

Metastatic Breast Cancer

When detected at an early stage, breast cancer is curable, and deaths from breast cancer are almost always the result of metastatic disease. Metastasis is a complex process by which cancer cells spread from the original tumor site to a distant site. In approximately 5% of the new cases diagnosed each year, the breast cancer has already metastasized. Even with early detection and appropriate treatment, breast cancer can recur and spread to other parts of the body.

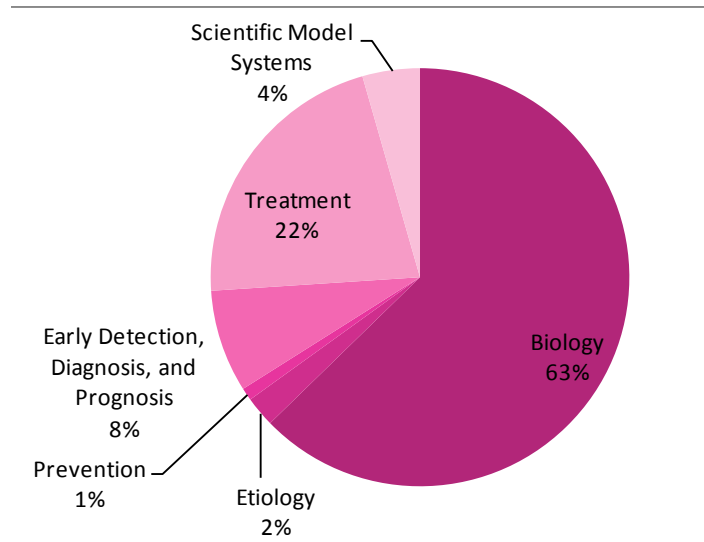
Breast cancer primarily metastasizes to the bone, lungs, regional lymph nodes, liver and the brain. There are multiple subtypes of breast cancer (e.g, luminal, Her2+, triple negative, inflammatory breast cancer), and there is evidence that certain subtypes metastasize to preferred sites. For example, bone metastases are less common in triple negative breast cancer while brain and soft tissue metastases are more common for this subtype. Meanwhile, other subtypes of breast cancer metastasize most frequently to bone.

Treatment of metastatic breast cancer is not uniformly effective in part because we do not fully understand the ways in which cancer spreads. Current research is largely focused on the underlying biology of metastasis. A greater understanding of the mechanisms of metastasis will allow researchers to identify targets for new treatments and may provide biomarkers that can be used to predict the most effective therapies and monitor progress.

Your Research Dollars at Work

In just the past five years, Susan G. Komen for the Cure has awarded 82 grants totaling \$25.5 million in funding for metastasis research. This funding includes training grants for 32 young scientists, who are pursuing careers in breast cancer research, and almost \$20 million to support the work of well-established researchers.

Metastasis Research Investment by Topic 2006-2010



Komen research is helping

- Discover the cellular proteins and pathways that regulate metastasis, including genes that suppress tumor growth and those that promote cancer, called oncogenes
- Identify characteristics that cause breast cancer to spread to specific sites, such as the lungs, bones, or brain
- Understand the role of cancer stem cells in metastasis
- Develop therapeutics that target metastasis and strategies for preventing metastasis, which may include drugs and natural products like fish oil
- Develop methods for predicting or detecting metastasis with blood and urine tests, body scans, or analysis of lymph nodes
- Find ways to trigger an immune response to metastasis or micrometastasis
- Develop pre-clinical models of metastasis that can be used to observe and manipulate the critical steps in metastasis and/or test potential therapeutic strategies
- Determine if changes in the breasts following pregnancy promote metastasis

Metastasis Research Grants Awarded in 2010

Biology—Career Catalyst Research

Elena Pugacheva

West Virginia University
The Role of NEDD9 Protein In Proliferation And Metastasis Of Breast Cancer

Kun Ling

Mayo Clinic and Foundation, Rochester
Type Igamma Phosphatidylinositol Phosphate Kinase: A Key Molecule Promoting Breast Cancer Metastasis

Erica Cassimere, Fellow

Catherine Denicourt, Mentor
University of Texas at Health Science Center at Houston
The Role Of P27kip1 Deregulation During Cell Migration And Metastasis

Xin Xu, Fellow

Xiao-Fan Wang, Mentor
Duke University
TGF-beta Regulates MiR-126/126 Expression To Promote Breast Cancer Metastasis*

Biology—Investigator Initiated Research

Stuart Martin

University of Maryland at Baltimore
Targeting Microtentacles on Circulating Breast Tumor Cells To Reduce Metastasis

Cheryl Jorcyk

Boise State University
Analysis Of Oncostatin M In Breast Cancer Metastasis To Bone For The Purpose Of Inhibiting Disease Progression

Richard Kremer

McGill University, Royal Victoria Hospital
Co-targeting Parathyroid Hormone-related Protein Signaling and Osteoclast Metabolism To Counter Breast Cancer Metastasis To Bone

Suzanne Fuqua

Baylor College of Medicine
Role Of Dicer And BCRP In Hormone Resistance

Biology

Post-Doctoral Fellowship in Basic Research

Thomas Marshall, Fellow

Jody Rosenblatt, Mentor
University of Utah
Cell Extrusion In 3D Models Of Tissue Homeostasis And Cancer Metastasis

Gina Kirsammer, Fellow

Mary Hendrix, Mentor
Children's Memorial Hospital
Validating the Embryonic Morphogen Nodal As a New Therapeutic Target For Breast Carcinoma

Biology

Post-Doctoral Fellowship in Translational Research

Antonio Fernandez Santidrian, Fellow

Brunhilde Felding-Habermann, Mentor
Scripps Research Institute
Role Of Mitochondrial Complex I Modulated Tumor Cell NAD⁺/NADH Redox Balance In Breast Cancer Progression

Jocelyn Reader, Fellow

Amy Fulton, Mentor
University of Maryland at Baltimore
Prostaglandin E EP1 Receptor In Breast Cancer Metastasis And Disparities

Treatment

Post-Doctoral Fellowship in Basic Research

Prajjal Singha, Fellow

Pothana Saikumar, Mentor
University of Texas Health Science Center at San Antonio
Targeting LC3-SQSTM1/p62 Signaling Axis To Treat Apoptosis-resistant And Metastatic Breast Cancers

Treatment—Career Catalyst Research

Gauri Sabnis

University of Maryland at Baltimore
Combination of Histone Deacetylase Inhibitor Entinostat And Aromatase Inhibitor Letrozole In ER-negative Breast Cancer Metastasis Model