, PhD
Center Medical Director



Clint Koerkenmeier, RN, MHS
Clinical Administrative Director

The **Leukemia Center** is the largest practice of leukemia subspecialists in the world. Patients have access to standard therapies as well as innovative biological therapies and targeted immunotherapies that offer options to those diagnosed with acute myelogenous leukemia, acute lymphocytic leukemia, chronic myelogenous leukemia, chronic lymphocytic leukemia, myelodysplastic syndromes, aplastic and other anemias, as well as Burkitt's lymphoma, large granular lymphocyte leukemia, mantle cell leukemia, and hairy cell leukemia. Other diseases treated include rare types of myeloproliferative syndromes, hypereosinophilic syndrome, and other related hematologic malignancies. The center also performs growth modifier subcutaneous injections, lumbar punctures, and trial vaccines for patients.

1,373 New patients
643 Consults
37,963 Follow-ups
3,375 Procedures

Bone Marrow Aspiration Clinic



Michael Andreeff, MD, PhD
Center Medical Director



Clint Koerkenmeier, RN, MHS
Clinical Administrative Director

In FY15, the Bone Marrow Aspiration clinic relocated to a larger space with an additional procedure room, a recovery lounge for patients, and a private waiting room for friends and family members who are supporting patients.

17,080 Procedures

Lymphoma & Myeloma Center



Donna Weber, MD
Center Medical Director



Penny Phillips, RN, MSN
Clinical Administrative Director

As one of the few comprehensive programs in the country, MD Anderson's **Lymphoma & Myeloma Center** is known for its groundbreaking treatments and leading diagnostic techniques. We continue to work every day to find new therapies for lymphomas and myelomas, a challenging and complex group of cancers. The Lymphoma and Myeloma Center's pathologists are specially trained to accurately diagnose and stage all types of lymphoma and myeloma, which is important for choosing the most effective treatment plan. Our diagnostic expertise covers rare lymphomas that most pathologists will never encounter.

For many lymphoma patients, their disease may be chronic. Personalized long-term care is especially important for patients who have relapsed. We provide monitoring and management programs to enhance patients' quality of life. The Lymphoma and Myeloma Center offers a range of innovative treatment options, including targeted therapies, vaccines and radio-immunotherapy, as well as clinical trials for new and relapsed disease.

1,498 New patients
568 Consults
32,134 Follow-ups
2,994 Procedures



Donna Weber, MD, pictured with **Robert Orłowski, MD, PhD**, ad interim chair of Lymphoma/Myeloma, (left) was the second recipient of the new MD Anderson Making Cancer History Patient Care Award. The first recipient was **Wen-Jen Hwu, MD, PhD**, professor of Melanoma Medical Oncology.

Patient Care

Treatment Centers

Stem Cell Transplantation & Cellular Therapy Center



Nina Shah, MD
Center Medical Director



Betul Oran, MD
Medical Director,
Matched Unrelated
Donor Program



**Denene Williams, RN,
MBA, MLA, NE-BC**
Clinical Administrative
Director

MD Anderson's **Stem Cell Transplantation and Cellular Therapy Center** is one of the largest facilities in the world for stem cell transplants, performing more than 850 procedures for adults and children each year, more than any other center in the nation. We treat a wide variety of cancers, hematologic diseases, and autoimmune disorders.

Our center is recognized by the National Marrow Donor Program (NMDP) as a specialized center for matched unrelated donor stem cell transplants, and maintains an advanced cell processing laboratory dedicated to preparing safe and effective tissues for transplantation.

In addition to inpatient and outpatient services, the Stem Cell Transplantation and Cellular Therapy Center has a clinic that helps monitor and manage complications of graft vs. host disease, a major complication for many transplant patients.

193	Allogeneic related
208	Allogeneic unrelated
455	Autologous
856	Total transplants

Apheresis Center



Chitra Hosing, MD
Center Medical Director



**Denene Williams, RN, MBA,
MLA, NE-BC**
Clinical Administrative Director

Our **Apheresis Center** is unique because, while most hospitals refer these lifesaving procedures to blood banks or contract health organizations, MD Anderson has the expertise to perform this service in-house and in proximity to the Leukemia, Stem Cell, and Lymphoma/Myeloma Centers as a convenience for patients. The process involves the removal, collection, and return of blood components for patients needing leukodepletion, red blood cell depletion, platelet depletion, or total plasma exchange. The majority of patients are referred for stem cell collections for autologous and/or allogeneic stem cell transplantation.

The Apheresis Center also performs extracorporeal photopheresis (ECP) to treat graft vs. host disease and mycosis fungoides (cutaneous T-cell lymphoma). During the photopheresis process, cells are removed, treated, and returned to the patient.

10,721	Procedures
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Supportive Care Center



Eduardo Bruera, MD
Center Medical Director



Natalie Schuren, RN, MSN, NE-BC
Director, PRIM

The **Supportive Care Center** continues to help patients improve their quality of life no matter where they are in the treatment process, offering specialized care that works in tandem with primary cancer treatments. The center offers help for a variety of distressing symptoms such as pain, nausea, constipation, fatigue, anxiety, depression, delirium, and overall impaired sense of well-being. A team of experts approaches patients' needs by considering the whole person — the physical as well as the psychosocial and spiritual domains. The service is available on inpatient units, on the outpatient clinic, and on a mobile consultation basis.

182	New patients
1,557	Consults
7,558	Follow-ups
518	Procedures

Integrative Medicine Center



Gabriel Lopez, MD
Center Medical Director



Natalie Schuren, RN, MSN, NE-BC
Director, PRIM

The **Integrative Medicine Center** aims to work collaboratively with patients' primary oncology teams to build a comprehensive and integrative care plan that is personalized, evidence-based, and safe with the goal of improving clinical outcomes.

993	Consultations
459	Follow-ups
1,656	Procedures
2,168	Acupuncture
1,723	Massage
726	Music
28	Meditation
548	Nutrition
3,888	Group therapy sessions

Houston-area and Network Locations

Providing MD Anderson's High-Caliber Care Beyond Texas Medical Center

Over 4 million people call the Greater Houston area home, and when many face cancer diagnoses, they choose MD Anderson Cancer Center regional locations to receive the highest caliber of cancer care closer to home.

MD Anderson in the **Bay Area** serves residents in South Harris County in Nassau Bay, and is located on the campus of the Methodist St. John Hospital. The medical oncologists there are **Amy Hassan, MD**, and **Celyne Bueno-Hume, MD**.

348 New patients
5,978 Follow-ups & Consults
11,340 Infusions

Drs. Nikesh Jasani, Sunil Patel, and **Rachel Theriault** provide outstanding care at our center in **Katy**, located on the campus of Christus St. Catherine Hospital.

405 New patients
7,844 Follow-ups & Consults
10,395 Infusions

MD Anderson in **Sugar Land** provides care to patients in the Fort Bend County area at St. Luke's Sugar Land Hospital under the leadership of **Drs. Mark Lewis** and **Janet Tu**.

285 New patients
5,467 Follow-ups & Consults
9,742 Infusions

Our center in **The Woodlands** serves residents living in far north Harris and Montgomery counties.

Douglas Nelson, MD, medical director, collaborates with **Drs. Angela Coscio** and **Jenny Pozadzides** to address the needs of area residents.

492 New patients
7,100 Follow-ups & Consults
8,587 Infusions

Additionally, patients are able to participate in several of the medical oncology clinical trials that are also offered at the Texas Medical Center campus. During FY15, providers signed on regional patients in 26 trials, the majority of which focused on women's cancers.

LBJ Oncology Program Thriving in Harris Health System

Nineteen physicians participating in Cancer Medicine's Hematology/Medical Oncology Fellowship Program had the privilege of providing care to patients at **Lyndon Baines Johnson (LBJ) General Hospital** in 2015. The facility is part of the Harris Health System, which provides care to a low-income and underserved patient population. "Our group is invested in offering our patients the best that MD Anderson has to offer, no matter where they receive that care,"

said **Alyssa Rieber, MD**, associate professor of General Oncology and director and chief of oncology at LBJ.

454 New patients
8,922 Follow-ups & Consults
1,430 Infusions

Beyond State Lines

A steady number of patients continue to entrust their oncology care to our specialists at **Banner MD Anderson Cancer Center** in Gilbert, Ariz., a freestanding campus about 30 minutes northwest of Phoenix. **Tomislav Dragovich, MD, PhD**, the division chief of hematology, leads a group of 12 medical oncologists and several advanced practice providers. The most prevalent diagnoses at Banner are breast, gastrointestinal, and hematologic malignancies.

2,615 New patients
21,549 Follow-ups & Consults
22 Stem cell transplantations

More people in the region of Camden, N.J., are relying on **MD Anderson Cancer Center at Cooper**, to meet their needs closer to home. **Generosa Grana, MD**, serves as director for the center, which began accepting patients in late 2013. Cooper's experienced clinical team includes 16 medical oncologists as well as advanced practice providers. The most prevalent diagnoses were breast, lung, and uterine malignancies.

3,362 New patients
43,445 Follow-ups
6,386 Consults
55 Clinical trials opened

Medical and clinical support specialists began accepting patients at the **Baptist MD Anderson Cancer Center** in Jacksonville, Fla., in October 2015. **Joe "Bill" Putnam, MD**, serves as the medical director who is steering all clinical activities and programs and working with MD Anderson clinical leadership to develop our co-branded program. While patients are currently receiving care at the outpatient center, a dedicated facility is planned to open in 2017 on the Baptist Medical Center campus, where they will be able to receive the full continuum of cancer care needs, from screening and diagnosis to treatment and survivorship follow-ups.

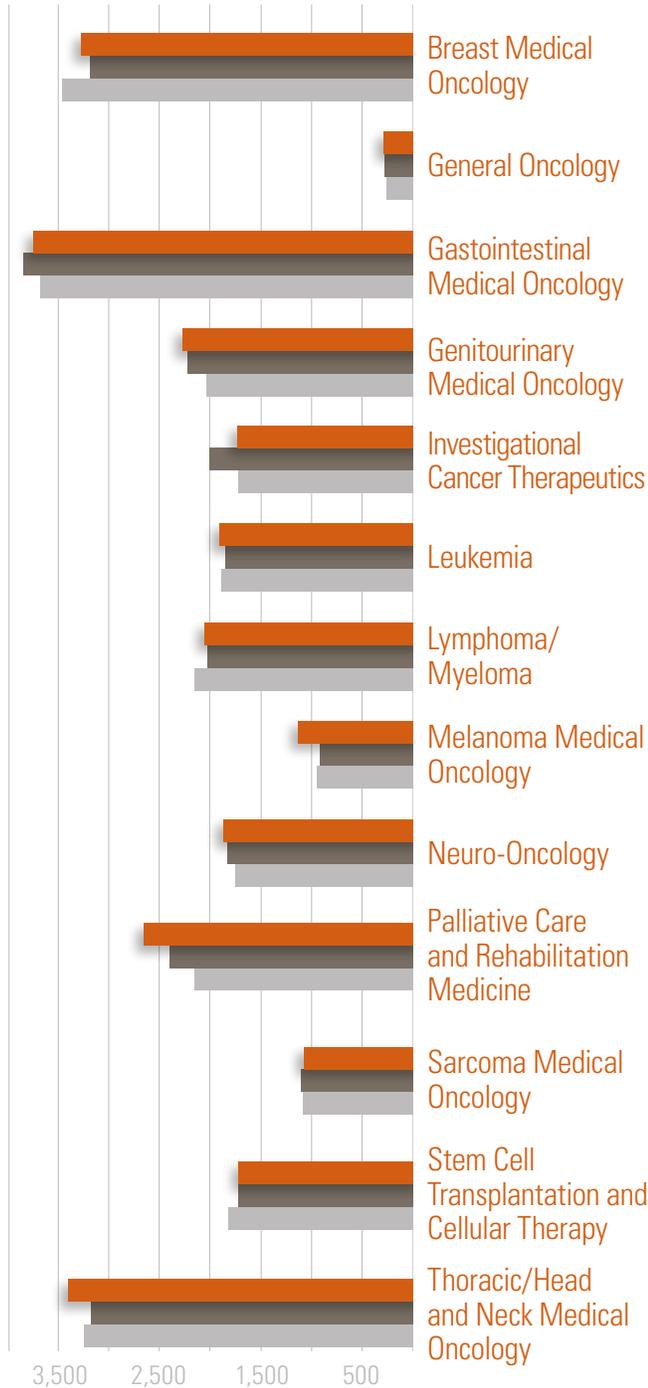
An advanced practice registered nurse in the **LBJ Drop-In Clinic** works with patients between doctor appointments to provide symptom control for those who are transitioning to hospice care. The Drop-In Clinic had **212 visits** in FY15. The **Survivorship Clinic** in its second full year welcomed **135 new patients** and had **845 follow-up visits**, with assistance provided by medical residents with The University of Texas Health Science Center-Houston.

In FY15, the fellowship saw **182 patients** in its new, weekly **Genetics Clinic** for hereditary breast cancer. Also in the past year, **28 patients** signed on for various **clinical trials** at the LBJ campus. Additionally, a new faculty member was recruited and another will begin this fall.

Academic Departments

Total Patient Activity by Department

2015 2014 2013



Source: Essbase and Hyperion

Our goal is to **provide the best research-driven patient care**. We already do a fantastic job, but we have the potential to improve by focusing on key areas: **Patient access, safety and quality, value, efficient and impactful clinical trials, and learning from every patient**. We are working to organize ourselves better and to be more efficient, which in turn will better serve our patients and enhance their experience and outcomes.

Breast Medical Oncology



Debasish Tripathy, MD
Chair



Vicente Valero, MD
Deputy Chair and Clinical Director, The Morgan Welch Inflammatory Breast Cancer Research Program



Banu Arun, MD
Co-Clinical Medical Director, Clinical Cancer Genetics



V. Craig Jordan, PhD
Basic Science Research Leader



Stacy Moulder, MD
Chief, Section of Clinical Research and Drug Development



Naoto Ueno, MD, PhD
Chief, Section of Translational Breast Cancer Research

Clinical faculty:

Sausan Abouharb, MD
Banu Arun, MD
Carlos Barcenas, MD
Daniel Booser, MD
Aman Buzdar, MD
Angela Coscio, MD
Senthil Damodaran, MD
Gabriel Hortobagyi, MD
Nuhad Ibrahim, MD
Kazuharu Kai, MD, PhD
Meghan Karuturi, MD
Kimberly Koenig, MD
Bora Lim, MD
Jennifer Litton, MD
Stacy Moulder, MD
James Murray, MD, MPH
Rashmi Murthy, MD
David Ramirez, MD
Sadia Saleem, MD
Debasish Tripathy, MD
Naoto Ueno, MD, PhD
Vicente Valero, MD
Ronald Walters, MD

Research faculty:

Chandra Bartholomeusz, MD, PhD
Bedrich Eckhardt, PhD
Ping Fan, PhD
V. Craig Jordan, PhD
Shuying Liu, MD, PhD
Philipp Maximov, MD, PhD



Walker Averitt, MBA
Medicine Department Administrator



Isabel Nieto,
*Inflammatory
Breast Cancer
Survivor*

When Isabel Nieto came to Houston from Weslaco, Texas, in October 2011 with stage IV inflammatory breast cancer (IBC), she was offered a slot in the Phase III MARIANNE clinical trial that compared therapies for patients with untreated metastatic breast cancers who tested positive for human epidermal growth factor 2 (HER2). One group of patients received then-standard treatment of the anti-HER2 antibody trastuzumab with a taxane-based chemotherapy drug. Nieto's group received the new drug, ado-trastuzumab emtansine (T-DM1), either with or without another HER2-targeting antibody, pertuzumab. IBC specialist **Vicente Valero, MD**, professor of Breast Medical Oncology, described T-DM1 as an immunoconjugate consisting of an antibody and a drug connected by a molecular bridge that allows trastuzumab to attract HER2-positive cells and gives DM1, a derivative of the cytotoxic agent maytansine, the opportunity to kill them. This selective delivery of chemotherapy to only cancer cells reduced systemic side effects. Nieto originally didn't want to be in the trial because it required a tissue biopsy and a two-week wait for results to return from Germany. With extensive metastasis to her lymph nodes and liver, she had a 1% chance of achieving remission, but after more discussion with Valero, she gave the trial a chance. "It was the way he worded it. I had nothing to lose in trying this out. He was real persistent, and I'm grateful for that," she said. Once Nieto was in clinical remission, she underwent mastectomy where no cancer was left in the breast, nor in the lymph nodes. Radiation followed, and so did news of no evidence of disease in June 2013. She returns for follow-up scans annually.

Academic Departments

Experimental Therapeutics



Varsha Gandhi, PhD
Ad interim Chair



William Plunkett, PhD
Deputy Chair



Aaron Walton, MPAff
*Medicine Department
Administrator*

Research faculty:

Kumudha Balakrishnan, PhD
Geoffrey Bartholomeusz, PhD
Robert Bast, Jr., MD
George Calin, MD, PhD
Lisa Chen, PhD
Rong Chen, PhD
Zhen Fan, MD
Izabela Fokt, PhD
Enrique Fuentes-Mattei, PhD
Varsha Gandhi, PhD
Walter Hittelman, PhD
Cristina Ivan, PhD
Yingjun Jiang, PhD
Jian Kuang, PhD
Betty Lamothe, PhD
Kwankook Lee, PhD
Hui Ling, PhD

Chang-Gong Liu, PhD
Xiaojun Liu, PhD
Xiuping Liu, MD
Gabriel Lopez-Berestein, MD
Zhen Lu, MD
John McMurray, PhD
Khalid Mohamedali, PhD
Bulent Ozpolat, MD, PhD
William Plunkett, PhD
Waldemar Priebe, PhD
Walther Rosenblum, PhD
Aloke Sarkar, PhD
Zahid Siddik, PhD
Christine Stellrecht, PhD
Katrien Van Roosbroeck, PhD
Chuan Fen Wu, PhD
Shuxing Zhang, PhD

Gastrointestinal Medical Oncology



James Yao, MD
Chair



Alicia Newton, MHA, MBA
*Medicine Department
Administrator*

Clinical faculty:

Jaffer Ajani, MD
Humaid Alshamsi, MD
Mariela Blum Murphy, MD
Nageshwara Dasari, MBBS
Cathy Eng, MD
David Fogelman, MD
Daniel Halperin, MD
Linus Ho, MD, PhD
Milind Javle, MD
Ahmed Kaseb, MBBS
Bryan Kee, MD
Scott Kopetz, MD, PhD
Renato Lenzi, MD
Michael Overman, MD
Kanwal Raghav, MBBS, MD
Rachna Shroff, MD
Imad Shureiqi, MD
Gauri Varadhachary, MBBS, MD
Robert Wolff, MD
James Yao, MD

Research faculty:

Jennifer Goldstein, MD
Manal Hassan, MD, PhD, MPH
Donghui Li, PhD
Wei Qin Lu, PhD
David Menter, PhD
Van Morris, MD
Shumei Song, MD, PhD
Ji Yuan Wu, MD
Mingxin Zuo, PhD
Xiangsheng Zuo, MD, PhD

General Oncology



Robert Wolff, MD
Ad interim Chair



Alyssa Rieber, MD
*Deputy Chair and Chief,
Lyndon B. Johnson (LBJ)
Medical Oncology*



Alicia Newton, MHA, MBA
*Medicine Department
Administrator*

Clinical faculty:

Nishin Bhadkamkar, MD
Celyne Bueno-Hume, MD
Ahmed Eid, MD
Amy Hassan, MD
Nikesh Jasani, MD
Mark Lewis, MD
Arlene Nazario, MD

Douglas Nelson, MD
Sunil Patel, MD
Jenny Pozadzides, MD
Alyssa Rieber, MD
Rachel Theriault, MD
Janet Tu, MD
Robert Wolff, MD

Genitourinary Medical Oncology



Christopher Logothetis, MD
Chair



Nizar Tannir, MD
Deputy Chair



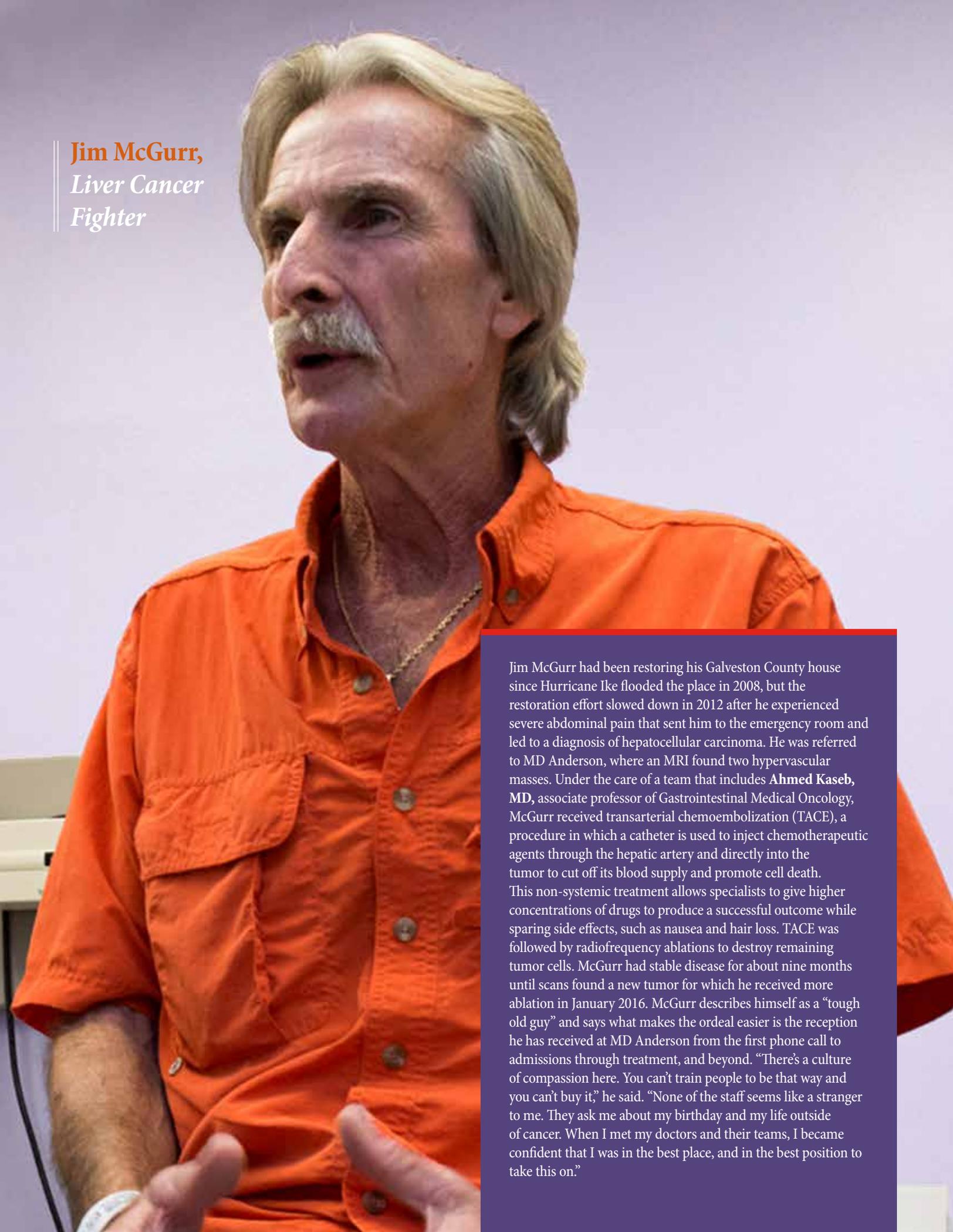
Rebecca Fueger, RN, MS
*Medicine Department
Administrator*

Clinical faculty:

Ana Aparicio, MD
John Araujo, MD, PhD
Matthew Campbell, MD
Paul Corn, MD, PhD
Jianjun Gao, MD, PhD
Eric Jonasch, MD
Jeri Kim, MD
Christopher Logothetis, MD
Padmanee Sharma, MD, PhD
Arlene Siefker-Radtke, MD
Sumit Subudhi, MD, PhD
Nizar Tannir, MD
Shi-Ming Tu, MD
Jennifer Wang, MD
George Wilding, MD
Amado Zurita-Saavedra, MD

Research faculty:

William Benedict, MD
Eleni Efsthathiou, MD, PhD
Peter Friedl, MD, PhD
Gary Gallick, PhD
Likun Li, PhD
Xiande Liu, PhD
Sankar Maity, PhD
Nora Navone, MD, PhD
Lewis Shi, MD, PhD
Mianen Sun, PhD
Timothy Thompson, PhD
Mark Titus, PhD
Xinhai Wan, PhD
Michael Weiger, PhD
Guang Yang, MD, PhD



Jim McGurr,
*Liver Cancer
Fighter*

Jim McGurr had been restoring his Galveston County house since Hurricane Ike flooded the place in 2008, but the restoration effort slowed down in 2012 after he experienced severe abdominal pain that sent him to the emergency room and led to a diagnosis of hepatocellular carcinoma. He was referred to MD Anderson, where an MRI found two hypervascular masses. Under the care of a team that includes **Ahmed Kaseb, MD**, associate professor of Gastrointestinal Medical Oncology, McGurr received transarterial chemoembolization (TACE), a procedure in which a catheter is used to inject chemotherapeutic agents through the hepatic artery and directly into the tumor to cut off its blood supply and promote cell death. This non-systemic treatment allows specialists to give higher concentrations of drugs to produce a successful outcome while sparing side effects, such as nausea and hair loss. TACE was followed by radiofrequency ablations to destroy remaining tumor cells. McGurr had stable disease for about nine months until scans found a new tumor for which he received more ablation in January 2016. McGurr describes himself as a “tough old guy” and says what makes the ordeal easier is the reception he has received at MD Anderson from the first phone call to admissions through treatment, and beyond. “There’s a culture of compassion here. You can’t train people to be that way and you can’t buy it,” he said. “None of the staff seems like a stranger to me. They ask me about my birthday and my life outside of cancer. When I met my doctors and their teams, I became confident that I was in the best place, and in the best position to take this on.”

Academic Departments



Filip Janku:
*Pioneering
liquid biopsy*

Research scientist **Helen Huang, MD**, assists **Janku** in the lab to isolate cfDNA.

Through efforts in the clinic and the laboratory, **Filip Janku, MD, PhD**, assistant professor of Investigational Cancer Therapeutics (ICT), hopes to improve cancer patient outcomes by refining how we obtain information about tumors over the course of disease. In the laboratory, he focuses on the non-invasive liquid biopsy, an innovative method that operates on the principle that cells, both malignant and normal, shed short fragments of DNA into the bloodstream that can be recovered from the serum fraction of whole blood. Known as cell-free DNA (cfDNA), these circulating fragments allow for convenient and minimally invasive retrieval of tumor DNA that can be sequenced to determine mutation profiles and real-time genetic changes that may correlate with various disease events including progression and therapy response. This concept is particularly useful in the Phase I clinical trial setting where there is a need for serial biopsies to track treatment responses and emergence of resistance. “The only way for us to try to understand the mechanism causing therapy resistance in an individual patient is to do serial biopsies,” Janku noted, a process made much easier with liquid biopsy. Levels of cfDNA may also predict prognosis in some cases; surprising recent findings from Janku’s group have shown that patients with higher fractions of BRAF-, KRAS-, and EGFR-mutant DNA fare worse than patients with less, despite the fact that all three of these mutations have corresponding targeted therapies. In addition to blood, Janku has found that both urine and cerebral spinal fluid contain detectable amounts of cfDNA; he is also investigating the utility of genetic material-containing exosomes shed from tumor cells into plasma and other biological fluids.

Genomic Medicine



Andrew Futreal, PhD
Ad interim Chair



Cathy Davis, MBA
*Medicine Department
Administrator*

Research faculty:

Laura Bover, PhD
Giulio Draetta, PhD, MD
Andrew Futreal, PhD
Giannicola Genovese, MD
Troy Johnson, PhD
Hoon Kim, PhD
Paul Leonard, PhD
Todd Link, PhD
Yonathan Lissanu Deribe, PhD
John Mendelsohn, MD
Luigi Nezi, PhD
Guillaume Poncet Montange, PhD
Kunal Rai, PhD
Andrea Viale, MD
Kui Shin Voo, PhD
Siyuan Zheng, PhD

Investigational Cancer Therapeutics



Funda Meric-Bernstam, MD
Chair



Mary Silverstein, BA
*Ad interim Medicine
Department Administrator*

Clinical faculty:

Argun Akcakanat, MD, PhD
Siqing Fu, MD, PhD
David Hong, MD
Filip Janku, MD, PhD
Daniel Karp, MD
Shumei Kato, PhD
Funda Meric-Bernstam, MD
Aung Naing, MD
Sarina Piha-Paul, MD
Vivek Subbiah, MD
Apostolia Tsimberidou, MD, PhD

Leukemia



Hagop Kantarjian, MD
Chair



Jorge Cortes, MD
Deputy Chair; Chief, Section of Acute Myelogenous Leukemia and Chronic Myelogenous Leukemia



Michael Andreeff, MD, PhD
Chief, Section of Molecular Hematology and Therapy



Guillermo Garcia-Manero, MD
Chief, Section of Myelodysplastic Syndromes



Elias Jabbour, MD
Chief, Section of Acute Lymphoblastic Leukemia



Farhad Ravandi-Kashani, MD
Chief, Section of Developmental Therapeutics



Srdan Verstovsek, MD, PhD
Chief, Section of Myeloproliferative Neoplasms



William Wierda, MD, PhD
Chief, Section of Chronic Lymphocytic Leukemia



Mary Silverstein, BA
Medicine Department Administrator

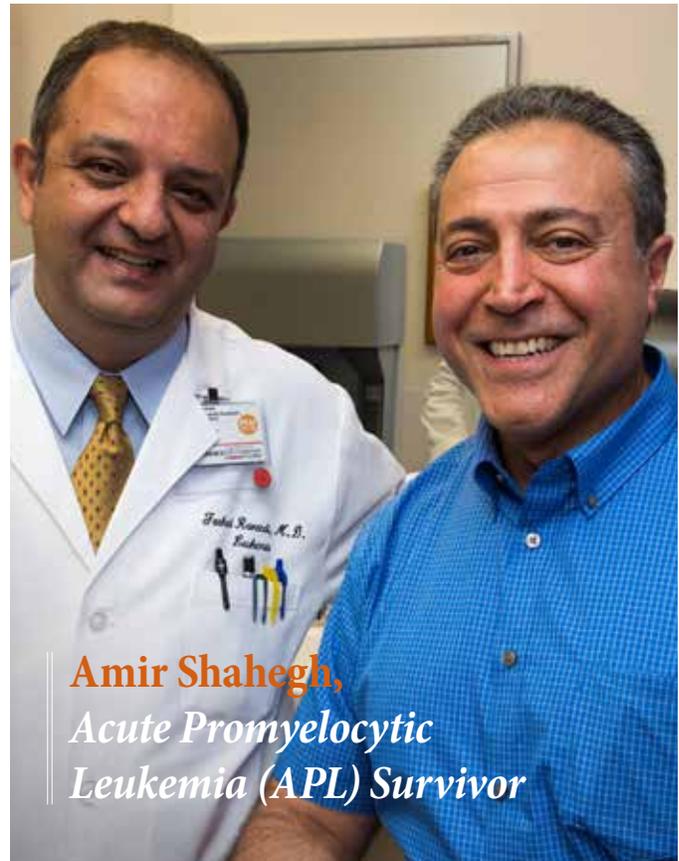
Clinical faculty:

Yesid Alvarado, MD
Michael Andreeff, MD, PhD
Christopher Benton, MD
Kapil Bhalla, MBBS
Gautam Borthakur, MBBS
Prithviraj Bose, MD
Jan Burger, MD, PhD
Jorge Cortes, MD
Naval Daver, MD
Courtney DiNardo, MD, MSCE
Zeev Estrov, MD
Alessandra Ferrajoli, MD
Emil Freireich, MD
Guillermo Garcia-Manero, MD
Elias Jabbour, MD
Nitin Jain, MBBS
Tapan Kadia, MD
Hagop Kantarjian, MD
Michael Keating, MBBS
Marina Konopleva, MD, PhD
Steven Kornblau, MD
Kiran Naqvi, MD
Maro Ohanian, DO

Naveen Pemmaraju, MD
Farhad Ravandi-Kashani, MD
Koichi Takahashi, MD
Philip Thompson, MBBS
Srdan Verstovsek, MD, PhD
William Wierda, MD, PhD

Research faculty:

Venkata Battula, PhD
Jared Burks, PhD
Bing Carter, PhD
Simona Colla, PhD
Warren C Fiskus, PhD
Lina Han, PhD
Rodrigo Jacamo, PhD
Sujan Piya, PhD
Sean Post, PhD
Peter Ruvolo, PhD
Rui-Yu Wang, MD, PhD
Yue Wei, PhD
Hui Yang, MD, PhD
Zhihong Zeng, MD
Weiguo Zhang, MD, PhD



Amir Shahegh,
Acute Promyelocytic Leukemia (APL) Survivor

A wireless network engineering manager who drove two-and-a-half hours every other week from his home in Little Rock, Ark., to meet with team members in Memphis, Tenn., Amir Shahegh didn't know he was sick until he heard back from his doctor's office following an annual checkup that included blood work. He was a runner and felt fine, but labwork found a lower than normal white blood count along with low platelets. His results were worse upon second testing, which prompted a referral to a local oncologist who diagnosed him with "the grizzly bear" of leukemias. Acute promyelocytic leukemia (APL) can cause life-threatening bleeding. Other symptoms include fever, fatigue, unexplained infections, anemia, pale skin, weight loss, pain in the bones and joints, increased susceptibility to bruising, and bleeding from the gums and nose. The local specialist referred Shahegh to MD Anderson to meet **Farhad Ravandi-Kashani, MD**, professor of Leukemia, who enrolled him in a Phase II study of all-trans retinoic acid (ATRA) and arsenic trioxide as a front-line therapy. The differentiation therapy causes the immature APL cells to "grow up" and stop multiplying, making it easier for other agents, in this case arsenic trioxide, to bring about intended cell death. Test results found no evidence of disease after the first of five cycles. Shahegh completed the remaining regimen under the care of his Arkansas physician. His treatment ended in June 2015, with several bone marrow aspirations to follow as surveillance. "We expect him to be one of the 'cured' patients," said Ravandi-Kashani.

Academic Departments

Lymphoma/Myeloma



Robert Orlowski, MD, PhD
Ad interim Chair



Jorge Romaguera, MD
Deputy Chair



Randy Vidrine, MS
Ad interim Medicine Department Administrator

Clinical faculty:

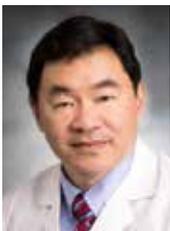
Fernando Cabanillas, MD
Michelle Fanale, MD
Luis Fayad, MD
Nathan Fowler, MD
Fredrick Hagemester, MD
Hun Ju Lee, MD
Elisabet Manasanch, MD
Loretta Nastoupil, MD
Sattva Neelapu, MD
Yasuhiro Oki, MD
Robert Orlowski, MD, PhD
Nahum Puebla-Osorio, PhD
Shirley Riggs, MD
Alma Rodriguez, MD
Jorge Romaguera, MD
Felipe Samaniego, MD, MPH

Jatin Shah, MD
Sheeba Thomas, MD
Francesco Turturro, MD
Michael Wang, MD
Donna Weber, MD
Jason Westin, MD

Research faculty:

Soung-Chul Cha, PhD
Fuliang Chu, PhD
R. Eric Davis, MD
Richard Jones, PhD
Hans Chulhee Lee, MD
Rohit Mathur, PhD
Jinsheng Weng, MD, PhD
Jing Yang, PhD
Liang Zhang, MD, PhD

Melanoma Medical Oncology



Patrick Hwu, MD
Chair



Michael Davies, MD, PhD
Deputy Chair



Randy Vidrine, MS
Medicine Department Administrator

Clinical faculty:

Rodabe Amaria, MD
Michael Davies, MD, PhD
Adi Diab, MD
Isabella Glitza Oliva, MD, PhD
Patrick Hwu, MD
Wen-Jen Hwu, MD, PhD
Sapna Patel, MD
Hussein Tawbi, MD, PhD
Cassian Yee, MD

Research faculty:

Chantale Bernatchez, PhD
Chandrani Chattopadhyay, PhD
Guo Chen, PhD
Suhendan Ekmekcioglu, PhD
Elizabeth Grimm, PhD
Yared Haillemichael, PhD
Cara Haymaker, PhD
Sun-Hee Kim, PhD
Kyung-Mi Lee, PhD
Gregory Lizee, PhD
Ying Ma, PhD
Willem Overwijk, PhD
Weiyi Peng, MD, PhD
Jason Roszik, PhD, MBA
Manisha Singh, PhD
Amjad Talukder, PhD
Scott Woodman, MD, PhD
Vashisht Yennu Nanda, PhD

Neuro-Oncology



John DeGroot, MD
*Ad Interim Chair
Clinical Research Director,
Fellowship Director*



Juan Fueyo-Margareto, MD
*Chief, Section of
Experimental Neuro-
Oncology*



Sudhakar Tummala, MD
*Chief, Section of
Neurophysiology*



Jeffrey Wefel, PhD
*Chief, Section of
Neuropsychology*



Ben Anderson, MHA, MBA
*Medicine Department
Administrator*

Clinical faculty:

Mariana Bradshaw, PhD
Merry Chen, MD
John de Groot, MD
Carlos Kamiya Matsuoka, MD
Shelli Kesler, PhD
Monica Loghin, MD
Kyle Noll, PhD
Barbara O'Brien, MD
Marta Penas-Prado, MD
Jennie Rexer, PhD
John Slopis, MD, MPH
Sudhakar Tummala, MD
Shiao-Pei Weathers, MD
Jeffrey Wefel, PhD
Karin Woodman, MD
W.K. Alfred Yung, MD

Research faculty:

Juan Fueyo-Margareto, MD
Candelaria Gomez-Manzano, MD
Mohammad Hossain, PhD
Hong Jiang, PhD
Dimpy Koul, PhD
Zhimin Lu, MD, PhD
Yan Xia, PhD
Yanhua Zheng, PhD

“To all of you at MD Anderson, I want to say thank you. Without you, I may not have been here this holiday season. I am in awe of how you all work together to get it done. There are so many patients there ... but you still took the time to make me feel like I was the only one there. That is a rare thing nowadays! Excellent job, you guys.”

La Shunda Minix,
*Lymphoma
Survivor*



In October 2014, La Shunda Minix was still in the throes of celebrating two great beginnings — she was a new assistant principal at a middle school in Marshall, Texas, and she was four months pregnant with her first child. Unfortunately, that excitement was soon replaced with concern after she began to experience a severe shortness of breath that compelled her to call out to her husband to help her out of the shower. A trip to the emergency room led to a CT scan that showed a mass covering half of her right and left lungs and her heart. The diagnosis was non-Hodgkin lymphoma, and she was airlifted to MD Anderson, where her disease was further categorized as diffuse large B cell lymphoma with primary mediastinal designation. **Jason Westin, MD**, assistant professor of Lymphoma/Myeloma, said NHL rarely presents during pregnancy and that Minix's subtype only accounts for about 2.5% of patients. He worked with a fetal maternal specialist at Texas Children's Hospital to care for Minix, and prescribed a regimen of rituximab with cyclophosphamide, doxorubicin, vincristine, and prednisone, known as R-CHOP, to be given once every three weeks. The pregnancy made her ineligible for the preferred treatment, called R-EPOCH, a five-day dose of rituximab with etoposide, prednisone, vincristine cyclophosphamide, and doxorubicin. When the baby's growth slowed down before what would have been the sixth and final treatment, the obstetrician induced early. Chemotherapy and radiation followed, and today, both mother and baby Denim Minix are thriving. He's enjoyed going to a Dallas Cowboys game and has been hugged and kissed by all the people who prayed for him. "A lady at my church told me that I look nothing like what I've been through. I'm grateful for that," Minix said. On Sept. 22, 2015, she was informed that follow-up tests found no evidence of disease.

Academic Departments

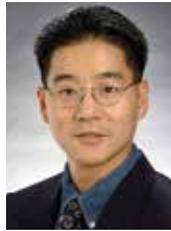
Palliative, Rehabilitation & Integrative Medicine (PRIM)



Eduardo Bruera, MD
Chair



Suresh Reddy, MD
Section Chief



Ki Shin, MD
Section Chief



Natalie Schuren, RN, MSN, NE-BC
Director

Clinical faculty:

Joseph Arthur, MBChB
Ashan Azhar, MD
Eduardo Bruera, MD
Cindy Carmack, PhD
Shalini Dalal, MD
Maxine De La Cruz, MD
Marvin Delgado Guay, MD
Rony Dev, DO
Daniel Epner, MD
Jack Fu, MD
Ying Guo, MD
Ekta Gupta, MD
Ali Haider, MBBS
David Hui, MD
Gabriel Lopez, MD
Kevin Madden, MD
Amy Ng, MD
An Ngo-Huang, DO
Akhila Reddy, MD

Suresh Reddy, MD
Ki Shin, MD
Kimberson Tanco, MD
Jegy Tennison, MD
Marieberta Vidal, MD
Paul Walker, MD
Angelique Wong, MD
Rajesh Yadav, MD
Sriram Yennu, MD
Donna Zhukovsky, MD

Research faculty:

Alejandro Chaoul, PhD
Lorenzo Cohen, PhD
Mary Kay Garcia, DrPH
Kathrin Milbury, PhD
Sarah Prinsloo, PhD
Peiyang Yang, PhD

Sarcoma Medical Oncology



Patrick Hwu, MD
Chair



Shreyaskuma Patel, MD
Deputy Chair



Randy Vidrine, MS
Medicine Department Administrator

Clinical faculty:

Dejka Araujo, MD
Robert Benjamin, MD
Anthony Conley, MD
Patrick Hwu, MD
Joseph Ludwig, MD
Shreyaskumar Patel, MD
Ravin Ratan, MD
Vinod Ravi, MD
Neeta Somaiah, MD
Saroj Vadhan-Raj, MD
Maria Alejandra Zarzour, MD

Stem Cell Transplantation & Cellular Therapy (SCT/CT)



Richard Champlin, MD
Chair



Elizabeth Shpall, MD
Deputy Chair



Jeffrey Mollndrem, MD
Section Chief, Transplantation Immunology



Kent Walters, FACHE, CMPE
Medicine Department Administrator

Clinical faculty:

Sairah Ahmed, MD
Gheath Alatrash, DO, PhD
Amin Alousi, MD
Paolo Anderlini, MD
Borje Andersson, MD, PhD
Qaiser Bashir, MD
Richard Champlin, MD
Stefan Ciurea, MD
Chitra Hosing, MD
Roy Jones, MD, PhD
Partow Kebriaei, MD
Issa Khouri, MD
Martin Korbling, MD
David Marin, MD
Ian McNiece, PhD
Jeffrey Mollndrem, MD
Yago Nieto, MD, PhD
Amanda Olson, MD
Betul Oran, MD
Simrit Parmar, MD
Krina Patel, MD
Uday Papat, MD
Muzaffar Qazilbash, MD
Katy Rezvani, MD, PhD
Nina Shah, MD
Elizabeth Shpall, MD

Research faculty:

Jonathan E Brammer, MD
Karen Dwyer, PhD
Haven R Garber, MD
Jin Seon Im, MD
Sijie Lu, PhD
Qing Ma, PhD
Gabriela Rondon, MD
Rima Saliba, PhD
Benigno Valdez, PhD
Eric Yvon, PhD

SCT/CT Clinical Labs



Elizabeth Shpall, MD
Director, CTL and CBB



Katy Rezvani, MD, PhD
Medical Director,
GMP and CTL facilities



Chitra Hosing, MD
Associate Medical
Director, CBB



Suzanne Dworsky, MBA
Administrative Director,
SCT/CT Clinical Labs

The SCT/CT department is also involved in clinical trials evaluating the benefit of novel immunotherapies and cellular therapeutic approaches to treat cancer patients. All cellular products for stem cell transplantation and immunotherapies are manufactured in the Cell Therapy Laboratory (CTL) following Good Tissue Practice (GTP) for products requiring minimal manipulation and Good Manufacturing Practice (GMP) procedures for products that require more than minimal manipulation. The CTL supports both the adult and pediatric Stem Cell Transplantation

programs. The CTL is accredited by CAP, CLIA and FACT. The SCT/CT Clinical Labs consist of the Core Laboratory and the GMP facility with support areas including a Flow Cytometry Laboratory, Quality Control Laboratory, and Quality Assurance team located on the 14th floor of the Lutheran Pavilion. The Cord Blood Bank is also part of the SCT/CT Clinical Labs. The CTL has two main areas:

Core Laboratory (Non-classified air): Processing of primarily standard of care cellular products that require minimal manipulation is performed in the Core Laboratory following GTPs as described in 21CFR Part 1271. The laboratory consists of 10 bays equipped for standard processing of stem cell grafts. Activities in the Core Laboratory include:

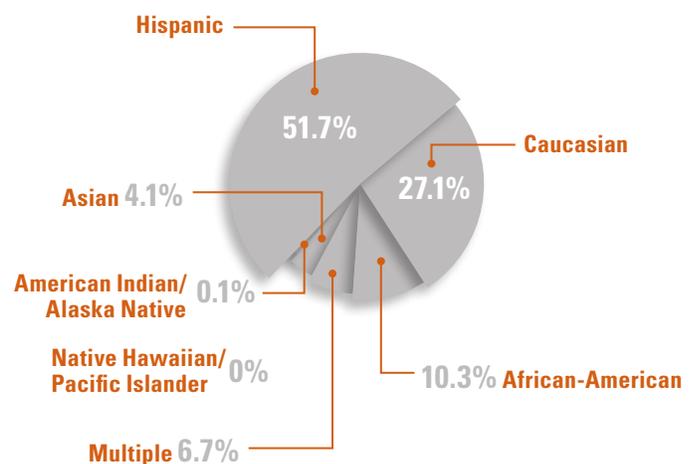
- Performance/monitoring quality assessment – cell counts, immunophenotyping, and sterility
- Preparation of components – red blood cell and plasma depletion, total nuclear cell concentration (buffy coat), and mononuclear cell concentration
- Cryopreservation and storage
- Thawing, washing, and preparation for infusion
- Depletion of specific sub-population of cells
- Enrichment of hematopoietic progenitor cells

GMP Facility (Class 10,000): The GMP Facility consists of 11 clean rooms that meet the ISO-Class 7 (ISO 14644) standards. The airflow in three clean room suites is negative pressure and in seven suites is positive pressure. The GMP Facility has air conditioning delivered through HEPA filters 24 hours/day; its power supply and separate air handlers are connected to an emergency generator located in-house. The GMP Facility supports more than 40 complex clinical research protocols across multiple departments and divisions and external customers. Activities in the GMP Facility include:

- Performance/monitoring quality assessment – cell counts, immunophenotyping, sterility, viability, endotoxin and colony forming unit (CFU) assays
- Culture of specific cell populations
- Cryopreservation and storage
- Thawing, preparation for infusion
- Isolation of subpopulation of cells
- Manufacturing of specific reagents including liposomes, and peptides

Cord Blood Bank

The MD Anderson Cord Blood Bank (CBB) began collecting units in 2005 and is now the fastest growing program in the nation. We currently have more than 24,500 clinical units banked that are available through the National Marrow Donor Program (NMDP) and are adding approximately 250 clinical units to our inventory every month. Our affiliation with four area hospitals and one out-of-state hospital has allowed us to access and bank a diverse population of minority cord blood units. The MD Anderson CBB was one of the first cord blood banks contracted to be a National Cord Blood Bank by Health Resources and Services Administration (HRSA) in 2007 and, due to continued high performance, our contract has been extended through 2020. Through the HRSA contracts, our bank has listed more than 15,000 units with the National Cord Blood Inventory (NCBI), of which more than 80% were minority units. As of December 2015, the MD Anderson CBB has provided almost 1,500 cord blood units for transplant to transplant centers worldwide including MD Anderson. We have also provided thousands of non-clinical units to MD Anderson researchers in support of numerous research efforts.



Academic Departments

Thoracic/Head & Neck Medical Oncology



John Heymach, MD, PhD
Chair



Bonnie Glisson, MD
Associate Chair



Faye Johnson, MD, PhD
Co-Chief, Head and Neck
Section



William William, Jr., MD
Co-Chief, Head and
Neck Section



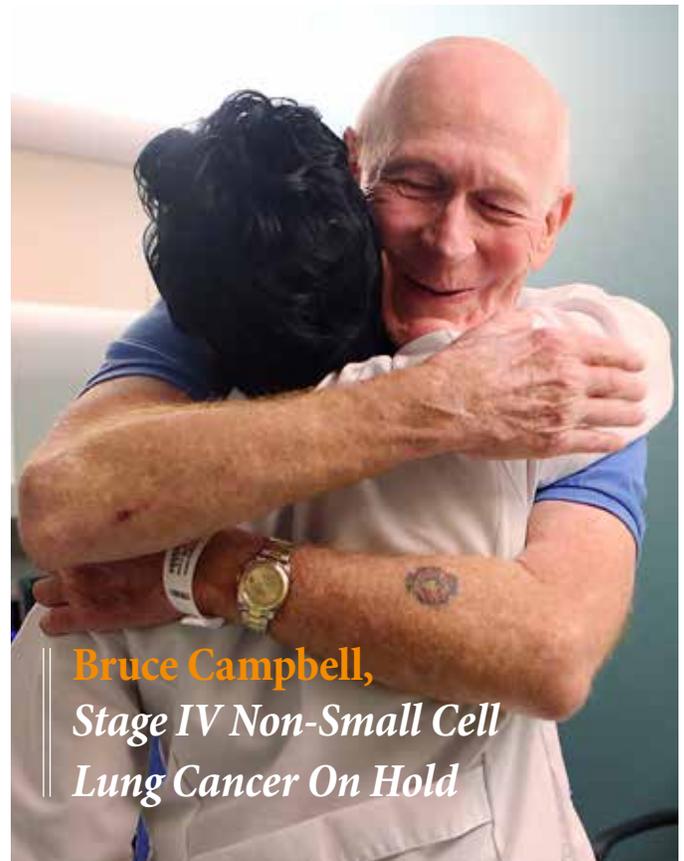
Sheryl Vick, MPH
Medicine Department
Administrator

Clinical faculty:

George Blumenschein, MD
Lauren Byers, MD
Renata Ferrarotto, MD
Frank Fossella, MD
Don Gibbons, MD, PhD
Bonnie Glisson, MD
John Heymach, MD, PhD
Faye Johnson, MD, PhD
Merrill Kies, MD
Jonathan Kurie, MD
Xi Liu, PhD
Charles Lu, MD
Erminia Massarelli, MD, PhD
Vassiliki Papadimitrakopoulou, MD
Katherine Pisters, MD
George Simon, MD
Ferdinandos Skoulidis, MD, PhD
Anne Tsao, MD
William William, Jr., MD
Jianjun Zhang, MD, PhD

Research faculty:

Carmen Behrens, MD
Limo Chen, PhD
Ethan Dmitrovsky, MD
Waun Ki Hong, MD
Samrat Kundu, PhD
Hai Tran, PharmD
Dianren Xia, PhD



Bruce Campbell,
*Stage IV Non-Small Cell
Lung Cancer On Hold*

Mayra Beltran/©Houston Chronicle. Used with permission.

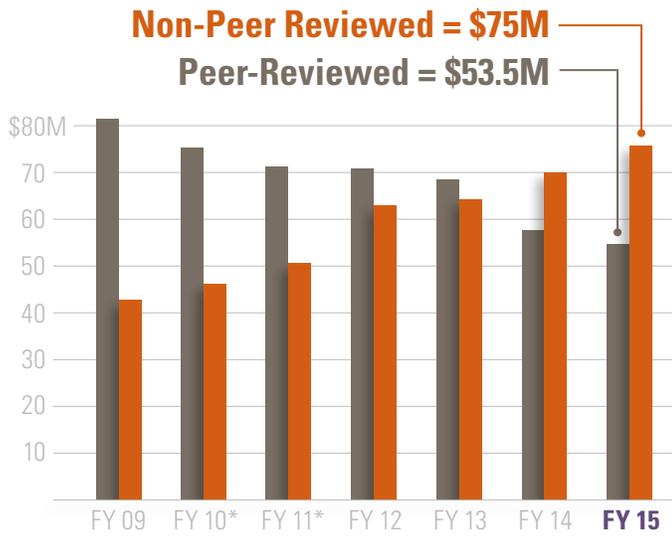
Bruce Campbell enjoys giving hugs to clinical team members who are helping him stop stage IV non-small cell lung cancer (NSCLC) from progressing. In the fall of 2013, the now 81-year-old retired engineer and former Navy captain was ready to end treatment for tumors in both lungs after enduring two years of chemotherapy that he said, “felt like the work of the devil.” **John Heymach, MD, PhD**, chair of Thoracic/Head and Neck Medical Oncology, convinced him to try an immunotherapy trial to treat NSCLC in patients whose tumors expressed PDL1 and worsened after platinum-based therapy. Campbell, who lives in Amarillo, Texas, gave it a shot and began infusions of PD1, now known as pembrolizumab. The drug blocks an immune checkpoint that stops the body’s T cells from attacking the cancer, releasing the brakes on an anti-tumor immune arsenal. After six months, Campbell’s scans showed 69% tumor shrinkage compared to the start of the trial. Today, he has stable disease, with no symptoms of the lung cancer that was found through a government program that monitors the health of former nuclear workers. During his career, Campbell worked with radioactive materials including plutonium and highly enriched uranium, today acknowledged as carcinogens. Interestingly, he is receiving radiation therapy for residual disease while enjoying things like seeing a grandchild graduate from high school and meeting Jim Allison, PhD, chair of Immunology, the researcher whose work led to his treatment.

“*Doctor, you are a LIFE SAVER. Thank you so much. It must be an amazing feeling to be in a profession where you truly are saving lives! My family thanks you from the bottom of our hearts.*”

Research

Research Report Card

Total FY15 = \$128.5M



FY15 includes 66 R01s, 10 DoDs, and 17 R21s. FY10 and FY12 include American Recovery and Reinvestment Act (ARRA) grants.

Source: Essbase and Hyperion

Recent Cancer Prevention and Research Institute of Texas (CPRIT) grants include one Core Facility Support Award (CFSA) (~\$6M) and 10 Individual Investigator Research Awards (IIRAs) (totaling ~\$10.6M).

CFSA:

- **Funda Meric-Bernstam, MD**, Investigative Cancer Therapeutics
"Precision Oncology Decision Support Core"

IIRAs:

- **Robert Bast, MD**, Experimental Therapeutics
"Early Detection of Ovarian Cancer with Tumor Associated Proteins and Autoantibodies"
- **Michael Davies, MD**, Melanoma Medical Oncology
"Exploiting Molecular and Metabolic Dependencies to Optimize Personalized Therapeutic Approaches for Melanomas"
- **Giulio Draetta, MD**, Genomic Medicine
"Identifying New Epigenetic Vulnerabilities in Pancreatic Cancer"
- **Gary Gallick, PhD**, Genitourinary Medical Oncology
"Mechanisms of de novo and Acquired Resistance to Therapeutic Treatment of Bone-metastatic Prostate Cancer"
- **Don Gibbons, MD, PhD**, Thoracic/Head & Neck Medical Oncology
"Tumor Cell Epithelial-Mesenchymal Transition in Regulating Immunosuppression and Metastasis in Lung Cancer"
- **Marina Konopleva, MD, PhD**, Leukemia
"Defining and Treating Targetable Lesions in AYA Acute Lymphoblastic Leukemia"
- **Sattva Neelapu, MD**, Lymphoma/Myeloma
"T cell Activating Immunotherapy for Indolent B cell Malignancies"
- **Simrit Parmar, MD**, Stem Cell Transplantation & Cellular Therapy
"Clinical Safety and Efficacy of Third Party, Fucosylated, Cord Blood Derived Regulatory T cells to Prevent Graft versus Host Disease"
- **Imad Shureiqi, MD**, Gastrointestinal Medical Oncology
"Mechanisms of DHA and EPA Differential Effects on Colon Cancer Chemoprevention"
- **Michael Wang, MD**, Lymphoma/Myeloma
"An Adaptive Personalized Clinical Trial using a Patient-Derived Xenograft Strategy to Overcome Ibrutinib Resistance in Mantle Cell Lymphoma"

Active peer-reviewed funding received from the **National Institutes of Health (NIH)**—primarily from the **National Cancer Institute (NCI)**—includes:

Newly Funded R01s:

- **Kapil Bhalla, MD**, Leukemia
"Novel Targeted Therapy for AML"
- **Ethan Dmitrovsky, MD**, Thoracic/Head & Neck Medical Oncology
"Targeting Anaphase Catastrophe to Combat Lung Cancer"
- **Katherine Gold, MD**, and **John Heymach, MD, PhD**, Thoracic/Head & Neck Medical Oncology (multiple Principal Investigators (PIs) with Bingliang Fang, MD, Thoracic & Cardiovascular Surgery)
"Overcoming Resistance to Anti-EGFR Therapy by Drug Repurposing"
- **Manal Hassan, MD, PhD**, Gastrointestinal Medical Oncology
"Genome-wide Association Study (GWAS) in Hepatocellular Carcinoma (HCC)"
- **John Heymach, MD, PhD**, Thoracic/Head & Neck Medical Oncology (multiple PIs with Peter Hammerman, MD, PhD, Dana Farber Cancer Institute)
"Therapeutic Approaches for LKB-1 Deficient NSCLC"
- **Marina Konopleva, MD, PhD**, Leukemia
"Therapeutic Targeting of Glutamine Metabolism in MDS"
- **Scott Kopetz, MD, PhD**, Gastrointestinal Medical Oncology
"Tumor Heterogeneity and Acquired Resistance to EGFR Inhibition"
- **Zhimin Lu, MD, PhD**, Neuro-Oncology
"Deciphering the Role of CDC25A in Cancer Metabolism"
- **Robert Orłowski, MD, PhD**, Lymphoma/Myeloma
"Proteasome Assembly Chaperones in Sensitivity and Resistance to Proteasome Inhibitors"
"Role of TJP1 in Sensitivity and Resistance to Proteasome Inhibitors in Myeloma"
- **Imad Shureiqi, MD**, Gastrointestinal Medical Oncology
"15-LOX-1 Modulation of Colon Cancer Promotion by Linoleic Acid"
- **Jing Yang, PhD**, Lymphoma/Myeloma
"Role of Integrin VLA-6 in Suppression of Bone Formation in Myeloma"
"Targeting Adipocyte-secreted Chemerin for Chemotherapy Resistance in Myeloma"

SPOREs:

- **Brain Cancer**
Frederick Lang, Jr., MD, Neurosurgery; and **Juan Fueyo-Margareto, MD**, Neuro-Oncology
- **Leukemia**
Hagop Kantarjian, MD, Leukemia
- **Myeloma SPORE**
Robert Orłowski, MD, PhD, Lymphoma/Myeloma
- **Ovarian Cancer SPORE**
Robert Bast, Jr., MD, Experimental Therapeutics, and **David Gershenson, MD**, Gynecologic Oncology and Reproductive Medicine

P01s:

- **"Therapy of Chronic Myeloid Leukemia"**
Richard Champlin, MD, Stem Cell Transplantation & Cellular Therapy
- **"Improving Cord Blood Transplantation"**
Elizabeth Shpall, MD, Stem Cell Transplantation & Cellular Therapy

Research Clinical Trials

We are working hard to streamline clinical trial activations that will help us to improve patient care, to give them the best opportunity for care today, but even better care tomorrow. It takes a lot of clinical research to test the most novel and potent therapies to change clinical practice toward more desirable patient outcomes.

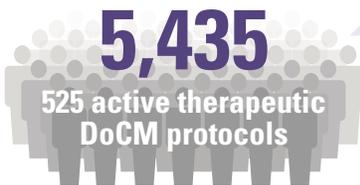
Our goal is to help patients.

One institutional initiative focused on reducing industry-sponsored protocol activation timelines is the Fast-track Informed Consent Document (ICD)

initiative, developed through the Office of the Vice Provost, Clinical and Interdisciplinary Research, which has been piloted in Leukemia, Lymphoma/Myeloma, ICT, THNMO, and Melanoma. This program provides direct negotiations with sponsors by ICD editors as well as access to expedited biostatistical reviews. The median time from Clinical Research Committee submission to activation for studies that are included in this program is 106.5 days.

Other ongoing initiatives include transitioning to parallel, rather than linear, processes for budget and contract negotiations, and sharing best practices and learning from the success of others.

Total patients registered on therapeutic clinical trials =

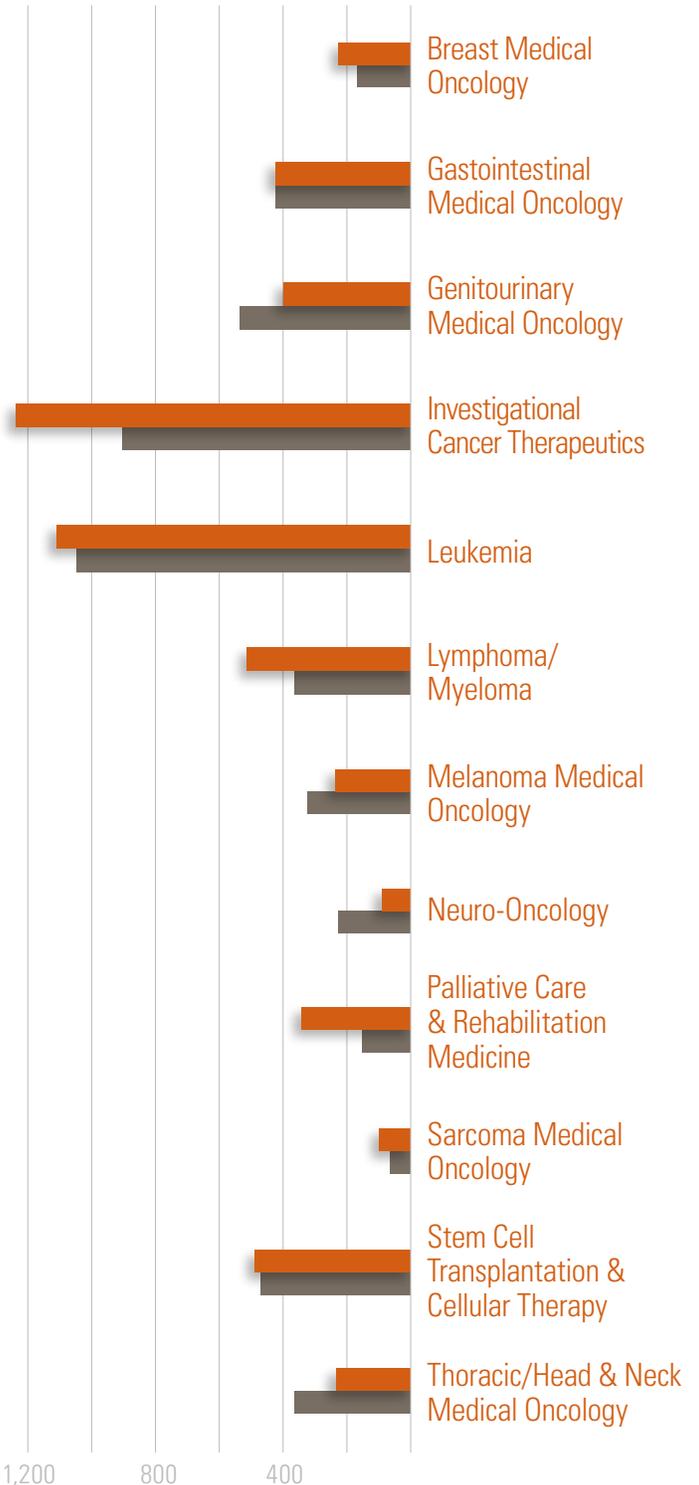


7%
increase
from FY14

FY15 data

FY15 Therapeutic Clinical Trial Registrations by Department

2015 2014



Source: FY15 OPR Patient and Protocol Statistics (Blue Sheet)

Large Strategic Agreements

Several Alliance Agreements are currently under negotiation for multiple trials to be conducted in BMO, ICT, THNMO, and Neuro-Oncology; other proposals are in development across multiple departments for studies targeting rare tumors.

Our goal is to increase access to novel agents for our patients.

Working with Ferran Prat, PhD, JD, the institution’s Vice President of Strategic Industry Ventures (SIV), we’ve successfully negotiated large strategic alliance agreements with companies that provide one contract and one budget to cover multiple trials.

Vetting and selecting studies to go forward is accomplished through a Joint Steering Committee, which is comprised of MD Anderson clinical investigators and industry partner scientists. **Everyone is unified and working together** to move these alliance trials from development for activation to completion faster, and to bring more novel drugs to our patients.



Ferran Prat, PhD, JD, negotiates alliance agreements for the institution.

Executed Alliance Agreements

Industry Partner	Clinical Departments	Deliverables
BMS	Leukemia	10 clinical trials
Cellectis	Leukemia, Lymphoma/Myeloma	4 clinical trials, preclinical work
Merck	Gastrointestinal (GI) Medical Oncology	Multiple clinical trials
Idera	Melanoma Medical Oncology	4 clinical trials
Nektar	Melanoma Medical Oncology	1 preclinical agreement, 1 clinical agreement for multiple clinical trials
Medimmune	Melanoma, Sarcoma, GI Medical Oncology	At least 6 clinical trials

Several groups are now meeting regularly to discuss concepts that would be appropriate for large alliances. If the opportunity exists to form an alliance, our investigators work with Prat and others in the SIV office to negotiate the terms; if not, investigators can still utilize an investigator-initiated approach to pursue funding. These alliances can only happen if we’re unified in our goals. We don’t want to simply have numerous trials and alliances. **We want to make a huge impact for patients. This initiative is just one of the approaches we’re taking toward that goal.**

Research Moon Shots

During FY15, the six new moon shots announced in FY14 hit the ground running as flagship projects and translational goals took shape. Additionally, rapid progress toward therapeutic endpoints continued to be made in the original six moon shots. DoCM faculty have been instrumental in advancing basic scientific discoveries in all 12 programs. Central themes connecting these innovative efforts include strategies to overcome therapy resistance, development of cellular and immunotherapies, combining novel agents in the clinic, and personalizing treatment to fit the needs of individual patients.

Acute Myeloid Leukemia/Myelodysplastic Syndrome

Leaders: **Guillermo Garcia-Manero, MD**, professor of Leukemia, and **Hagop Kantarjian, MD**, chair of Leukemia
The primary goal of the AML/MDS

Moon Shot is to rapidly develop new compounds that can cure or change the course of these malignancies. The first of two flagships focuses on **overcoming resistance to hypomethylating agents (HMAs)** through exhaustive analysis of cell lines and mouse models, and collaboration with the APOLLO platform to genomically annotate as many AML/MDS cases as possible. The second flagship involves cellular immunotherapies, including the **development of methods to rapidly expand natural killer cell populations** *ex vivo* for use as mediators of graft vs. tumor response in bone marrow stem cell transplants.

B Cell Lymphoma

Leaders: **Michael Wang, MD**, professor of Lymphoma/Myeloma, and **Richard Champlin, MD**, chair of Stem Cell Transplantation and Cellular Therapy

The goal of the B Cell Lymphoma Moon Shot is to **double the 30% cure rate in five years**. The targeted therapy flagship is working to overcome ibrutinib resistance by studying preclinical mouse models and testing novel therapy combinations in clinical trials. One effort from the cellular therapy flagship seeks to optimize CAR T and NK cells to target malignant B cells. Members of the immunotherapy flagship are working to quantify the anti-tumor T cell effector response using gene signatures as a proxy for likelihood of response to immunotherapy. This effort aims to guide personalized therapy and predict outcomes.

Breast and Ovarian Cancers

Leaders: Gordon Mills, MD, PhD, chair of Systems Biology; Anil Sood, MD, professor of Gynecological Oncology and Reproductive Medicine; Mien-Chie Hung, PhD, chair of Molecular and Cellular Oncology; and **Debasish Tripathy, MD**, chair of Breast Medical Oncology

Efforts in the Breast and Ovarian Cancer Moon Shot aim to **improve testing for and treatment of BRCA1/2 defective breast cancers and high grade serous ovarian cancer**. New web-based tools are being developed to offer universal genetic testing for BRCA1/2 deficiency. Trials combining PARP inhibitors and other targeted therapies against PI3K, mTORC1/2, and AKT seek to implement synthetic lethal targeting of tumor cells defective in homologous recombination due to BRCA mutation. Efforts continue to identify resistance mechanisms and improve methods for prioritizing chemotherapy or surgery using a novel scoring mechanism, with trials planned for ovarian tumors deemed unresectable. Patient-derived xenograft models and cell lines are in development to characterize tumor subtypes.

Chronic Lymphocytic Leukemia

Leaders: **Michael Keating, MD**, professor of Leukemia, and **William Plunkett, PhD**, professor of Experimental Therapeutics

The CLL Moon Shot is committed to **developing, improving, and understanding treatment options** for those suffering from this malignancy. Studies to determine the therapeutic mechanism of ibrutinib activity suggest that this agent stifles B cell receptor signaling and removes CLL cells from the tumor microenvironment, leading to massive cell death and remission. Immunotherapies are being developed against PD1 and PDL1 for CLL, and clinical trials combining ibrutinib and nivolumab are planned. Further, therapies such as urelumab and lirilumab have been designed to boost NK cell activity in synergy with rituximab, and are currently in trials. Retrospective analyses are shedding light on trends between CLL and additional malignancies.

Colorectal Cancer

Leaders: **Scott Kopetz, MD, PhD**, associate professor of Gastrointestinal Medical Oncology; Stanley Hamilton, MD, division head of Pathology/Lab Medicine; Ernest Hawk, MD, MPH, vice president of Cancer Prevention

Flagship 1 of the Colorectal Cancer (CRC) Moon Shot centers on early detection and prevention, using biomarker discovery/validation to **develop blood-based assays for detection of CR neoplasia**. The second flagship is deeply characterizing premalignant/malignant genome atlases to identify consensus molecular subtypes of CR adenomas and carcinomas; PDX models will be used to evaluate therapeutic vulnerabilities in these subtypes. The immunotherapy flagship has developed a personalized antigen identification pipeline to **generate patient-specific immunotherapies**, including adoptively transferred T cells and peptide vaccines, for metastatic CRC patients. Also under investigation are neoadjuvant immunotherapy trials in CRC with liver metastases.

Glioblastoma

Leaders: Amy Heimberger, MD, professor of Neurosurgery; Frederick Lang, Jr., MD, professor of Neurosurgery; **John de Groot, MD**, chair *ad interim* of Neuro-Oncology

In the Glioblastoma Moon Shot, the immunotherapy flagship is developing antigen-specific chimeric antigen receptor (CAR) T cells to **target mechanisms of tumor-mediated immune suppression**, and exploring checkpoint inhibition with anti-PD1/anti-CTLA4 antibodies. The biological therapeutics flagship is studying and optimizing the oncolytic adenoviruses Delta-24-RGD and Delta-24-RGD^{OX} in clinical trials to improve immune stimulation in the glioblastoma tumor microenvironment. The drug development and selection flagship is performing high-throughput drug screening with *in vivo* validation to identify new agents with anti-glioblastoma activity, translating several previously identified agents into clinical trials, and molecularly profiling glioblastoma patients to identify biomarkers of disease.

High-risk Multiple Myeloma

Leaders: **Robert Orlowski, MD, PhD**, chair *ad interim* of Lymphoma/Myeloma; Donald Berry, PhD, professor of Biostatistics; **Richard Eric Davis, MD**, associate professor of Lymphoma/Myeloma

The High-risk Multiple Myeloma (MM) Moon Shot aims to **decrease risk of disease progression by 50% and to double PFS** in high-risk MM patients after stem cell transplant. The immunotherapy flagship is studying the ability of CD38- and PD1-targeting antibodies to prevent progression to symptomatic disease from precursor MGUS and high-risk smoldering MM through clinical trials and correlative studies. Flagship 2 is **investigating the ability of cord blood-derived natural killer cells to destroy MM cells** in a Phase I study of high-risk patients undergoing transplantation. Efforts are also underway to identify genetic and cell surface markers of aggressive MM phenotypes, with the goal of developing corresponding new therapies.

HPV-related Cancers

Leaders: Erich M. Sturgis, MD, MPH, professor of Head and Neck Surgery; **Cathy Eng, MD**, professor of Gastrointestinal Medical Oncology; Lois Ramondetta, MD, professor of Gynecologic Oncology and Reproductive Medicine; Kathleen Schmeler, MD, associate professor of Gynecologic Oncology and Reproductive Medicine

The HPV-related Cancers Moon Shot seeks to **employ vaccination and novel screening to prevent malignancies**, and to reduce patient suffering through development of innovative therapies. The prevention/screening flagship is working to increase HPV vaccination rates in Texas and to improve cervical cancer screening in underserved populations. The discovery flagship aims to **identify genes altered in HPV-driven cancer progression and therapy resistance** to guide development of new therapies, and to test promising drug combinations in mouse models. In the immunotherapy/novel trials flagship, trials are planned or underway for HPV E6/E7 peptide vaccines and immunomodulating agents, as well as for anogenital and other rare cancers.

Lung Cancer

Leaders: **John Heymach, MD, PhD**, chair of Thoracic/Head and Neck Medical Oncology; Stephen Swisher, MD, head of the Division of Surgery; and Jack Roth, MD, professor of Thoracic and Cardiovascular Surgery

The driving force behind innovative treatments in the Lung Cancer Moon Shot is the Genomic Marker-Guided Therapy Initiative (GEMINI), which captures deep molecular profiles for all enrolled patients to instruct drug discovery and **identify actionable mutations that lead to lung cancer**. Results from these efforts have helped determine that KRAS-mutated lung cancer consistently divides into three subgroups based on the presence of specific mutations that co-occur with KRAS: TP53, STK11/LKB1, and CDKN2A/B. Work on the epithelial-to-mesenchymal transition (EMT) has shown that the microRNA200-Zeb1 regulatory axis promotes immune suppression in the lung tumor microenvironment by upregulating PDL1 on tumor cells, opening the door for immunotherapy approaches.

Melanoma

Leaders: Jeffrey Gershenwald, MD, professor of Surgical Oncology, and **Michael Davies, MD, PhD**, associate professor of Melanoma Medical Oncology

The personalized disease management flagship project of the Melanoma Moon Shot has developed **an algorithm that generates the predicted total mutation load** for a given sample using the sequences of only about 200 genes; calculated mutation loads correlate well with clinical immunotherapy outcomes. Additionally, samples from melanoma patients treated with ipilimumab, then anti-PD1 treatment upon progression, are being molecularly profiled to determine why some progress and others do not. Immune infiltrate in early on-treatment biopsy seems to correlate with response. The prevention flagship has developed the Sunbeatables™ educational program for young school children and ultraviolet photography to discourage tanning behavior in teenagers.

Pancreatic Cancer

Leaders: **Robert Wolff, MD**, professor of Gastrointestinal Medical Oncology and deputy division head for clinical and educational affairs; Anirban Maitra, MBBS, professor of Pathology and scientific director of the Ahmed Center for Pancreatic Cancer Research; and Jason Fleming, MD, professor of Surgical Oncology

Efforts in the pre-operative program within the Pancreatic Cancer Moon Shot aim to **deliver therapy to all patients with resectable disease** and leverage their tissues to determine clinical mechanisms. Genetic material within exosomes shed from pancreatic tumors is being used to determine disease stage, track therapy response, and more. Markers for detection of pre-neoplastic pancreatic lesions are under investigation, and a high-risk clinic is being organized. A personalized immunotherapy pipeline is being developed in which highly expressed mutated peptides from a patient's tumor are identified by mass spectrometry and T cells are generated in the lab or *in vivo* via administration of a peptide vaccine to react against the tumor.

Prostate Cancer

Leaders: **Christopher Logothetis, MD**, chair of Genitourinary Medical Oncology; Timothy Thompson, PhD, professor of Genitourinary Medical Oncology

The Prostate Cancer Moon Shot aims to **reduce mortality in patients with advanced prostate cancer by 30% and triple PFS** of patients with treatment-refractory disease. A Phase II clinical trial combining abiraterone and enzalutamide, which target the androgen receptor-testosterone pathway and thwart resistance mechanisms when combined, aims to condense hormone therapy into a single curative regimen for patients with androgen-receptor driven, castrate-resistant cancer. As of April 2016, 195 eligible patients were enrolled in the 200-patient study. Preclinical work in prostate cancer cell lines and mouse models is investigating new therapy combinations for metastatic castrate-resistant cancer, including androgen-targeting agents and drugs limiting DNA damage repair.

The right drugs at the right time for the right patient: The MD Anderson precision oncology decision support platform.

– *Drug Discovery Today*, July 3, 2015

Vemurafenib in Multiple Nonmelanoma Cancers with BRAF V600 Mutations.

– *Drug Discovery Today*, July 3, 2015.

The Cancer Genome Atlas: Genomic classification of cutaneous melanoma.

– *Cell*, June 18, 2015

A critical role of autocrine sonic hedgehog signaling in human CD138+ myeloma cell survival and drug resistance.

– *Blood*, September 25, 2014

A Bim-targeting strategy overcomes adaptive bortezomib resistance in myeloma through a novel link between autophagy and apoptosis.

– *Blood*, October 23, 2014

Selective antitumor activity of ibrutinib in EGFR-mutant non-small cell lung cancer cells.

– *Journal of the National Cancer Institute*, September 10, 2014

From Protocols to Publications: A Study in Selective Reporting of Outcomes in Randomized Trials in Oncology.

– *Journal of Clinical Oncology*, August 24, 2015

Integrating Murine and Clinical Trials with Cabozantinib to Understand Roles of MET and VEGFR-2 as Targets for Growth Inhibition of Prostate Cancer.

– *Clinical Cancer Research*, August 15, 2015

Co-clinical assessment identifies patterns of BRAF inhibitor resistance in melanoma.

– *Journal of the National Cancer Institute*, April 11, 2015

A decision support framework for genomically informed investigational cancer therapy.

– *Journal of the National Cancer Institute*, April 11, 2015

3D tissue-engineered model of Ewing's sarcoma.

– *Advanced Drug Delivery Reviews*, December 15, 2014

Prolonged survival of a patient with metastatic leptomeningeal melanoma treated with BRAF inhibition-based therapy: a case report.

– *BMC Cancer*, May 13, 2015

Clinical characteristics, pathophysiology, and management of noncentral nervous system cancer-related cognitive impairment in adults.

– *CA: A Cancer Journal for Clinicians*, March 11, 2015

Rational Clinical Experiment: Assessing Prior Probability and Its Impact on the Success of Phase II Clinical Trials.

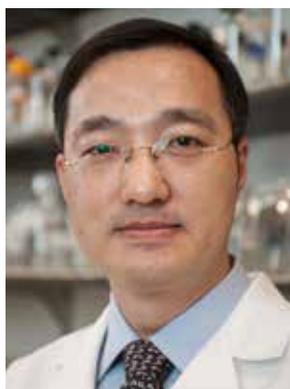
– *Journal of Clinical Investigation*, April 1, 2015

Research

Research Summaries

Translational Studies Solid Tumors

Jianjun Zhang, MD, PhD, Thoracic/Head and Neck Medical Oncology, and **Andrew Futreal, PhD**, Genomic Medicine, used multiregion whole-exome sequencing to assess intratumor heterogeneity of localized lung adenocarcinomas [*Science* 2014; 346(6206): 256–9]. In the 11 tumor samples analyzed, they found that a single biopsy sequenced at appropriate depth was sufficient to identify the majority of known cancer gene mutations in this subset of lung adenocarcinomas. Additionally, a larger proportion of heterogeneous mutations found only in some regions or one region of the primary tumor was associated with increased likelihood of relapse after surgery. This study revealed critical previously unstudied insights into genetic heterogeneity of lung cancer.



Zhimin Lu, MD, PhD, Neuro-Oncology, (pictured) unraveled a complex molecular mechanism that stabilizes the non-homologous end-joining (NHEJ) repair machinery responsible for fixing DNA double-strand breaks (DSBs) [*Nature Cell Biology* 2015; 17(9): 1158–68]. His work revealed a feedback loop by which a critical component of NHEJ, DNA-dependent protein kinase (DNA-PK), ensures stabilization of the NHEJ machinery at DSB sites by phosphorylating fumarate-producing enzyme, fumarase,

and recruiting it to a break site. Once there, fumarase generates fumarate, which inhibits de-methylation of histone H3, further recruiting DNA-PK and other DNA repair components to the break site. This process helps ensure repair of DSBs, thereby promoting cell survival.

Lu also discovered a regulation mechanism involving EGFR, which is aberrantly activated in numerous types of cancer [*Nature Cell Biology* 2015; 17(10): 1348–55]. He and his team determined that a secreted form of human macrophage migration inhibitory factor (MIF), modified with sugar O-linked β -N-acetylglucosamine, binds and inhibits signaling of EGFR, competing with its activating ligand, epidermal growth factor. In response, EGFR activation induces production of MMP13, a peptidase that degrades MIF, thereby ensuring continued signaling of EGFR. This work illustrates a critical mechanism tumors may employ to evade destruction and promote tumorigenesis.

Ferdinandos Skoulidis, MD, PhD, **John Heymach, MD, PhD**, and others from Thoracic/Head and Neck Medical Oncology and several other institutions, identified three subsets of KRAS-mutant lung adenocarcinoma based on genomic, transcriptomic, and proteomic data from early-stage and chemorefractory tissue samples [*Cancer Discovery* 2015; 5(8): 860–77]. The subsets were delineated by the presence of mutations found to co-occur with KRAS: 1) STK11/LKB1, 2) TP53, and 3) CDKN2A/B inactivation paired with low expression of NKX2-1. Each subset was also found to have unique characteristics regarding drug sensitivity, histology, and expression of immune markers. Identification of these biologically distinct subgroups will help improve treatment strategies and bring order to this phenotypically heterogeneous set of malignancies.



Andrea Viale, MD, (pictured) and **Giulio Draetta, MD, PhD**, Genomic Medicine, discovered a population of KRAS oncogene-ablation resistant tumor cells with cancer stem cell properties responsible for eventual relapse of pancreatic ductal adenocarcinoma (PDAC) [*Nature* 2014; 514(7524): 628–32]. The team used an inducible KRAS-mutant mouse model to demonstrate that, following pancreas-specific ablation of this oncogene, a subpopulation of oxidative phosphorylation (OXPHOS)-dependent

cells survived. These cells expressed genes involved in mitochondrial function, autophagy, and lysosome activity, and showed high sensitivity to OXPHOS inhibitors. This work illuminated the possibility of a novel approach for targeting oncogenic pathways in combination with OXPHOS to prevent PDAC relapse.

Xinhai Wan, PhD, and **Nora Navone, MD, PhD**, Genitourinary Medical Oncology, performed parallel preclinical and clinical studies showing anti-tumor activity of the FGFR inhibitor dovitinib in castration-resistant bone-metastasized prostate cancer [*Science Translational Medicine* 2014; 6(252): 252ra122]. FGFR signaling appears to mediate interactions between prostate and bone cells, fostering growth of prostate cancer cells in the bone. Clinical application of dovitinib led to a reduction of tumor lesion size and improved bone scans in some men with metastatic castration-resistant prostate cancer; predictive biomarkers of response to dovitinib are under investigation.

Yulong Chen, PhD, and **Jonathan Kurie, MD**, Thoracic/Head and Neck Medical Oncology, determined that a change in the chemical nature of collagen crosslinks promotes invasion and metastasis of epithelial tumors [*Journal of Clinical Investigation* 2015; 125(3): 1147–52]. Specifically, hydroxylation of collagen lysine residues by lysyl hydroxylase 2 (LH2) leads to higher levels of crosslinks that increase tumor stiffness and propensity to invade surrounding tissue. In patients with lung adenocarcinoma, LH2 expression was associated with poor prognosis. Downregulation of LH2 expression may be possible using already developed inhibitors for Janus kinase or the Jumonji histone demethylases.

Gabriel Lopez-Berestein, MD, and others from Experimental Therapeutics analyzed the Cancer Genome Atlas (TCGA) ovarian cancer data sets to implicate the zinc finger transcription factor ZNF304 as playing a role in metastasis of ovarian cancer [*Nature Communications* 2015; 6(7351): 1–12]. Through activation of beta-1 integrin expression, ZNF304 inhibits anoikis, a form of cell death that occurs when cells detach and lose integrin-mediated survival signals from the extracellular matrix. As a result, this transcription factor promotes tumor cell survival. In patients, ZNF304 expression associated with poorer overall survival (OS), and ZNF304 silencing in a murine model led to reduction in tumor burden. This transcription factor offers a novel strategy for targeting metastasis of ovarian cancer.

Research

Research Summaries

Limo Chen, PhD, Don Gibbons, MD, PhD, Jonathan Kurie, MD, and others in Thoracic/Head and Neck Medical Oncology demonstrated a link between epithelial-to-mesenchymal transition (EMT) and immunosuppression of tumor-infiltrating CD8+ T cells [*Nature Communications* 2014; 5(5241): 1-12]. The miR-200/ZEB1 axis activates expression of genes involved in the pro-metastatic EMT program when ZEB1 represses transcription of miR-200, a microRNA that promotes the epithelial phenotype. This work found a new role for the miR-200/ZEB1 axis in regulation of PDL1 expression, such that this immune ligand is de-repressed in tumor cells when the axis is activated, leading to immunosuppression of CD8+ T cells present in the microenvironment concomitant with metastasis. PDL1 blockade could be a feasible treatment for patients whose progression is driven by EMT activators.



Joseph Ludwig, MD, (pictured) and colleagues from Sarcoma Medical Oncology, working with collaborators at Rice University developed a 3D cell culture scaffold within a flow perfusion bioreactor to accurately mimic tumorigenic and pro-metastatic mechanical stresses that Ewing sarcoma (ES) cells encounter physiologically [*PNAS* 2015; 112(33): 10304-9]. Their model reflected the known *in vivo* importance of the IGF1/IGF1R pathway in ES oncogenesis, demonstrating a perfusion-dependent

increase in both IGF-1 secretion and ES cell sensitivity to IGF-1 receptor inhibitor, dalotuzumab. These findings underscore the importance of refining *in vivo* models to better recapitulate *in vivo* stimuli and improve preclinical screening of drug candidates.

Vashisht Yennu Nanda, PhD, and Michael Davies, MD, PhD, Melanoma Medical Oncology, revealed a clinical subset of BRAF- and NRAS-mutant melanomas exhibiting OXPPOS-mediated resistance to MAPK inhibition that can be overcome by mTORC1/2 inhibition [*Cancer Research* 2014; 74(23): 7037-47]. Mechanistic studies demonstrated that blockade of mTORC signaling in these cells prevented upregulation of OXPPOS-promoting factor PGC1 α , thereby avoiding induction of OXPPOS and resensitizing melanoma cells to treatment. The clinical importance of PGC1 α was confirmed in BRAF-mutant patient biopsies, which showed elevated levels of this factor in half of the tumor samples tested. This work highlights the utility of combining MAPK and mTORC inhibitors to treat melanomas with this phenotype.

Guo Chen, PhD, Davies, and others in Melanoma Medical Oncology explored the molecular pathogenesis governing brain versus extracranial melanoma metastases to identify possible therapeutic targets for disease spread to the brain [*Clinical Cancer Research* 2014; 20(21): 5537-46]. The team profiled mRNA and protein expression, hotspot mutations, and copy number variations in resected samples from both brain and extracranial melanoma metastases. These analyses revealed largely similar profiles between the two sites of metastasis, with the exception of increased expression of several protein markers in the PI3K/AKT pathway found to be enriched in samples isolated from the brain. While the mechanism remains to be clarified, this pathway represents a strong potential therapeutic target for melanoma brain metastases.

Davies and others in Melanoma Medical Oncology also found that loss of tumor suppressor PTEN in patients with BRAFV600-mutated stage IIIB/C melanoma correlated with decreased overall survival (OS) and time to brain metastasis [*Clinical Cancer Research* 2014; 20(21): 5527-36]. Archival tissue from lymphadenectomy specimens was analyzed for PTEN protein expression by immunohistochemistry, and results were correlated with clinical outcomes. PTEN loss was specifically associated with shorter time to melanoma brain metastasis, but not to liver, lung, or bone metastasis, solidifying the importance of the PI3K/AKT pathway in this disease event.



Sean Post, PhD, Leukemia, (pictured) investigated the impact of a single-nucleotide polymorphism (SNP) in the promoter region of the gene coding for E3 ubiquitin ligase, Mdm2, on development and severity of colorectal cancer [*Oncogene* 2014; 34: 4412-20]. Colon cancer induced in mouse models, carrying either the T-to-G SNP in question or the normal allele, led to reduced survival, more colonic lesions across more of the colon, and attenuated apoptotic response in the former cohort. These changes were

associated with upregulation of estrogen receptor alpha in mice carrying the Mdm2 T-to-G SNP, which is associated with increased colon cancer risk in women.

Elizabeth Grimm, PhD, and Suhendan Ekmekcioglu, PhD, Melanoma Medical Oncology, revealed a role for IFN γ in melanoma tumor cell survival via enhancement of the CD74- MIF receptor-ligand interaction [*Journal of Investigative Dermatology* 2015; 135(11): 2775-84]. IFN γ increases transcription and cell surface expression of CD74, which interacts with its ligand MIF, leading to activation of the pro-survival PI3K/AKT pathway and upregulation of pro-tumorigenic factors such as BCL-2, IL-6, and IL-8. These findings detail a mechanism by which IFN γ promotes melanoma cell survival, and introduce a promising cellular interaction that may be targeted therapeutically in these cancers.



Filip Janku, MD, PhD, Funda Meric-Bernstam, MD, (pictured) and others in Investigational Cancer Therapeutics found that cell-free DNA (cfDNA) collected from the plasma of patients with advanced cancers showed strong concordance with matched tumor tissue biopsies with regard to the mutational status of four major oncogenes: BRAF, EGFR, KRAS, and PIK3CA [*Oncotarget* 2015; 6(14): 12809-21]. Further, this study found that a higher level of mutant cfDNA regardless of mutation type was

associated with shorter OS. These results support non-invasive collection of cfDNA as a feasible method for determining mutation profiles for tumors that are difficult or potentially risky to biopsy by traditional means. (Read more about Janku and serial biopsies on page 18.)

Michael Rosenblum, PhD, Experimental Therapeutics, developed two agents to block interaction of cytokine TWEAK with its receptor, Fn14, which is upregulated in various advanced cancers [*Molecular Cancer Therapeutics* 2014; 13(11): 2688–705]. Both targeted agents were designed to carry fused cytotoxic payload, granzyme B, to cells expressing Fn14 and demonstrated the ability to kill tumor cells in triple-negative breast cancer (TNBC) cell lines and patient-xenograft mouse models using this mechanism. Additionally, strong Fn14 expression in TNBC patient samples emphasized the potential therapeutic use of these engineered agents for this particular malignancy.



Manisha Singh, PhD, Patrick Hwu, MD, Willem Overwijk, PhD, (pictured) and others in Melanoma Medical Oncology investigated the anti-tumor activity of injectable TLR7/8 agonist, 3M-052, against melanoma [*Journal of Immunology* 2014; 193(9): 4722–31]. Using mouse models, they found that 3M-052 generated a systemic anti-tumor immune response from the injected tumor, leading to destruction of both injected and distant tumors. This activity was shown to involve CCL2, tumor-

associated macrophages, T and B lymphocytes, and type I and gamma interferon. 3M-052 could also potentiate CTLA-4 and PDL-1 blockade therapy even when these therapies alone were ineffective, suggesting this agent holds great promise for combination regimens.

Peter Friedl, MD, PhD, of Genitourinary Medical Oncology explored how the geometry of the extracellular matrix (ECM) affects structure and function of the tumor cell actin cytoskeleton, which dictates cellular migration [*Biochemical Society Transactions* 2014; 42(5): 1356–66]. Mouse melanoma cells moving across a continuous 2D collagen surface displayed cell spreading and lamellipod motility, allowing rapid migration of most cells in the population. A discontinuous 2D surface instead caused cells to form multiple filopod-like protrusions, while on a 3D surface, cells adopted spindle-shaped polarity with a single actin-rich leading edge. A much smaller percentage of the population migrated and at much slower speeds on discontinuous 2D and 3D surfaces. These findings reveal that the tumor cell actin cytoskeleton can adapt to the complex topography of the ECM during migration.

Giulio Draetta, MD, PhD, and others in Genomic Medicine compared genetic ablation of mutated KRAS versus MEK inhibition in a mouse model of PDAC [*Cancer Research* 2015; 75(6): 1091–101]. Ablation of mutated KRAS inhibited PI3K-AKT-mTOR and MAPK signaling, leading to tumor regression via induction of apoptosis. Conversely, MEK inhibition activated the PI3K pathway and several receptor tyrosine kinases, had only cytostatic effects, and did not yield a strong clinical anti-tumor response. This study emphasizes the utility of the KRAS-ablated mouse model for the study of KRAS effectors, and suggests that patient-specific combinatorial therapies may be needed to successfully inhibit PI3K pathway activation associated with KRAS-driven PDAC.

Carlo Toniatti, MD, PhD, of the Institute for Applied Cancer Science, evaluated the anti-proliferative activity of the PARP inhibitor niraparib and the topoisomerase-I inhibitor irinotecan on microsatellite-stable and -unstable colorectal cancer cell lines *in vitro* and *in vivo* [*Cancer Cell International* 2015; 15(1): 1–11]. Unstable cell lines were more sensitive to irinotecan, but not to niraparib, than microsatellite stable cell lines; the combination of both agents was shown to be more potent regardless of microsatellite status. These findings support clinical evaluation of a combined irinotecan and niraparib regimen in colorectal cancer patients with both stable and unstable microsatellite regions.

Hematologic Malignancies



George Calin, MD, PhD,

Experimental Therapeutics, (pictured) and others in Leukemia used sequencing and molecular techniques to identify a role for Epstein-Barr virus (EBV) microRNA BHRF1-1 in progression of chronic lymphocytic leukemia (CLL) [*EBioMedicine* 2015; 2(6): 572–82]. The work in this study detected BHRF1-1 in the plasma of CLL patients and found that expression levels of this microRNA were significantly higher in CLL patients than healthy individuals.

Importantly, higher BHRF1-1 expression correlated with high tumor burden markers and advanced Rai stage, as well as with shorter survival in two independent patient cohorts. Further work is needed to determine the mechanism underlying these associations.

Simona Colla, PhD, Leukemia, showed that DNA damage resulting from eroded telomeres in common myeloid progenitors can bias their differentiation toward the myeloid lineage and directly induce myelodysplastic syndrome (MDS) [*Cancer Cell* 2015; 27(5): 644–57]. DNA damage in these cells was shown to alter expression of mRNA splicing genes, leading to production of aberrantly spliced transcripts in pathways related to MDS pathogenesis. This study draws a previously unknown and crucial mechanistic link between dysfunction of dwindling telomeres, RNA splicing, and MDS.

Varsha Gandhi, PhD, Experimental Therapeutics, employed a pro-caspase activating compound to bypass apoptosis resistance characteristic of malignant B cells in CLL [*Blood* 2014; 125(7): 1126–36]. B-PAC-1 induced apoptosis in CLL cells isolated from patients by sequestering zinc ions that prevent activation of latent executioner procaspases -3 and -7. This agent appears to be effective at killing CLL cells because it acts downstream of anti-apoptotic proteins expressed at high levels in these cells, thereby routing around their survival mechanisms. This family of procaspase-activating compounds represents a novel approach for designing new CLL therapeutics.

Research

Research Summaries



Working with **Kumudha Balakrishnan, PhD**, Experimental Therapeutics, (pictured) Gandhi and team also showed that IPI-145 (duvelisib) could potentially inhibit proliferation of primary CLL cells [Leukemia 2015; 29(9): 1811–22]. Duvelisib inhibits two of the four (delta and gamma) catalytic domains of PI3K, which are involved in B cell function and trafficking. Treatment of CLL cells inhibited signaling of the B cell receptor, diminished CCL3/4 chemokine secretion, and interfered

with cell chemotaxis. In addition to demonstrating the preclinical activity of duvelisib, this work also revealed important functional insights into the delta and gamma isoforms of PI3K.

Gandhi and others in Leukemia identified BCL-2 antagonist ABT-199 (venetoclax) as a potent inducer of CLL cell death for patients previously treated with ibrutinib [Clinical Cancer Research 2015; 21(16): 3705–15]. *Ex vivo* and *in vitro* incubation of ABT-199 with CLL patient cells obtained before and after treatment with ibrutinib inhibited Bruton's tyrosine kinase activity and resulted in high cytotoxicity. Mechanistic studies showed that ibrutinib and ABT-199 worked synergistically to decrease the expression of anti-apoptotic proteins, with the former impacting MCL-1 and BCL-XL and the latter antagonizing BCL-2. The combination of these agents could prove promising in the clinical setting.

Simrit Parmar, MD, and **Elizabeth Shpall, MD**, Stem Cell Transplantation and Cellular Therapy (SCT/CT), established that *ex vivo* fucosylation of adoptively transferred T regulatory cells (Tregs) improved their *in vivo* persistence, ability to prevent graft vs. host disease (GvHD), and prolonged host survival in a mouse model [Blood 2014; 125(9): 1502–6]. Fucosylation of Tregs generates a sialyl Lewis X tetrasaccharide on the cell surface, which helps target them to sites of GvHD-associated inflammation via improved binding to endothelial selectins. This method of empowering Tregs to battle GvHD was then translated to the clinic in a Phase I clinical trial.

Robert Orlowski, MD, PhD, and others in Lymphoma/Myeloma, demonstrated *in vitro* and *in vivo* activity of the Spleen tyrosine kinase (Syk) inhibitor fostamatinib against cells of Waldenström macroglobulinemia, a type of non-Hodgkin Lymphoma [Clinical Cancer Research 2015; 21(11): 2538–45]. Fostamatinib limited activation of Syk, Bruton's tyrosine kinase, and downstream signaling through MEK, ultimately activating apoptosis in affected B cells. Combination of this agent individually with dexamethasone, bortezomib, rituximab, and bendamustine enhanced its activity. Translation of these preclinical findings to the clinical setting could provide a new approach for managing this malignancy.

Clinical Studies

Solid Tumors

James Yao, MD, and **Daniel Halperin, MD**, Gastrointestinal Medical Oncology, led a multi-center Phase II study investigating the efficacy of the VEGF kinase inhibitor pazopanib in patients with pancreatic neuroendocrine tumors (pNETs) and carcinoid tumors [Lancet Oncology 2015; 16(6): 695–703]. They observed a 21.9% response rate for patients with pNETs, a result that supports further Phase III studies in this group. While no objective response

was detected in advanced carcinoid tumors, progression-free survival (PFS) is an increasingly common endpoint for pNET clinical trials that may have yielded a better outlook for this patient population.

Christopher Logothetis, MD, Genitourinary Medical Oncology, (pictured)



helped lead MD Anderson's portion of a Phase III multi-center study that aimed to determine if treatment intensification following early serum tumor marker decline would improve PFS in germ-cell tumor patients [Lancet Oncology 2014; 15(13): 1442–50]. Patients with unfavorable decline in serum levels of human chorionic gonadotropin and alphafetoprotein following one round of standard-of-care were randomized to receive a dose-dense chemotherapeutic regimen. These patients showed a 59% three-year

PFS compared to 48% for their counterparts who continued standard-of-care, suggesting that chemotherapy intensification reduces the risk of progression or death for patients with poor prognosis germ-cell tumors exhibiting unfavorable marker decline.

Debasish Tripathy, MD, and others in Breast Medical Oncology integrated a critical measure, number of brain metastases, into the current breast graded prognostic assessment, an index that predicts OS in patients with breast cancer and brain metastases [Journal of Clinical Oncology 2015; 33(20): 2239–45]. The modified prognostic assessment including number of brain metastases as a fourth parameter showed strong concordance with the original index in a retrospective analysis of patients with breast cancer who were treated for newly diagnosed brain metastases between May 1996 and January 2013 at MD Anderson Cancer Center. This study helped to strengthen the prognostic value of a widely used clinical tool.

David Hong, MD, Investigational Cancer Therapeutics, led a Phase I dose-escalation trial to evaluate the safety and anti-tumor activity of the multikinase inhibitor lenvatinib in patients with advanced solid tumors [Clinical Cancer Research 2015; 21(21): 4801–10]. In total, 77 patients were treated with seven different cancer types including melanoma, thyroid, pancreatic, lung, renal, endometrial, and ovarian. Overall, a partial response rate of 15.6% was observed, 24.7% of patients achieved stable disease, and decreases in the angiotensin-1 ratio measured at two hours versus baseline correlated with longer PFS in melanoma patients. In all, lenvatinib demonstrated a favorable safety profile and promising anti-tumor activity in this cohort.

Stacy Moulder, MD, Breast Medical Oncology, and several members of Investigational Cancer Therapeutics documented treatment of metaplastic breast cancer, a rare and aggressive form of this malignancy, with mTOR inhibitor, temsirolimus and chemotherapy-based regimens [Annals of Oncology 2015; 26(7): 1346–52]. Patients were evaluated for molecular aberrations in the PI3K pathway; a variety of factors within this cascade including PIK3CA, PTEN, NF2, and PIK3R1 were found to be affected as a hallmark of this set of patients. A response rate of 25% was observed across all regimens, with 33% achieving stable disease for more than six months. Patients attaining stable disease possessed mutations that activated the PI3K/Akt/mTOR axis.

Hematologic malignancies

Jorge Cortes, MD, and others in Leukemia performed a retrospective analysis to determine whether complete molecular/cytogenetic response had similar prognostic implications for four tyrosine kinase inhibitors (TKIs) used to treat frontline chronic-phase chronic myeloid leukemia (CML) [*Lancet Hematology* 2015; 2(3): e118–28]. They found that more patients receiving higher-dose imatinib or the second-generation TKIs dasatinib and nilotinib achieved durable rates of complete cytogenetic response, major molecular response, and at least a 4-5 log reduction in BCR-ABL transcripts than patients treated with lower-dose imatinib. These results suggest treatment with either higher-dose imatinib or newer TKIs yields a similarly deep and durable response in chronic-phase CML patients, superior to lower-dose imatinib.

Cortes and team also investigated the safety and potency of TKI ponatinib as first-line treatment for chronic-phase CML in a Phase II trial [*Lancet Hematology* 2015; 2(9): e376–83]. Cardiovascular events were observed in approximately half of the patients on the trial, and 88% of patients required dose reductions. Due to warnings from the Food and Drug Administration, the study was terminated over concerns of increased risk for thromboembolism. Despite this, 94% of evaluable patients achieved complete cytogenetic response at six months. Extensive monitoring is needed for patients on ponatinib therapy and alternative therapies should be considered first in the frontline setting.

Cortes and others in Leukemia investigated the impact of modern TKIs imatinib, nilotinib, and dasatinib on OS in patients with chronic-phase CML [*Lancet Hematology* 2015; 2(5): e186–193]. Clinical data was taken from six consecutive or parallel prospective clinical trials of the three TKIs, totaling approximately 500 patients. Within this population, the five-year OS was only slightly lower than that of the matched general population; patients who achieved complete cytogenetic response or other survival benefits within one year had the same five-year survival as the general population. These results demonstrate the importance of TKIs in narrowing the survival gap between chronic-phase CML patients and the population at large.



Srdan Verstovsek, MD, Leukemia, (pictured) helped run the Randomized Study of Efficacy and Safety in Polycythemia Vera with JAK Inhibitor INCB018424 versus Best Supportive Care (RESPONSE) Phase III trial [*New England Journal of Medicine* 2015; 372(5): 426–35]. This international, multi-center study aimed to evaluate the safety and efficacy of the JAK inhibitor ruxolitinib in patients with the myeloproliferative neoplastic disorder polycythemia vera who are unable to tolerate or are resistant to first-line agent

hydroxyurea. Ruxolitinib proved to be a far superior agent to hydroxyurea and other standard therapies in controlling hematocrit, reducing spleen volume, and alleviating symptoms associated with the disease.

Hagop Kantarjian, MD, Leukemia, helped lead a Phase I study of novel hypomethylating agent guadecitabine (SGI-110), assessing safety and clinical activity in patients with relapsed and refractory acute myeloid leukemia (AML) and myelodysplastic syndromes (MDS) [*Lancet Oncology*; 2015 16(9): 1099–110]. Guadecitabine is a dinucleotide of the hypomethylating agent decitabine and deoxyguanosine that resists degradation by cytidine deaminase, an enzyme that dramatically lowers the half-life of decitabine. In 93 total patients, guadecitabine was well tolerated and showed clinical activity in both malignancies, with a higher response rate in MDS. Findings in this trial warrant further Phase II studies.



Nathan Fowler, MD, (pictured) **Sattva Neelapu, MD**, and others in Lymphoma/Myeloma assessed the safety and efficacy of combining the immunomodulator lenalidomide with rituximab in a Phase II trial for untreated, advanced stage indolent non-Hodgkin lymphoma [*Lancet Oncology* 2014; 15(12): 1311–18]. This combination proved to be very well tolerated and highly active in follicular, marginal zone, and small lymphocytic lymphomas, with complete responses occurring in 63% and partial responses

in 27% of 110 total patients. These results informed an in-progress Phase III study comparing lenalidomide/rituximab with chemotherapy in patients with untreated follicular lymphoma.

Michelle Fanale, MD, Lymphoma/Myeloma, helped lead a multi-center, international Phase 1 trial investigating the combination of brentuximab vedotin (BV) and the current frontline chemotherapy regimen for patients with CD30+ peripheral T cell lymphomas [*Journal of Clinical Oncology* 2014; 32(28): 3137–43]. The antibody-drug conjugate BV targets CD30, a marker expressed by peripheral T cell non-Hodgkin lymphoma cells, and delivers the cytotoxic compound monomethyl auristatin E to these malignant cells. Administered sequentially with cyclophosphamide-doxorubicin-vincristine-prednisone (CHOP) or in combination with cyclophosphamide-doxorubicin-prednisone (CHP), BV had a controllable safety profile and brought about objective responses in most patients on the trial. A randomized Phase III trial is currently in progress to compare BV/CHP with CHOP.

Michael Wang, MD, and others in Lymphoma/Myeloma reported long-term follow-up results from the international, multi-center Phase II trial that led to accelerated approval of single-agent ibrutinib in the treatment of relapsed/refractory mantle cell lymphoma (MCL) [*Blood* 2015; 126(6): 739–45]. The original study demonstrated an overall response rate of 68% and 17.5 month duration of response when investigated at median of 15.3 months follow-up. These results held consistent at a median of 26.7 months follow-up, with a 67% overall response rate accompanied by a median of 13 months PFS and 22.5 month OS. These figures represent the best response numbers reported for a single agent in treatment of MCL to date, and affirm ibrutinib as a safe and effective therapy for this malignancy.

Research

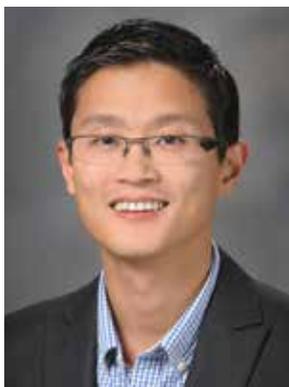
Research Summaries

Using observational data from the Center for International Blood and Marrow Transplant Research, **Stefan Ciurea, MD, SCT/CT**, compared survival outcomes between haploidentical donor transplant with post-transplant cyclophosphamide and HLA-matched unrelated donor transplantation in patients with AML [*Blood* 2015; 126(8): 1033-40]. Analysis revealed that three-year probabilities of OS were comparable following both of the two transplant modalities. However, acute and chronic GVHD occurred at a substantially lower frequency after haploidentical transplantation, possibly due to donor source or use of post-transplant cyclophosphamide. Limitations of this analysis warrant a trial randomizing hematologic patients to one transplant modality versus another.

Musa Yilmaz, MD, Jorge Cortes, MD, and others in Leukemia evaluated the impact of chronic TKI use on kidney function in patients with chronic-phase CML [*Cancer* 2015; 121(21): 3894-904]. The study followed 468 newly diagnosed chronic-phase CML patients being treated with TKIs and found that 4% developed acute kidney injury and 14% developed chronic kidney disease during this time, with a majority receiving imatinib. Both imatinib and dasatinib were associated with a decline in glomerular filtration rate in patients with normal kidney function at baseline; however, these changes did not impact response rates. This study revealed important data about the long-term effects of TKI therapy on renal function.

Richard Champlin, MD, Elizabeth Shpall, MD, and others in SCT/CT evaluated the prognostic significance of European LeukemiaNet (ELN) risk classification and age in predicting allogeneic hematopoietic stem cell transplant outcome for AML patients in first complete remission [*Biology of Blood and Marrow Transplantation* 2015; 21(8): 1405-12]. In this study, ELN category was classified by FLT3-ITD mutation status, and patients were considered in two age groups, below 60 years and 60 years or older. This system was able to stratify both age cohorts into separate favorable and adverse transplant outcome groups, suggesting that it could also be used to classify patients in clinical trials for post-remission therapies.

Supportive Care

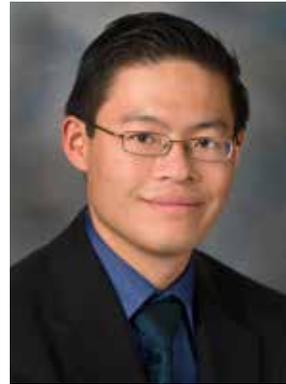


Kimberson Tanco, MD, (pictured) Eduardo Bruera, MD, Palliative, Rehabilitation & Integrative Medicine (PRIM), and an international team compared patients' perception of physician compassion after watching video vignettes of two physicians conveying a more optimistic vs. a less optimistic message to determine physician preference and establish clinical predictors of compassion [*JAMA Oncology* 2015;1(2): 176-83]. Both physicians made the same number of empathetic statements and displayed

identical posture. Patients reported significantly better compassion scores after watching the more optimistic video. Patients preferred physicians who provided a more optimistic message, indicating that more research is needed in structuring less optimistic message content to support health care professionals in delivering less optimistic news.

Bruera and team members from PRIM and General Oncology teamed with colleagues in France to study financial distress and its associations with physical and emotional symptoms and quality of life among advanced cancer patients [*The Oncologist* 2015;20(9): 1092-8]. From interviewing 149 patients, they found that financial distress was very frequent, but among

patients at a general public hospital, distress intensity was twice that of patients at a comprehensive cancer center. More than 30% of patients rated financial distress to be more severe than physical, family, and emotional distress. The group advised that more research is needed to better characterize financial distress and to develop possible interventions.



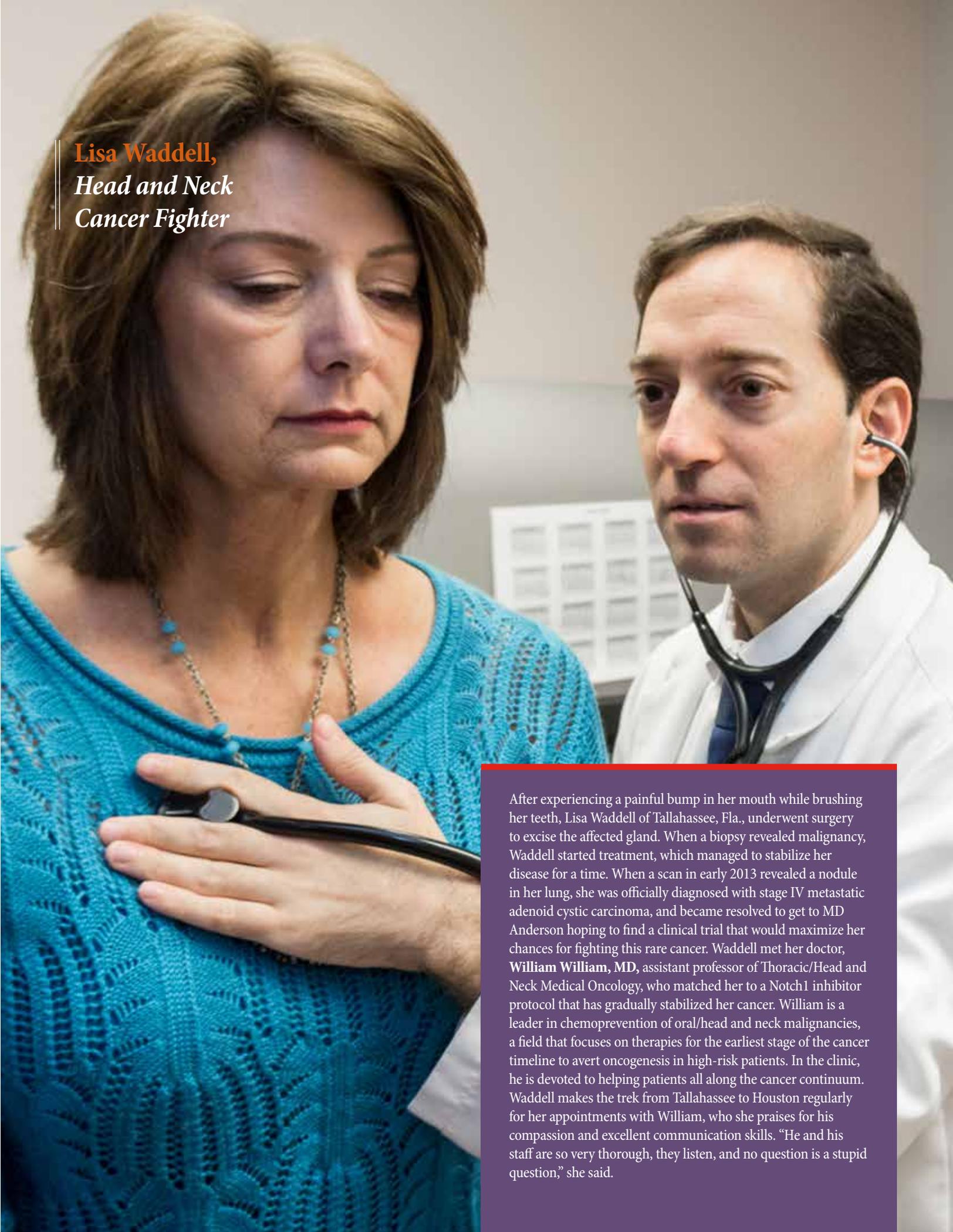
Bruera, **David Hui, MD, (pictured)** and colleagues in Korea evaluated and diagnosed 432 consecutive patients seen for chemical coping [*The Oncologist* 2015;20(6): 692-7]. Chemical coping occurs when patients use opioids in a nonprescribed way, which can lead to misuse of and complications including neurotoxicities, respiratory depression, and death. Proper diagnosis and documentation is needed to avoid unnecessary harm. Approximately 18% of advanced cancer patients seen by a palliative care service were diagnosed

with chemical coping, but only 4% were documented as such in the medical records. Researchers concluded that better and safer ways are needed for physicians to assess and report chemical coping.

Hui, Bruera, and team members from Biostatistics surveyed oncology specialists and found that hematologic specialists were less likely than solid tumor specialists to report that they would refer symptomatic patients with newly diagnosed cancer to palliative care [*The Oncologist* 2015;20(11): 1326-32]. However, both groups were significantly more willing to refer patients earlier in the disease trajectory if the service name "supportive care" was used instead of "palliative care." These findings suggest that rebranding might improve patient access to palliative care services.

Hui, Bruera, and colleagues from Biostatistics, Leukemia, and Thoracic/Head and Neck Medical Oncology surveyed hematologic and solid tumor oncology specialists to examine various aspects of end-of-life care [*Annals of Oncology* 2015;26(7): 1440-6]. They found significant differences in attitudes and beliefs toward end-of-life care between hematologic and solid tumor specialists, and identified opportunities to standardize end-of-life care. Compared with solid tumor specialists, hematologic specialists were more likely to favor prescribing systemic therapy with moderate toxicity and no survival benefit for patients. Hematologic specialists felt less comfortable discussing death and dying and hospice referrals, and were more likely to feel a sense of failure with disease progression.

Hui, Bruera, and colleagues in Brazil studied variations in vital signs in the last days of life in 357 patients with advanced cancer [*Journal of Pain and Symptom Management* 2014;48(4): 510-7]. Although blood pressure and oxygen saturation decreased in the last days of life, they cautioned that clinicians and families cannot rely on vital sign changes alone to rule in or rule out impending death, as a large proportion of patients had normal vital signs in the last days of life. Their findings do not support routine vital signs monitoring of patients who are imminently dying.



Lisa Waddell,
*Head and Neck
Cancer Fighter*

After experiencing a painful bump in her mouth while brushing her teeth, Lisa Waddell of Tallahassee, Fla., underwent surgery to excise the affected gland. When a biopsy revealed malignancy, Waddell started treatment, which managed to stabilize her disease for a time. When a scan in early 2013 revealed a nodule in her lung, she was officially diagnosed with stage IV metastatic adenoid cystic carcinoma, and became resolved to get to MD Anderson hoping to find a clinical trial that would maximize her chances for fighting this rare cancer. Waddell met her doctor, **William William, MD**, assistant professor of Thoracic/Head and Neck Medical Oncology, who matched her to a Notch1 inhibitor protocol that has gradually stabilized her cancer. William is a leader in chemoprevention of oral/head and neck malignancies, a field that focuses on therapies for the earliest stage of the cancer timeline to avert oncogenesis in high-risk patients. In the clinic, he is devoted to helping patients all along the cancer continuum. Waddell makes the trek from Tallahassee to Houston regularly for her appointments with William, who she praises for his compassion and excellent communication skills. "He and his staff are so very thorough, they listen, and no question is a stupid question," she said.

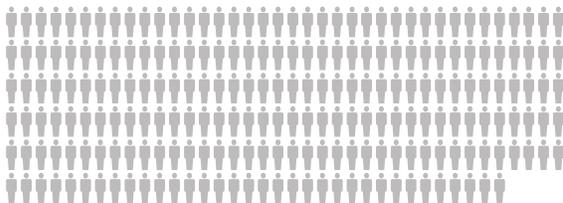
Education

Division Fellowship Programs

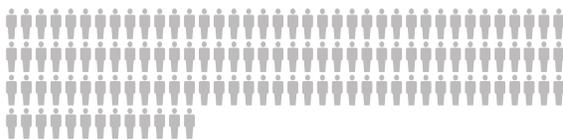
DoCM-based Trainees by Type

In addition to the division-level Hematology/Medical Oncology Fellowship Program, the DoCM departments host numerous specialty training programs for graduate medical education as well as observerships, internships, and even high school students.

224 Rotating Residents



127 Postdoctoral Fellows



76 Graduate Research Assistants



73 Fellows



8 College Students



4 Research Interns



3 Research Medical Students



2 High School Students



2 Observers



519 Trainees

- Cancer Rehabilitation
- Consultation-Liaison Psychiatric
- Oncology/ Psychosomatic Medicine
- Genitourinary Medical Oncology
- Hospice and Palliative Care
- Immunotherapy
- Investigational Cancer Therapeutics
- Leukemia
- Lymphoma/Myeloma
- Medical Oncology International
- Melanoma Oncology
- Neuro-Oncology
- Sarcoma Medical Oncology
- Stem Cell Transplantation and Cellular Therapy
- Susan G. Komen Interdisciplinary Breast Cancer
- Symptom Control and Palliative Care
- Thoracic/Head and Neck Medical Oncology

Hematology/Medical Oncology Fellowship Program

The 15 candidates who began their first year of the Division of Cancer Medicine's Hematology/Medical Oncology Fellowship Program in July 2015 were among 436 contenders to apply through the National Resident Matching Program.



Robert Wolff, MD, program director, **Alyssa Rieber, MD**, faculty associate program director (*not pictured*), and **Catherine Butler-Gunn, JD**, (*pictured*) associate director of the DoCM Graduate Medical Education Program, partner to manage this premier fellowship. Michael Kroll, MD, professor of Hematology, serves as faculty associate program director for Hematology. The fellowship offers 12 to 18 months of clinical rotations, didactic learning, and the opportunity to engage in research. Based on their

interests, fellows can pursue one of four tracks. The physician-scientist track provides training for basic and translational oncology research. The clinical-investigator track provides training focused on the development and implementation of therapeutic and prevention-oriented clinical trials and associated correlative studies. The master-clinician track prepares fellows interested in community-based practice. The fourth track is for the future clinician-educator who wishes to pursue an academic position with a focus on subspecialties in medical oncology, hematology, or hematology/oncology. Fellows can also pursue master's degrees in science, public health, or education.

Our second-year fellows take care of patients with a variety of cancers at the Lyndon B. Johnson General Hospital (LBJ) under the supervision of MD Anderson faculty. Rieber, assistant professor of General Oncology, is the program director and chief of medical oncology at LBJ. She and **Arlene Nazario, MD**, clinical associate professor of General Oncology, provide daily supervision and mentor fellows as they manage patients at the Harris County campus. The fellows also participate in a board review curriculum that involves case-based instruction.

In FY14, **Richard Champlin, MD**, then *ad interim* division head, took on the role of co-principal investigator for the T32 training grant as **Wan Ki Hong, MD**, prepared to step down as leader of Cancer Medicine. **Michael Davies, MD, PhD**, associate professor of Melanoma Medical Oncology and director of fellowship research, provides immeasurable support and guidance to the fellows in their research endeavors. The T32 training program grant received a perfect score on its Ruth L. Kirchstein National Research Service Award renewal application with the National Institutes of Health. Notice of funding to support seven fellows was received in 2015 at the level of \$472,243 (total cost) a year for five years.

The July 2016 incoming class has already been selected. Division leadership is expecting to greet 14 new fellows — arriving from residency programs including John Hopkins University School of Medicine, Duke University, The University of Texas Southwestern Medical Center, and Vanderbilt University.

The **Introduction to Research** series, a weekly presentation on research projects available in the division and across the institution, acquaints first-year fellows with ongoing research in various departments. During each meeting, faculty members present their current and upcoming research projects highlighting opportunities to participate, and fellows utilize the occasion to hold conversations with potential mentors and find projects of interest. In FY15, four departments outside the division — Benign Hematology, Epidemiology, Health Services/Health Disparities Research, and Cancer Prevention — also delivered presentations to the fellows. These meetings assist first-year fellows in their orientation to MD Anderson and guide them in choosing their research areas and mentors. Most of the first-year fellows who arrived in 2015 have been matched with mentors, and many presented posters at key oncology conferences such as AACR, ASCO, and ASH.



Alyssa Rieber, MD, (left) and Arlene Nazario, MD, (not pictured) associate professors of General Oncology, mentor fellows during their training at LBJ.



Scott Kopetz, MD, PhD, associate professor of Gastrointestinal Medical Oncology, (above), presents at the weekly Introduction to Research series in the fall of 2015.



(From left), Program Coordinators Crystal Franzese and Kary Garnica support the Hematology/Medical Oncology Fellowship Program. Heather Shalagan, senior administrative assistant, lends a hand with the weekly Introduction to Research program. Also pictured is Butler-Gunn.

Hematology/Medical Oncology Fellowship Graduation

"You're entering a career that will always be exciting," said **Ethan Dmitrovsky, MD**, executive vice president and provost, as he addressed 14 physicians just moments before they would receive their certificates of completion from the Division of Cancer Medicine's Hematology/Medical Oncology Fellowship Program on June 19, 2015. "For example, when I trained, melanoma used to be a metastatic disease for which we could only provide palliative care to our patients. But now, we have optimism. Now, we have Lazarus moments when we can treat patients on their sick beds and then give them back to their families better. In the future, research — some being conducted by the people in this room — will give us more advances." Division Head **Patrick Hwu, MD**, thanked the executive fellowship committee for their hard work. "Education is a high priority at MD Anderson and for the division. I'm thankful to the committee members who work hard on your behalf because they want to see you succeed," Hwu said.



The 2015 graduating class

Several awards were presented at the graduation ceremony. Richard Theriault, DO, MBA, medical director of MD Anderson's Physician's Network and retired professor of Breast Medical Oncology, presented the Humanitas Award, which he established several years ago to recognize a fellow for providing exceptionally mindful, empathetic, and reflective practice. "There is so much more knowledge about science and biology than when I was a fellow, but you're still caring for patients at their most vulnerable. So, your charge must always be to cure their disease when possible, and when it's not, you must still help ease suffering at the end of life," he said. "Let me encourage all of you to continue to develop the skill of being 'present' for your patients, their families, and your colleagues. This is the human being part of care." He presented the award to two graduates this year:

Matthew Campbell, MD, and **Lori Leslie, MD.**

The program presented several other honors:

- **Robert Orłowski, MD, PhD,** *ad interim* chair of Lymphoma/Myeloma, Mentor of the Year
- **David Ramirez, MD,** assistant professor of Breast Medical Oncology, Teacher of the Year; and the Vicente Valero Lyndon Baines Johnson (LBJ) Clinician Educator Award of the Year, recognizing efforts specifically at that campus
- **General Oncology,** Teaching Department of the Year
- Christopher Logothetis, MD, chair of Genitourinary Medical Oncology, Distinguished Alumnus of the Year
- **Richard Champlin, MD,** associate division head, Honorary Fellow of the Year
- **Michael Davies, MD, PhD,** associate professor of Melanoma Medical Oncology, Leadership in Education
- **Tina Cascone, MD, PhD,** the Clifton D. Howe Award, honoring first-year fellows for outstanding clinic performance
- **Daniel Halperin, MD,** the Waun Ki Hong Achievement in Clinical Investigation Award
- **Jennifer Goldstein, MD,** and **Jin Im, MD, PhD,** the Waun Ki Hong Achievement in Basic Science Research

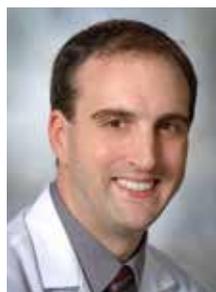
Additionally, program leadership recognized the contributions of the five chiefs who were responsible for components of the group's training: Drs. Luis Baez, Andy Livingston, Aron Rosenstock, Amishi Shah, and Andrew Shaw. Second- and third-year fellows, Drs. Amishi Shah and Marc Hoffman, were noted for strong performance at LBJ, where they cared for patients in continuity clinics under faculty supervision.

Where are they going?

Nearly half of our 2015 fellowship graduates will continue their careers at MD Anderson. They are:

- **Jonathan Brammer, MD,** Advanced Scholar in Stem Cell Transplantation & Cellular Therapy
- **Matthew Campbell, MD,** Assistant Professor of Genitourinary Medical Oncology
- **Jennifer Goldstein, MD,** Advanced Scholar in Gastrointestinal Medical Oncology
- **Daniel Halperin, MD,** Assistant Professor of Gastrointestinal Medical Oncology
- **Jin Im, MD, PhD,** Advanced Scholar in Stem Cell Transplantation & Cellular Therapy
- **Ravin Ratan, MD,** Assistant Professor of Sarcoma Medical Oncology

The Advanced Scholar Program provides physician-scientists in-training with an additional year of experience focused on honing their skills in academic research, helping them springboard into an academic career. This program is designed for those physicians who have excelled in clinical and/or laboratory spheres, and seek to further develop their ability to translate basic science discoveries into meaningful and impactful therapies. This year, the division is proud to announce three Advanced Scholars, featured below.



Jonathan Brammer, MD, is utilizing his Advanced Scholar year to study T cell hematologic malignancies, with an emphasis on preventing disease relapse after allogeneic stem cell transplantation. He completed his first two years of hematology/oncology fellowship at the Oregon Health & Science University, and came to MD Anderson to specifically focus on stem cell transplantation under the mentorship of **Richard Champlin, MD,** chair of Stem Cell Transplantation and Cellular Therapy.



Jennifer Goldstein, MD, has found her calling in the field of cancer genomics, where she hopes to advance understanding of intratumoral heterogeneity and mechanisms behind therapy resistance. A 2015 graduate of the division's Hematology/Medical Oncology Fellowship, she will continue to work during her year as an Advanced Scholar with mentor **Andrew Futreal, PhD,** chair *ad interim* of Genomic Medicine.



Jin Im, MD, PhD, seeks to understand the role of invariant natural killer (iNK) T cells from cord blood stem cell transplants in regulating GvHD. Her studies will be conducted under the guidance of **Jeffrey Mouldrem, MD,** professor of Stem Cell Transplantation and Cellular Therapy, with whom she worked as a Hematology/Medical Oncology Fellow from 2012 to 2015.

Accolades

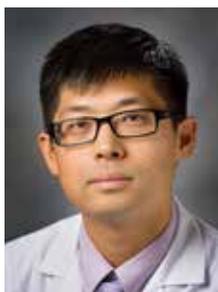
ASCO and AACR Awards

Congratulations to our hematology/oncology fellows who won awards in 2015 from the American Society of Clinical Oncology (ASCO) and the American Association for Cancer Research (AACR). One of these awardees, **Jennifer Goldstein, MD**, won both the ASCO Young Investigator Award (YIA) and the AACR Basic Cancer Research Fellowship.

ASCO YIA recipients



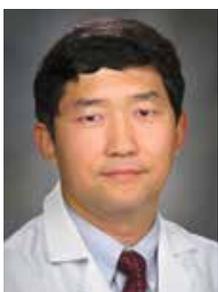
Matthew Campbell, MD, third-year fellow; mentor **Padmanee Sharma, MD, PhD**, professor of Genitourinary Medical Oncology: "Enhancing therapeutic efficacy in metastatic renal cell carcinoma by combining immune checkpoint blockade with cryoablation"



Michael Lee, MD, third-year fellow; mentor **Scott Kopetz, MD, PhD**, associate professor of Gastrointestinal Medical Oncology: "Combination CDK4/6 inhibitor and MEK inhibitor in KRAS mutant metastatic colorectal cancer"



Jennifer McQuade, MD, second-year fellow; mentor **Michael Davies, MD, PhD**, associate professor of Melanoma Medical Oncology: "The impact of energy balance and the insulin/IGF axis on resistance to targeted therapy in melanoma"



Jianjun Zhang, PhD, instructor of Genomic Medicine; mentor **Andrew Futreal, PhD**, *ad interim* chair of Genomic Medicine: "The impact of intra-tumor heterogeneity on disease-free survival after complete resection in patients with stage I lung adenocarcinomas"

ASCO YIA and AACR Basic Cancer Research Fellowship winner



Jennifer Goldstein, MD, third-year fellow; mentor **Andrew Futreal, PhD**, chair *ad interim* of Genomic Medicine

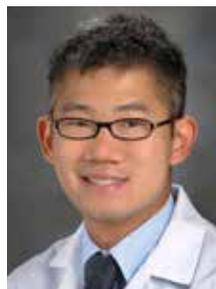
- **ASCO YIA:** "Clonal evolution of Glioblastoma: An insight into treatment resistance"
- **AACR Basic Cancer Research Fellowship:** "Clonal evolution of Glioblastoma: A dynamic look at subclonal architecture"

ASCO Career Development Award (CDA) winner



Jason Westin, MD, assistant professor of Lymphoma/Myeloma; mentors **Eric Davis, MD**, associate professor of Lymphoma/Myeloma, and **Sattva Neelapu, MD**, associate professor of Lymphoma/Myeloma: "Smart start: A Phase Ib/II study of rituximab, lenalidomide, ibrutinib, and EPOCH in patients with newly diagnosed diffuse large B cell lymphoma"

AACR Millennium Fellowship recipient



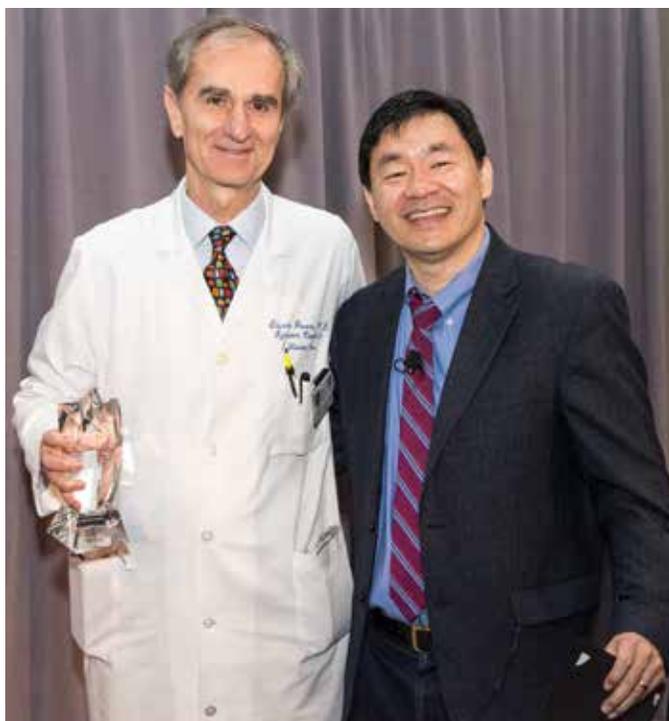
Hans Lee, MD, instructor of Lymphoma/Myeloma; mentor **Robert Orlowski, MD, PhD**, *ad interim* chair of Lymphoma/Myeloma: "Validating novel targets against deletion 17p myeloma"

Accolades

Faculty Recognition & Awards Program

The 10th annual awards program, held in December 2015, paid tribute to the tremendous contributions made every day by our medical oncologists and researchers. Recipients are selected by a review board comprised of department chairs, center medical directors, and clinical and research faculty. The awards are named after distinguished faculty who made a significant impact in those specific areas.

The John Mendelsohn Lifetime Scientific Achievement Award



Eduardo Bruera, MD, chair of Palliative Care, Rehabilitation and Integrative Medicine, is widely described as transformative and visionary, and is credited with leading the largest supportive care and palliative oncology program in the United States. He developed what is now standard practice: the Edmonton Symptom Assessment System (ESAS), which uses a zero to 10 symptom assessment scale for common symptoms that cancer patients experience. His groundbreaking research changed clinical practice to include the use of methadone and opioid rotation for pain control, methylphenidate for cancer-related fatigue, dexamethasone for nausea, oxygen and opioids for dyspnea, and neuroleptics for delirium, among others. Bruera serves as principal investigator for three NIH-funded R01 grants, has published nearly 800 peer-reviewed manuscripts, and mentors fellows at MD Anderson and abroad. He is a frequent invited lecturer and consultant, and receives international requests from physicians in Europe, Australia, and Asia to come to MD Anderson and observe our program firsthand. Bruera (*above left*) accepts this award from Division Head **Patrick Hwu, MD**.

The Melvin L. Samuels Award for Excellence in Patient Care



Donna Weber, MD, professor of Lymphoma/Myeloma, was recognized for outstanding clinical care that led to Food and Drug Administration (FDA) approval of lenalidomide and dexamethasone for relapsed multiple myeloma. Colleagues recalled Weber first noted that a patient whose myeloma was refractory to both steroids and thalidomide dramatically responded to thalidomide after steroids were given for a rash that developed during thalidomide therapy. Separately the agents didn't work, but there was an additive or

synergistic effect when they were given in combination. This led to a formal clinical trial of the combination for refractory myeloma, and subsequently, of the thalidomide derivative, lenalidomide with steroids, that proved extremely active. Results of the latter trial were published in the *New England Journal of Medicine* and won FDA approval for relapsed disease. Deputy Division Head **Robert Wolff, MD**, (*above left*) presents this award to Weber.

The Irwin H. Krakoff Award for Clinical Research



Eric Jonasch, MD, professor of Genitourinary Medical Oncology, is considered a heavy hitter in the medical oncology management of kidney cancer. He developed neoadjuvant treatment in collaboration with medical oncology and surgical colleagues for patients with metastatic kidney cancer, and he started one of the first von Hippel-Lindau (VHL) clinical programs to develop treatment strategies and trials for patients with this inherited cancer predisposition syndrome. Additionally, Jonasch was a co-PI on a NIH Roadmap project that used a nano-medicine approach to reprogram the protein-folding

machinery needed to reverse the phenotype of mutated VHL protein — work that may someday revolutionize renal cancer treatment and impact therapies for Alzheimer's, Parkinson's, and Huntington's diseases as well.

The Emil Frei, III Award for Excellence in Translational Research



Marina Konopleva, MD, PhD, professor of Leukemia, was recognized for developing an outstanding research program targeting the bone marrow stem cell niche and investigating the role of chemokine receptors and their link to cell signaling apoptosis. Her work includes two clinical trials testing her hypothesis that targeting the hypoxic microenvironment will ameliorate chemotherapy resistance and improve outcomes in patients with acute leukemias. Konopleva has funded projects in the AML-P01, the CML-P01,

Leukemia & Lymphoma SPORE grants, and the AML/MDS Moon Shot. She also was awarded a Cancer Prevention and Research Institute of Texas (CPRIT) grant. Deputy Division Head **Elizabeth Grimm, PhD**, (above left) presents this award to Konopleva.

The Potu N. Rao Award for Excellence in Basic Research



Timothy Thompson, PhD, professor of Genitourinary Medical Oncology, is lauded for advancing his colleagues' understanding of the role of growth factors and oncogenes in prostate cancer. His successes include being the first to demonstrate multistage carcinogenesis induced by RAS and Myc oncogenes in prostate cancer, discovering that elevated transforming growth factor β -1 and β -3 mRNA levels are associated with RAS and Myc-induced carcinomas, and characterizing tumor growth and the metastasis suppression properties of

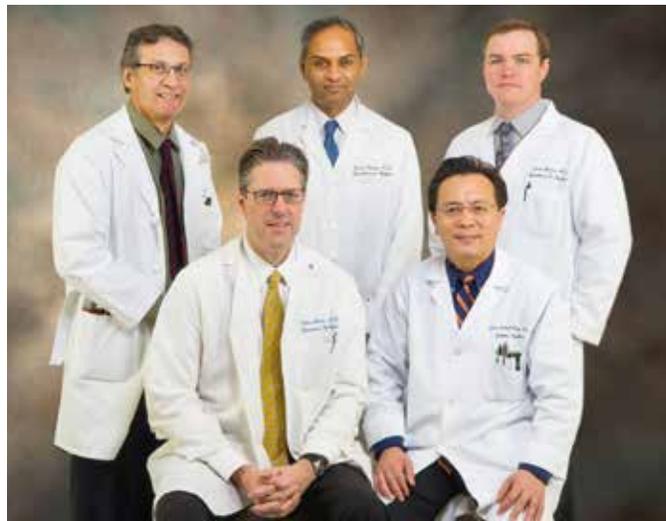
Glipr1 gene-modified macrophages in a metastatic model. Thompson then translated these findings in the clinic to show that intraprostatic injection of the Glipr1 tumor suppressor gene expressed by an adenoviral vector shows promise as a neoadjuvant therapy for localized low- to intermediate-risk prostate cancer. Thompson also plays a major role in the Prostate Cancer Moon Shot.

The Gerald P. Bodey Award for Excellence in Education



Michael Davies, MD, PhD, associate professor of Melanoma Medical Oncology, is credited as a major factor in the division's successful renewal of its T32 training grant for the Hematology/Medical Oncology Fellowship Program. Other accomplishments include launching a seminar series to support research interest among our fellows and to improve their grant-writing and interview skills, initiating weekend sessions to give physician-scientist applicants and faculty time to meet and discuss shared interests, and serving on the Advanced Scholars Executive Committee.

The Waun Ki Hong Award for Excellence in Team Science



The B Cell Lymphoma Team consists of Lymphoma/Myeloma faculty (clockwise from upper left) **Drs. Felipe Samaniego, Sattva Neelapu, Jason Westin, Michael Wang, and Nathan Fowler**. The team is developing safer, non-toxic therapies to improve upon the CHOP regimens that originated at MD Anderson in the 1970s. In addition to being granted a Moon Shot Program in 2015, the group's successes include developing the R2 combination of rituximab plus revlimid/lenalidomide in mantle cell lymphoma and incorporation of the regimen in the National Comprehensive Cancer Network (NCCN) guidelines as standard of care for B cell malignancies. A randomized, Phase III clinical trial is now underway to determine if the regimen should become the new standard of care for first-line follicular lymphoma. Furthermore, they found ibrutinib, a first-in-class, once-daily drug, to have remarkable efficacy in relapsed/refractory mantle cell lymphoma patients, and it was approved by the FDA in 2013 through the "breakthrough mechanism." The team also has made great strides testing immunotherapies in follicular lymphoma, furthering understanding of the mechanisms of action of the immune system in response to lymphoma.

Accolades

Visiting Professors

Reuben Lotan Memorial Lecture

Dannenberg working to unravel the obesity-inflammation-cancer triangle



Andrew Dannenberg, MD, professor of medicine at Weill Cornell Medical College, delivered the 2015 Reuben Lotan Memorial Lecture, established for the revered former MD Anderson faculty member. Lotan and Dannenberg were good friends and close collaborators with a shared passion for understanding the complex link between inflammation and cancer. Dannenberg discussed his team's efforts to unravel the multitude of **pathways that make up the obesity-inflammation-cancer triangle**

in breast and tongue cancers. His research has revealed that breast inflammation manifested by crown-like structures (CLSs), which form when dead or dying fat cells are encircled by macrophages, is associated with obesity, metabolic dysfunction, and shortened survival in patients with recurrent breast cancer. Dannenberg and his team developed a computational model that identifies a blood metabolite signature for breast CLSs and inflammation using data from a breast cancer metabolomics study, which may allow for development of a diagnostic blood test.

Breast inflammation is a sentinel for the inflammatory state of other adipose deposits in the body, so the ability to detect it through changes in blood chemistry is all the more important. He stressed that breast inflammation is actually not uncommon in women with a normal range body mass index (BMI), who may have breast adipocytes almost as large as those found in an obese woman's breast and therefore more likely to form CLSs. As a result, classifying such women by BMI alone may miss important diagnoses. In terms of reversing breast inflammation, preclinical models in Dannenberg's lab have shown that calorie restriction in mice may reverse mammary gland inflammation brought on by a high fat diet. He also identified CLSs in tongue tissue, linking their presence with higher BMI, vascular invasion, and a worse prognosis for tongue cancer.

Waun Ki Hong Visiting Professor

Herbst articulates evolution of umbrella protocols in battling lung cancer



Herbst, center, with **Bonnie Glisson, MD**, professor of Thoracic/Head and Neck Medical Oncology, and **Waun Ki Hong, MD**, professor of Thoracic/Head and Neck Medical Oncology and former Cancer Medicine division head.

Roy Herbst, MD, PhD, chief of Medical Oncology at Yale Cancer Center, was named the 2015 Waun Ki Hong Visiting Professor of Cancer Medicine, an award established to pay homage to this legendary physician, mentor, and clinical pioneer. From 2001 to 2011, Herbst was chief of Thoracic Medical Oncology in the department of Thoracic/Head and Neck Medical Oncology at MD Anderson, during which time he worked closely with Hong to drastically revamp lung cancer clinical trial and treatment paradigms. Herbst and Hong co-led the BATTLE-1 clinical trial, a game-changing program that used real-time patient-specific biomarkers from core biopsies to match patients to appropriate targeted agents. Herbst cautioned that although recent studies have changed the landscape of lung cancer treatment strategies, most have focused on a small number of actionable mutations, **leaving approximately 80% of lung cancers without specific therapies;** resistance to existing therapies is also becoming a critical issue. To begin addressing these concerns, work in Herbst's lab has shifted to exploring **application of immunotherapies in treatment of lung cancer.** Recent results showed that non-small cell lung cancer (NSCLC) patients with the strongest anti-PD1 immunostaining profiles had dramatically improved survival rates at one year. Further, he helped in a large collaborative trial for the new anti-PDL1 antibody atezolizumab. Phase Ia results demonstrated a 23% response rate that was rapid, durable, and accompanied by minimal drug toxicity in NSCLC patients. Staining of tissue derived from patients on the trial revealed that patients whose immune infiltrate — T cells, macrophages, and dendritic cells — stained positive for PDL1 had the best response rates. With the support of the newly acquired Yale SPORE in Lung Cancer, Herbst's team is set to perform exhaustive genetic, immunologic, and bioinformatic analyses on biopsies from normal tissue, immunotherapy- or targeted therapy-treated tissue, and treatment-resistant samples to understand changes in the tumor environment over the course of therapy.

John Mendelsohn Visiting Professor

Jacks uses CRISPR-Cas9 gene editing technology to study lung cancer



From left, **Hong, Jacks, John Mendelsohn, MD**, professor of Genomic Medicine and former MD Anderson President, and **Hwu**.

Tyler Jacks, PhD, director of the Koch Institute for Innovative Cancer Research at MIT, was selected as the 2015 John Mendelsohn Visiting Professor. Jacks is famous for his work employing **CRISPR-Cas9 gene editing technology to model and study the genetic heterogeneity of human non-small cell lung cancer (NSCLC) in mice**. He and his lab have used their engineered mouse model to address several major questions in cancer research, including an investigation into the genetic and molecular mechanisms that make one cancer cell different from another and account for considerable phenotypic heterogeneity at the tumor level. Use of the CRISPR-Cas9 system in their NSCLC mouse model has allowed rapid generation of hundreds more relevant NSCLC models, each developing tumors with distinct genotypes, biology, and therapeutic targets following a method that requires a fraction of the time and cost of previous options. A study of several such models has revealed the mechanism by which tumors select for mutation of the tumor suppressor KEAP1 to ensure activation of oncogene Nrf2, which helps protect the tumor against damaging reactive oxygen species. Further, his group showed how heterogeneous epigenetic regulation brings about a gradual shift to an aggressive, poorly differentiated cell phenotype through a trade-off in activity of transcription factors Nkx2.1 and Hmga2. Jacks also discussed work implicating the Wnt pathway as a marker of tumorigenic clones in the NSCLC mouse, suggesting that Wnt inhibition could be a promising new approach for lung cancer treatment. Novartis has produced an inhibitor of Wnt activation, which Jacks and team have shown can decrease tumor growth and prolong survival in their mouse model. Efforts are underway to demonstrate the same in a patient-derived xenograft model.

1st Annual Hortobagyi Visiting Professor

Davidson making strides in hormone-resistant breast cancer research



Hortobagyi, left, presents award to **Davidson**.

The body of knowledge generated and inspired by **Gabriel Hortobagyi, MD**, over the last several decades has had decisive force in determining what we currently know about breast cancer and how to treat it. Selected as the inaugural Gabriel Hortobagyi Visiting Professor, Nancy Davidson, MD, director of the University of Pittsburgh Cancer Institute, has contributed seminal findings about estrogen receptor (ER) signaling and led numerous standard-setting clinical trials that have determined best practices for treating breast cancer patients.

Recent work in Davidson's group has demonstrated that some phenotypically ER-negative breast cancer cell lines and primary specimens show repressive methylation modifications within the receptor coding sequence. ER expression could be restored in some of these cell lines by inhibiting DNA methyltransferase (DNMT) and histone deacetylase (HDAC) enzymes, opening the door for **DNMT/HDAC inhibitor combination trials in hormone-resistant breast cancer patients**. For late-stage metastatic breast cancer, Davidson's team devised a Phase II trial combining the DNMT inhibitor, 5-azacitidine with the HDAC inhibitor, entinostat, which produced partial responses in hormone-resistant patients. Importantly, the trial also confirmed acceptable toxicity for both agents and allowed for biopsy collection to **better understand why some patients benefited and others didn't**. She also discussed a study utilizing banked normal, primary, and metastatic patient samples, which revealed acquisition of single nucleotide and structural variants during metastasis, sometimes in a tissue site-specific manner. Structural variants including an ER-DAB2 gene fusion and other ER mutations were found to lead to a constitutively active and hormone-resistant receptor in metastatic tumors, but rarely in primary tumors. Further, findings from Davidson's group in lobular breast carcinoma have revealed that tamoxifen can actually stimulate growth of some such tumors, a process that is dependent on FGFR1 in a preclinical model. Her team is evaluating the ability of ER-degrading agent, fulvestrant, to inhibit growth of these tumors in a window trial.

Accolades

Recognizing Outstanding Employees

The 12th Annual Employee Recognition and Awards Program, held in May 2015, celebrated the successes of several of the division's 2,800 full-time employees. This year's standouts were recognized for many talents and contributions, including organizing international regulatory efforts to bring tissue samples from Lebanon and Jordan; identifying, anticipating, preventing, and managing toxicities in critically ill patients; and streamlining institutional consent forms on high-priority clinical trials.

Exemplary Employee of the Year



Emily Roarty, PhD, scientific manager in THNMO, was named Exemplary Employee of the Year for expert grantsmanship and scientific writing and editing. Multiple nominators from the DoCM, the Division of Surgery, and the Moon Shots initiative agreed that she has contributed significantly to the progress of the Lung Cancer Moon Shot. Roarty first joined the department in 2011 as a clinical research scientist and was promoted twice in two years — to administrative

director in 2012 and to her current position in 2013. Before her appointment in THNMO, she worked as a postdoctoral cell biologist in the lab of Isaiah Fidler, DVM, PhD, professor of Cancer Biology and a leader in the field of metastasis research. Nominators say this background provides a special dimension to Roarty's work managing both the Lung Cancer and HPV-related Moon Shots that has been integral to the success of many initiatives with which she has been involved, including winning applications for six R01s, a CPRIT grant, and a Lung Cancer SPORC. She was praised for establishing relationships with oncology research foundation leaders that have helped some of the department's junior investigator stars secure funding.

Citations were presented in 11 categories, including recognizing an employee outside the division, for making a significant impact on our mission.



Administration

Jennie Feliu, RN, research nurse supervisor in Leukemia, was appreciated for her thorough knowledge of departmental and institutional research policies, attention to detail that helps studies run smoothly, and for volunteering to do many things, including planning departmental education meetings and participating in

OneConnect project initiatives. Nominators described her as a fearless yet respectful communicator who speaks up on behalf of patients and staff, and interacts well with a huge team that consists of 10 research nurses, two study coordinators, study monitors, Leukemia physicians, and faculty from other departments.



Administrative Support

Candy Liedtke, senior administrative assistant in Gastrointestinal Medical Oncology, makes managing big responsibilities look easy. For a time last year, she supported nine doctors and their physician assistants, while also serving as the coordinator for fellows rotating through the department.



Advanced Clinical Practice

Michelle Rohlf, RN, MSN, AOCNP, FNP, OCN, advanced practice registered nurse in Melanoma Medical Oncology, was praised for delivering outstanding care to extremely ill patients, such as those requiring high-dose intrathecal interleukin-2 for metastases, especially to the brain and spinal cord. She was appreciated for not only identifying

and managing toxicities, but also for anticipating and preventing them when possible.



Clinical Nursing Practice

Tonya Edwards, RN, MS, BSN, CCRP, outpatient clinical nurse in the Supportive Care Center, was recognized for creating the High Alert Team (HAT) as a Performance Improvement Project to respond to the problem of opioid abuse among patients who were occasionally creating disturbances in the center and causing anxiety among employees.

Her research into drug misuse revealed that some patients were also attempting to acquire medication through emergency room visits across Harris County. HAT includes a doctor, nurse, social worker, pharmacist, patient advocate, and other allied health specialists, who intervene to provide education and resources to patients.



Clinical Research

Kimberly Pittman, senior research data coordinator in Genitourinary Medical Oncology, manages clinical research data from multiple sources, but nominators appreciate that she'll always jump in to do more whenever she sees a need. This includes the time she volunteered to work with a radiologist to help him record accurate

tumor measurements for trial participants, thus sparing research nurses this one responsibility so they would have time to see more patients in the clinic. Additionally, Pittman was appreciated for developing Adopt-a-Family projects, bringing magazines to patient waiting areas, and playing volleyball for an MD Anderson team.



Communication, Education, and Information Services

Mathew Sebastian, MS, ITIL, systems analyst III in Cancer Medicine Information Technology, received appreciative nominations from doctors in the Hematology/Medical Oncology Fellowship Program who wrote that he is always overly prepared, never says no, and answers their calls 24/7.



Divisional Support

Kristofer Griffith, CIP, human research regulations manager in the Office of Protocol Research, was nominated by the departments of Leukemia, Genitourinary Medical Oncology, and Breast Medical Oncology. He was praised for working on institutional initiatives to streamline consent negotiations on high-priority clinical trials among various departments and sponsors,

for working to reduce the number of consent forms patients must sign to participate in trials, and for helping to create a consent authoring tool that aims to reduce the time it takes to update patient consent forms after trials begin following the discovery of adverse events.



Financial Services

Elsa Perezous, grant program manager in Genitourinary Medical Oncology, was appreciated for leading her team of three coordinators to help her faculty and postdoctoral researchers submit 60 grants totaling \$14 million in about five months. Her work contributed to the successful submission and funding of a CPRIT grant and Prostate Cancer SPORE, and she is now assisting with the submission of a Kidney Cancer SPORE.



Laboratory Research

Monique Nilsson, PhD, senior research scientist in Thoracic/Head and Neck Medical Oncology, was described as a highly productive scientist, generous collaborator, and skilled laboratory manager. Her accomplishments include gaining favorable reviews in her first submission for an R01 grant and a CPRIT Individual Investigator Award to examine

her hypothesis that stress hormones might be responsible for promoting treatment resistance in front-line therapy for non-small cell lung cancer. Nilsson is revising both grants for resubmission.



Patient Services

Susan Neel, RN, nurse transplantation coordinator in the Stem Cell Transplantation Center, is appreciated for her organizational skills and impeccable follow-through, wrote nominators. For example, she works for three busy physicians, but recently made the time to enhance patient education materials to include more thorough

language, timelines, and visual aids. Neel trains newer coordinators and is held in high regard by faculty.



Research Nursing Practice

Evguenia "Eve" Gachimova, RN, senior research nurse in Leukemia, was recognized for taking action quickly after the FDA stopped a trial for CML patients following significant adverse events. Within one week, she wrote a telephone script, got it approved by the Institutional Review Board (IRB), and called each patient to explain the situation

and tell them about their new therapeutic options. Gachimova documented everything so well that when the FDA audited the study, the agency found no problems.

The Heart of MD Anderson Outstanding Employee Award

The Division of Cancer Medicine is proud to have had two employees recognized in FY15 for exemplifying the institution's core values and behaviors of caring, integrity and discovery. Recipients are selected monthly by a committee of previous winners.



October 2014

Christine An, MHM, senior financial analyst in Lymphoma/Myeloma, never sets foot in clinic exam rooms, but she has a lot to do with the clinical trial care that is offered to many of our patients. She oversees financial activities, pre/post-award grants and contracts, all fiduciary reporting, and annual budgeting for the department. Her dedicated

work ethic is what compelled faculty and colleagues to submit her name for consideration for the Heart of MD Anderson Outstanding Employee Award. Nominators said An is very results-oriented and collaborative, has a positive attitude, and instills excellence in others through her leadership. Others appreciated her efforts to foster a good team environment in which everyone has an important role. An has worked at MD Anderson for 15 years, eight of those in Lymphoma/Myeloma.



July 2015

Mark Choate, MBA, ITIL, associate director of information services in Cancer Medicine Information Technology, has worked for MD Anderson for 19 years. He has a knack for turning techie tools into instruments that make a measurable difference in our patients' lives.

Some of the systems Choate has developed are credited with decreasing patient wait times in the ATC by reallocating staff to where they are needed most, and increasing volume in the CTC with minimal strain on existing resources. He oversaw creation of the WebSchedule application, which interacts with KRONOS to verify that an employee actually has earned the time off that he or she requests. Choate also implemented a staffing model in his own group that logs response time to service requests and pairs it with attendance and training to ensure his team is providing the highest level of customer service.



The 12 monthly Heart of MD Anderson winners throughout the year are honored at an annual reception held each February.



Cathy Eng,
*Professor of
Gastrointestinal
Medical Oncology*

Eng helps organize the annual Sprint for Colorectal Oncology Prevention and Education (SCOPE) 5K run, which marked its 10th year in 2015. Over 2,000 people signed up to walk or run in support of research and public awareness campaigns about prevention, symptoms, and screening. Eng said the disease is one of the top causes of cancer deaths, and it is one of the most preventable. Several lifestyle-related factors have been linked to colorectal cancer, such as a diet high in red and processed meats, and low in vegetables, fruit, and whole grains. Physical inactivity, obesity and smoking also increase a person's chance of developing polyps or cancer. Non-lifestyle risk factors include age, personal history of polyps or colorectal cancer, or personal history of inflammatory bowel disease. This year's race raised more than \$50,000.

**Words of thanks
from a non-small
cell lung cancer
patient**

Touched By Your Presence

*When we encounter other people
We always leave an impression
Whether negative, neutral, or positive,
Whether short term or long term.
Such as waiting in a doctor's office, riding the elevator
Or a new acquaintance.
Our expression can leave a lasting impression,
The choice is ours.*

*Both pleasantries and unpleasant events
Are lasting imprints in our memory bank.
Warm and sweet attitudes
Are translated to our emotional senses
And can make our hearts leap to a higher level.*

*We are always touching another person's life
By our very presence.
Let's choose to make it positive.
For others to know and remember,
They were touched by your presence.*

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to know me as a person, not just a
medical record number, and for taking
the time to give me greater clarity
in my care plan.”*

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