

MD Anderson's moon shots mission grows to confront six more cancer types

October 29 2015

MD Anderson's Moon Shots Program, an unprecedented effort and novel organizational model designed to more rapidly convert scientific discoveries into life-saving advances, has expanded its targets, adding several of the most intractable cancers to its campaign.

The innovative program's transdisciplinary team-science approach now applies to B-cell lymphoma, glioblastoma (brain [cancer](#)), cancers caused by the human papillomavirus (HPV), high-risk multiple myeloma, colorectal and pancreatic cancers. These join the original moon shots launched in 2013 to address breast and ovarian cancer, chronic lymphocytic leukemia, lung cancer, melanoma, myelodysplastic syndrome/acute myeloid leukemia and prostate cancer.

"Our multidisciplinary, goal-oriented moon shots programs, enabled by the deep expertise and advanced technology of our execution-oriented platforms, are poised to accelerate declines in mortality for some of the most common types of cancer," said MD Anderson President Ronald DePinho, M.D. "As the Moon Shots Program matures, we're transitioning from the foundational phase to the results phase, and some moon shots already are making practice-changing advances in the clinic and in cancer prevention and control."

Building on early achievements

Early results include development of an algorithm to guide the decision

on whether to start a woman's ovarian cancer treatment with chemotherapy or surgery that is being adopted by other cancer centers nationally and internationally; cancer prevention educational efforts that supported new Texas laws banning the use of tanning beds and electronic cigarettes by minors; and collaborations with pharmaceutical companies to move new first-in-class drugs to [clinical trials](#) more quickly.

All 12 moon shots opened or have planned many novel clinical trials of new immunotherapies—drugs that activate the immune system to attack tumors—as well as targeted therapies and drug combinations precisely targeting cancer-specific genetic abnormalities.

In the longer term, collaboration with moon shots platforms and basic scientists will heighten understanding of the molecular details of cancers, treatments and how the two interact.

The Moon Shots Program was announced in 2012 and funded in 2013. Moon shots are chosen via a peer-review process that takes into account the potential to measurably reduce cancer mortality in the near term, the breadth and depth of the multidisciplinary teams and the quality of their scientific plans.

Ten moon shots platforms provide professional expertise and technology in the areas of [cancer prevention](#) and control, drug development, genomic and molecular analysis, and big data-driven patient care and research. Many moon shots include prevention and early detection projects with potential global impact.

Wielding big data to improve patient care

Two such platforms are standardizing sample collection, data generation and workflows so patient clinical information and research data, including genomics, can be combined into a big data platform to

improve patient care and research. This is one of the most advanced initiatives of its kind to date.

The combined efforts of the Big Data and Adaptive Patient-Oriented Longitudinal Learning and Optimization platforms are led by Andy Futreal, Ph.D., co-leader of the Moon Shots Program and acting chair of Genomic Medicine. Futreal and his team are in the process of loading information from more than 160,000 patients treated at MD Anderson since 2012 into the [big data](#) platform, where MD Anderson clinical and basic science researchers can carefully access information to evaluate the effects of treatment over time and to generate new ideas for improving patient care.

"APOLLO and Big Data are intended to be an engine that drives our vision of every patient contributing to and potentially benefiting from research," Futreal said. "MD Anderson's research and clinical expertise and its large number of diverse patients, combined with these new capabilities to gather, safely store and analyze data, provide a unique opportunity. We're in a powerful position to drive science in a way unlike anyone else."

New moon shots

The six new moon shots began as pilot projects, chosen by internal and external reviewers during summer of 2014 from among 14 proposals. The pilots received initial funding for researchers to develop their ideas a year ago. Both pilots and inaugural moon shots were subjected to rigorous peer-review this summer by the program's external Scientific Advisory Board, comprising 11 experts from other cancer centers and biopharma. The board's feedback helped mold priorities and funding for fiscal year 2016.

B-cell lymphoma—About 80,000 new cases of this group of blood

cancers are diagnosed annually. The cure rate is 30 percent. This moon shot will focus on overcoming resistant disease by developing new predictive tools, finding new targets for therapy and using new immunotherapy drugs, targeted therapies and engineered white blood cells called T cells to attack these lymphomas.

Colorectal cancer—Colorectal cancer is the second-leading cause of U.S. cancer-related deaths, with nearly 50,000 deaths annually. Projects focus on improving early detection and prevention as well as testing personalized treatment with immunotherapies before surgery. Another program builds on leadership by MD Anderson investigators to classify colorectal cancers by subtype based on integrated molecular and genomic analysis to improve targeted treatment.

Glioblastoma—Of the 15,000 people who receive a diagnosis of this most lethal of brain tumors, only 5 to 10 percent survive to five years. This moon shot will examine existing and experimental immunotherapy drugs and customized T cells designed to attack specific targets. Other projects include further clinical development of an engineered, cancer-killing virus invented at MD Anderson, identification of new targeted therapies, and how such advances could be combined with immunotherapy.

High-risk multiple myeloma—Patients with high-risk disease make up about 20 percent of the estimated 27,000 people expected to receive a diagnosis in 2015. While new drug combinations and blood stem cell transplants have dramatically improved survival for patients, prospects for those with high-risk disease have lagged. This moon shot will develop risk-prediction models and immunotherapeutic approaches to hit high-risk disease at earlier stages and to treat advanced disease.

Human papillomavirus-associated cancers—An estimated 17,500 women and 9,300 men each year develop a cancer caused by this

sexually transmitted virus, which infects 80 percent of sexually active people during their lifetimes. One goal is to inspire policy and education to increase HPV adolescent vaccination rates to 80 percent to prevent cervical, throat, anal and other cancers. Other projects extend cervical cancer screening to women in medically underserved communities, seek to develop HPV-related cancer screening for men and aim to more fully characterize HPV-associated tumors across multiple disease sites to develop targeted drugs and immunotherapies.

Pancreatic cancer—About 49,000 people receive a pancreatic cancer diagnosis each year, and only about 6 percent of patients survive for five years. This moon shot focuses on early detection methods, development of predictive biomarkers to guide presurgical targeted therapy and testing of new immune T cell-based therapies. They've also established MD Anderson's first pancreatic cancer high-risk clinic, where people at increased risk, such as those with multiple family members with the disease or pancreatic cysts or elderly patients with newly diagnosed diabetes, can be screened and advised.

Philanthropy fuels the moon shots

The Moon Shots Program concentrates on translational research, an inconsistently funded research phase that occurs between scientific discovery (mainly funded by federal grants) and late-stage clinical trials (financed by the private sector) where ideas often die before they have a chance to be thoroughly tested.

"Improving the efficiency of preclinical research and early clinical trials and cultivating the exchange of knowledge back and forth between lab and clinic are essential to success," said Giulio Draetta, M.D., Ph.D., co-leader of the Moon Shots Program. "Thoughtful, generous philanthropic support provides the foundation for our progress harnessing established knowledge with new, disruptive technologies to dramatically reduce

cancer deaths through prevention, [early detection](#) and curative treatment."

The Moon Shots Program has received cash gifts, pledges and bequests totaling \$290 million since June 2012. Major donors in 2015 include:

- Ann and Clarence Cazalot: \$1 million to the Breast Cancer Moon Shot
- The Farmer Family Foundation: \$2 million to the Melanoma Moon Shot
- Mr. and Mrs. Ford-Petrin: \$1.1 million to the Lung Cancer Moon Shot
- The Hackett Family: \$1 million to the Moon Shots Program

In the fiscal year that ended on Aug. 30, 2015, MD Anderson's Development Office raised \$255 million for the institution, including \$73 million for the Moon Shots Program. These philanthropic funds are complemented by grants from the National Institutes of Health and the Cancer Prevention and Research Institute of Texas as well as by returns from intellectual property, which are plowed back into our mission to end cancer. MD Anderson ranks first in the nation in the total amount of active research grant funds from the National Cancer Institute and in intellectual property-related commercialization agreements.

Provided by University of Texas M. D. Anderson Cancer Center

Citation: MD Anderson's moon shots mission grows to confront six more cancer types (2015, October 29) retrieved 24 April 2024 from <https://medicalxpress.com/news/2015-10-md-anderson-moon-shots-mission.html>

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