

BREAST AND OVARIAN MOON SHOT

*Tackling difficult subtypes – triple negative breast cancer and high-grade serous ovarian cancer
– to close knowledge gaps and improve outcomes*

INTRODUCTION

The breast and ovarian moon shot is unique in that it combines two aggressive cancer subtypes that occur in different sites – triple negative breast cancer and high-grade serous ovarian cancer. The underlying molecular events fueling cancer development are incredibly similar between these two cancers and the therapeutic options to target them are converging. Specifically:

- Triple negative breast cancer, a type of breast cancer that does not express commonly targeted receptor genes for estrogen, progesterone or Her2/Neu, remains a challenging foe despite great gains in treating other types of the disease. Triple negative breast cancer tends to occur in women who are younger, African-American, obese and genetically pre-disposed through heredity.
- High-grade serous ovarian cancer continues to elude oncologists in respect to recurrence rates due to drug resistance. Toxicities from multiple lines of therapy often result in physical side effects hard for patients to overcome.
- This moon shot has perhaps the strongest data on the molecular underpinnings of the disease at MD Anderson, with more breast and ovarian tumor samples analyzed than any other type of cancer.

KEY STATISTICS

- An estimated **229,000** women will be diagnosed with breast cancer and nearly **40,000** will die from the disease in 2012.
- There are **22,280** new cases of ovarian cancer diagnosed in the U.S. annually; in 2012, an estimated **15,000** women will die from the disease.

KEY PROJECTS

A specialty in which MD Anderson is a recognized long-time leader, the breast and ovarian moon shot will immediately advance clinical trial opportunities for high-grade serous ovarian cancer and triple negative breast cancer, providing a marked increase in five-year survival rates. Longer term efforts will lead to significant changes in early detection, prevention and quality of life for survivors. Some of the first undertakings of this moon shot will focus on:

- Establishing bio-marker-driven clinical trials, combining known therapeutic inhibitors to exploit the tumor microenvironment, the immune system and the P13K pathway – a pathway that is mutated in more women’s cancer patients than any other and leads to cancer cell growth.
- Understanding the role of residual disease and response rates to initial therapy on patient prognosis to redefine the best treatment algorithms for future patients; and
- Validating, in as little as five years, new ways to detect the disease early and stratify women at-risk by combining technologies such as CA-125 and other protein-based biomarkers to develop screening tests and expanding the use of BRCA sequencing and other genetic mutations to form new risk-assessment models.

-more-

THE AIM

The breast and ovarian moon shot has the potential to make strides across the cancer continuum from healthy women at moderate risk to long-term survivors.

- **Prevention and cancer control:** Finely-tuned advanced screening assays – proteomic and imaging-based, will detect breast and ovarian cancers at the earliest, most treatable stage. People with a family history will be closely monitored for all known genetic mutations. Interventions for those at high-risk will be available, while education efforts will look to change unhealthy behaviors and encourage appropriate screening.
- **Treatment:** Frontline individualized therapies will be more effective and less toxic; this specificity will pinpoint resistance mechanisms, decreasing the number of women who need aggressive treatment.
- **Survivorship:** Less toxic treatment will result in better quality of life for survivors; interventions will provide support on issues like sexual and physical functioning.

THE BREAST AND OVARIAN MOON SHOT TEAM

As many as 175 faculty members from more than 15 departments at MD Anderson have collaborated in the early stages of the breast and ovarian moon shot. The team:

- Represents many diverse disciplines including clinical surgical, medical and radiation oncologists; pathologists; and basic and translational researchers; and
- Builds on a well-established track record of working together and has been highly successful in leading large-scale national and international grants from organizations such as Stand Up to Cancer and Susan G. Komen, as well as three Specialized Programs of Research Excellence grants from the National Institutes of Health.
- Will look to partner with leaders in imaging and nanotechnology drug delivery and screening technologies, as well as other centers to produce large cohorts of women in which to study disease risk.

Moon shot leaders



Gordon B. Mills, M.D., Ph.D. – is the chair and professor in the Department of Systems Biology. He also co-directs the Kleberg Center for Molecular Markers. Mills' research focuses on the PI3K pathway, the genomics and genetics of women's cancers, and identifying and characterizing a number of potential oncogenes and tumor suppressor genes. He holds more than 20 patents in novel technologies and molecular biomarkers.



Mien-Chie Hung, Ph.D. – is the chair and professor in the Department of Molecular and Cellular Oncology. Dr. Hung's lab focuses on signaling pathways such as EGFR and HER-2/neu and the molecular mechanisms behind tumor promotion and suppression genes. He is involved in the development of animal models for breast and ovarian cancers, as well as the identification of therapeutic targets.



Anil K. Sood, M.D. – is a professor in the Department of Gynecologic Oncology and Reproductive Medicine. His research is focused in three main areas including the development of new strategies for systemic *in vivo* siRNA delivery using biocompatible nanoparticles; the effect of neuroendocrine stress hormones on ovarian cancer growth and progression; and the development of novel anti-vascular therapeutic approaches.