

Metastatic Breast Cancer

May 12, 2016

*Stan Lipkowitz MD. PhD
Chief, Women's Malignancies Branch
Center for Cancer Research
National Cancer Institute
National Institutes of Health*

Breast Cancer

Breast Cancer Definition:

A collection of cancers that arise from the cells of the breast

Metastatic Breast Cancer Definition:

**The spread of cancer cells to distant sites in the body
(e.g., lung, liver, bones, brain)**

Statistics

- ~250,000 new cases diagnosed a year in the US**
- ~ 40,000 deaths from breast cancer each year in the US**

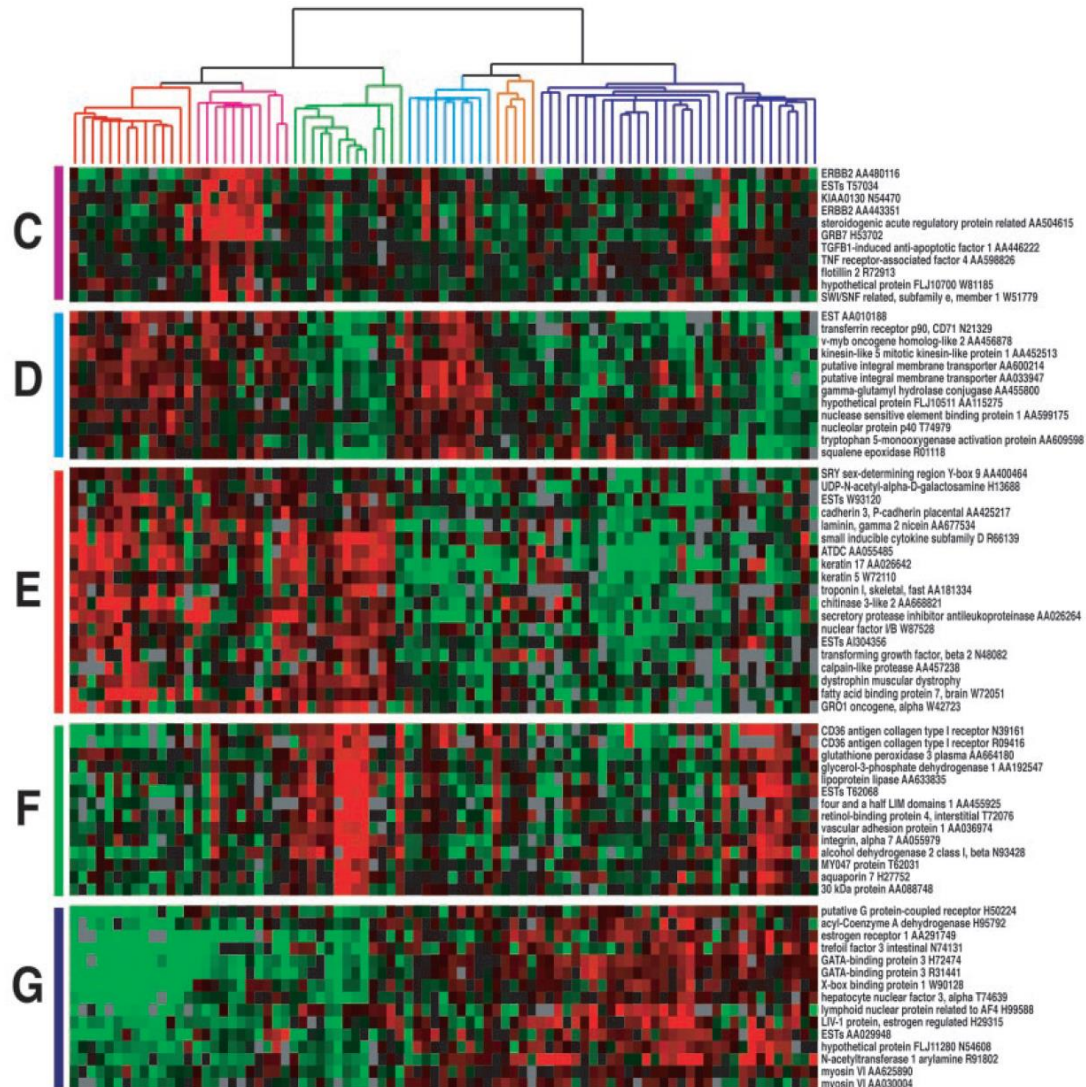
Breast Cancer is Not One Disease

Clinical Classification of Breast Cancer

<u>Type of Breast Cancer</u>	<u>Percentage of Patients</u>		<u>Treatment</u>
Hormone Receptor Positive (Estrogen and Progesterone Receptors)	65-70%	➔	Hormone targeted therapy (e.g., tamoxifen, anastrozole)
HER2 Positive	15-20%	➔	HER2 targeted agents (e.g., trastuzumab, pertuzumab)
None of the Above (a.k.a., Triple Negative Breast Cancer)	15-20%	➔	Chemotherapy

Breast Cancer is Not One Disease

Molecular Classification of Breast Cancer



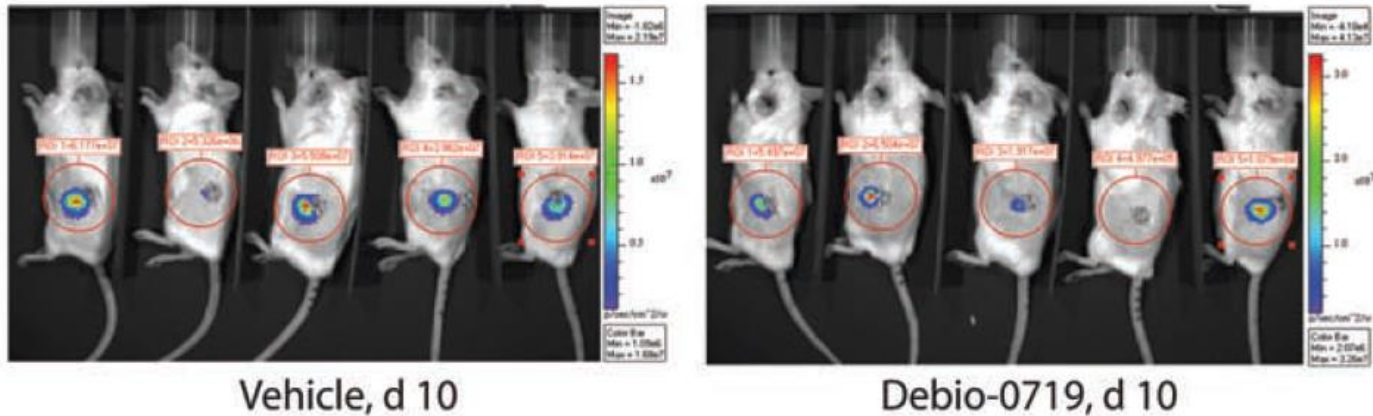
Breast Cancer Studies in the Intramural NCI

Basic and Translational Research at NCI:

- **Causes of metastases**
- **Pathways that drive the growth of breast cancer cells**
- **Activation of innate death pathways in cancer cells**
- **Exploiting the genomic abnormalities of breast cancer cells**
- **Immune therapy**

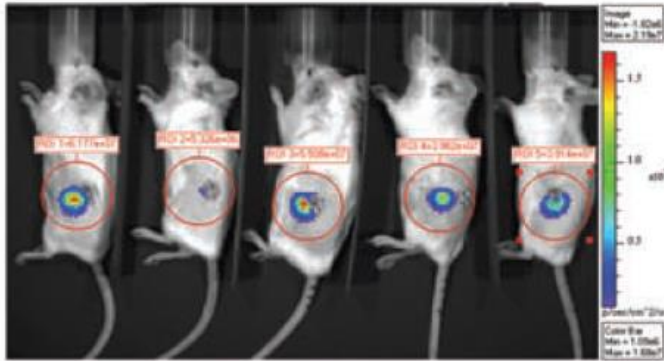
Breast Cancer Studies in the Intramural NCI

Basic/Translational Research Example: Prevention of systemic metastases

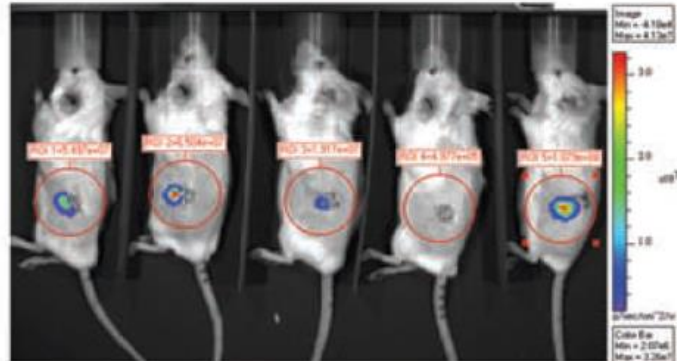


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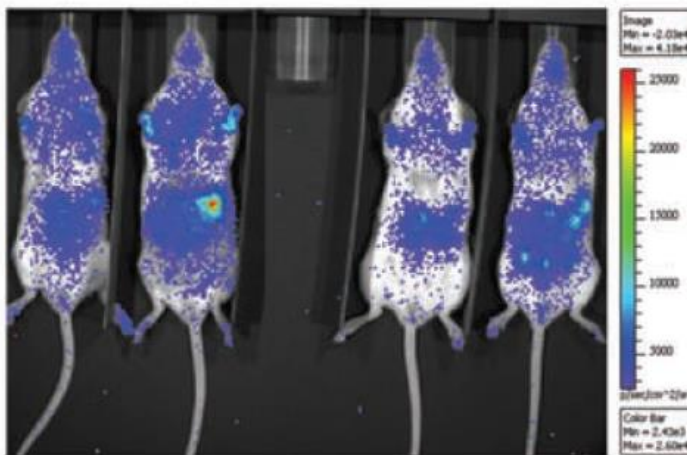
Basic/Translational Research Example: Prevention of systemic metastases



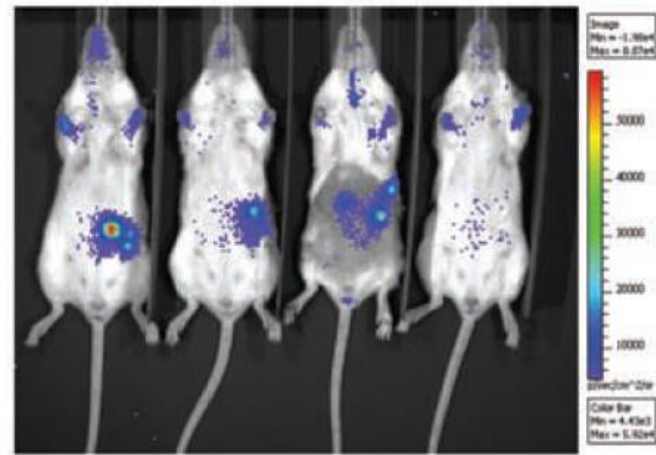
Vehicle, d 10



Debio-0719, d 10



Vehicle, d 70



Debio-0719, d 70

From Dr. Patricia Steeg in Women's Malignancies Branch
Marshall *et al.* JNCI 104: 1306-19, 2012

Breast Cancer Studies in the Intramural NCI

Clinical trials at the NCI:

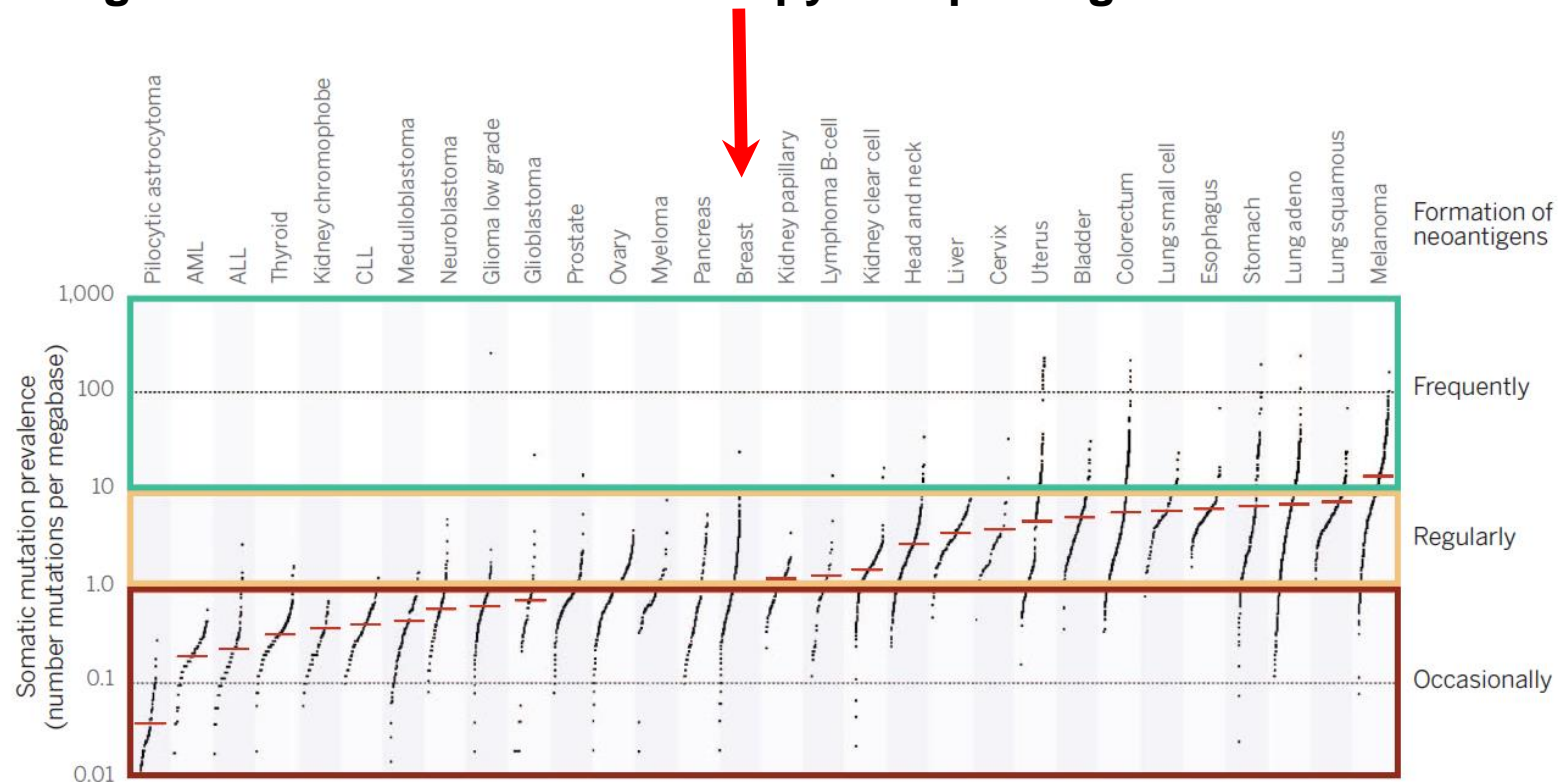
- **Prevention of metastatic disease**
 - **Systemic metastases**
 - **Brain Metastases**
- **Treatment of established metastatic disease**
 - **Molecularly targeted drugs**
 - **Immunotherapy**
 - **Activation of cell death pathways**
 - **Combinations**

Our studies incorporate tumor biopsies before and during treatment in order to identify molecular and genomic factors that predict who benefits from each treatment

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Clinical trial example at the NCI:

Improving the benefit of immune therapy in triple negative breast cancer

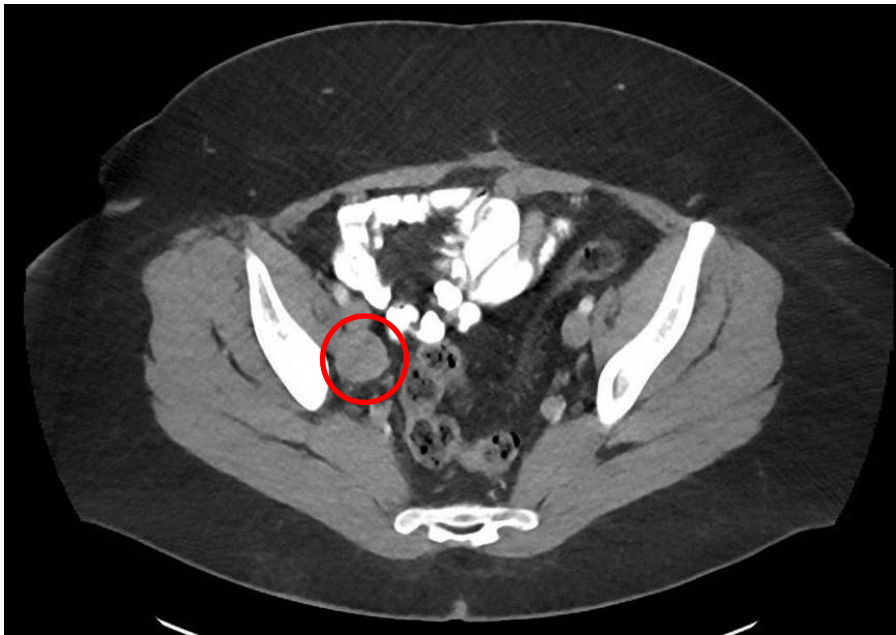


Can we make breast cancer look more like the tumors that respond to immune therapy by combining immune therapy with drugs that will increase the number of mutations in the cancer cells

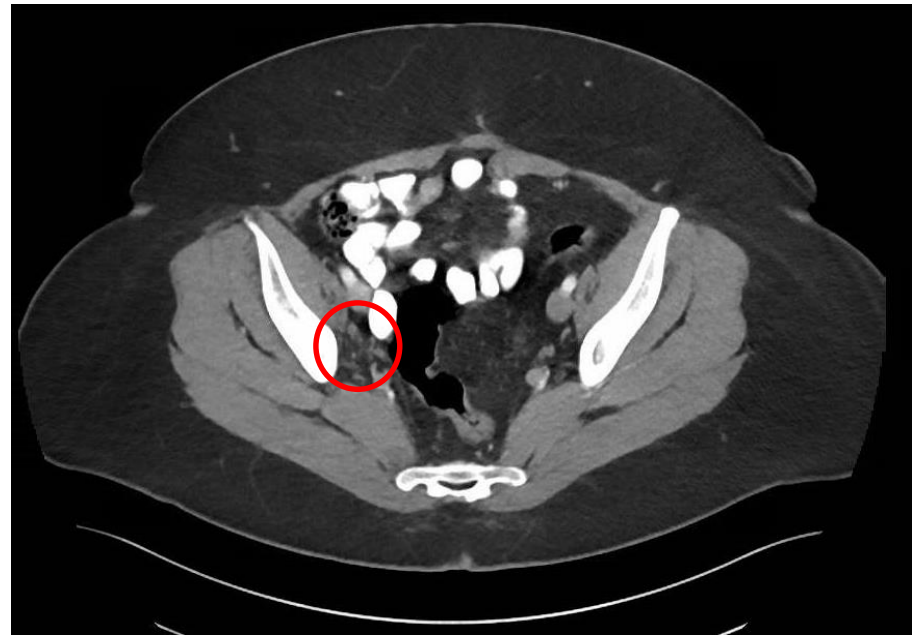
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Combine immune therapy (anti-PDL1) with a targeted therapy (olaparib) that prevents tumors from repairing errors in their DNA

Before Treatment



On Treatment – 10 months



NCI and the Vice President's Cancer Initiative

“The US Cancer Moonshot”

From Doug Lowy, Acting Director, NCI

➤ Cancer Treatment Studies

- Increase immunotherapy trials and combination therapy trials
- Increase patient participation in clinical trials
- Develop a drug formulary from many companies at NCI to facilitate the study of combination therapy
- Expand molecular (-omic) analysis of tumor cells and stromal cells

➤ Prevention, Screening, and Implementation

- Develop preventive vaccines against infectious and non-infectious targets
- Develop screening tests with body fluid samples (*e.g.*, blood, saliva)
- Increase uptake of standard of care for prevention, screening, and treatment

➤ Basic and Translational Research

- Increase preclinical studies of therapeutic cancer vaccines and cancer immunotherapy
- Increase basic research, especially in immunology
- Develop an “exceptional opportunities fund”

Acknowledgements

- **Women's Malignancies Branch, Center for Cancer Research, NCI**
 - **Patricia Steeg Ph.D Deputy Chief**
 - **Christina Annunziata, M.D., Ph.D.**
 - **Jung-min Lee, M.D.**
 - **Alexandra Zimmer, M.D.**
- **Doug Lowy, Acting Director of NCI**
- **Office of of Government and Congressional Relations, NCI**
 - **MK Holohan, J.D.**
 - **Holly Gibbons, M.P.P.**
- **The patients on our clinical trials**