



THE CURE BREAST CANCER FOUNDATION – INNOVATIVE RESEARCH TOWARD A CURE

Breast cancer is one of the leading causes of cancer death in women throughout the world. When the disease is localized in the breast and the lymph nodes under the arm most cases are now cured in countries that apply modern methods of screening, diagnosis and therapy. But should the cells spread to other parts of the body the disease can be controlled, but rarely cured.

The CBCF is dedicated to changing this dire prognosis. We focus our efforts on a revolutionary new concept of cancer.

A dedicated team of physicians and scientists at Memorial Sloan Kettering Cancer Center in New York and New Jersey and their national and international collaborators, coordinated by Dr. Larry Norton, CBCF's Chief Scientific Advisor, have discovered that cancer cell mobility and the interactions between the cancer cell and its microscopic environment are key pathways to understanding and eventually eradicating breast cancer.

*Cancer cells, in addition to their ability to divide and form masses, have the capability of moving from one part of the body to other parts, called *metastasis*. Indeed, cells can circulate back to the place they came from in the first place—called *self-seeding*—and become more aggressive in the process. When cancers are in one place—say the breast area— they can be removed completely or killed by irradiation; but the movement of cells is a bigger problem, one which we are tackling head on by using the most advanced weapons of medical science. For example:*

- *We have found that a particular kind of white blood cell—cytotoxic neutrophils—are able to kill cancer cells. These neutrophils and the molecules that stimulate them, called chemokines, are present in the blood of women with breast cancer but not in women without cancer. We are studying how the presence of such cells can help us determine the prognosis of individual patients. This work also allows for the possibility that we can stimulate the production of such cells in individuals so as to improve their prognosis.*
- *We have made a major discovery—just published and just accepted for presentation at the Annual Meeting of The American Society of Clinical Oncology, the biggest meeting of cancer doctors and scientists in the world—that the white blood cells found in breast cancers may not be normal (as previously assumed) but may have mutations known to be associated with malignancy. This is a finding of huge potential implications.*
- *We have made great progress in studying how cancers evolve in their primary site (the breast) and in metastatic sites. By tracking the changes in DNA in individual cancer cells from several sites simultaneously in individual patients, CBCF scientists plan to monitor such movement as well as define the molecular mechanisms that make the cancer cancerous.*
- *We continue to improve our understanding of cancer in a mathematical sense. With great effort to protect the confidentiality of the patients, CBCF scientists have mapped patterns of spread. We are now able to classify organs of the body as “sponges” that collect metastases and “spreaders” that allow cancer cells to travel from them to other sites in the body. In conjunction with our work on DNA biology this will enable us to understand—and eventually control—the metastatic behavior of cancers.*
- *We continue to assess the relationships between certain molecules derived from cancer cells found in blood—called miRNAs and exosomes—and the geometry of cancerous masses as measured on microscope slides and radiographic images. Cancer seeding has a direct influence on geometry, since more seeding produces more disorganized and denser*

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masses. We have made progress toward our goal to be able to interpret blood tests along with mammograms and MRIs to better predict who has cancer and who requires therapy.

- We are conducting an international study—based in the USA and in Israel—about the relationship between bone metabolism and breast cancer. A paper describing the relationships between the function of bone-forming cells and breast cancer biology is soon to be published. This work relates to both breast cancer and osteoporosis, two common problems in post-menopausal women throughout the world.*
- We are convening an international group of world-leaders in breast cancer hereditary genetics to discuss whether certain populations—particularly those of Ashkenazi Jewish ancestry—should have testing for mutations in BRCA1 and BRCA2 regardless of their own family histories. This is a major topic with obvious implications beyond the strictly medical.*

It is clear that donations to CBCF are used to fund innovative research that could significantly change the management of breast cancer in the near future. Generosity is rewarded by results. We thank all of our supporters and promise them our total dedication to achieving a world free of breast cancer.

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