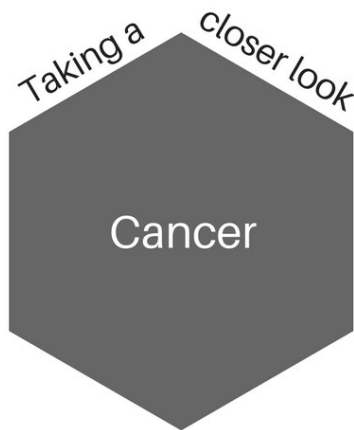
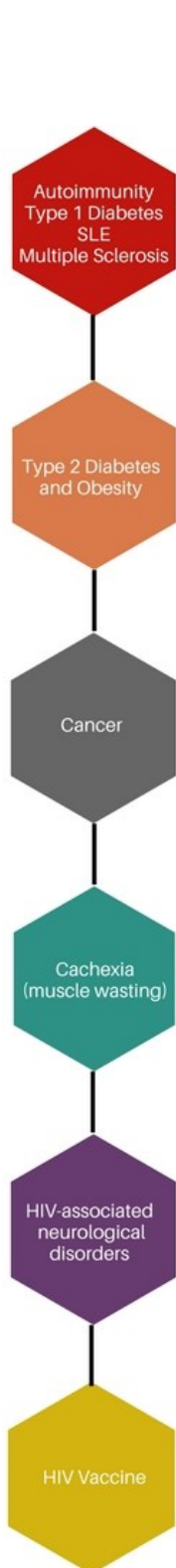


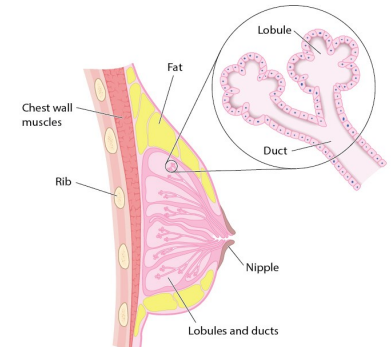
The Bench and Beyond



At diagnosis, breast cancer is usually recognized as a lump of tissue either in the breast or in the lymph nodes close to the breast. The lump is made up of many cells that multiply in an uncontrolled manner. It begins when a single cell stops listening to the normal signals that tell it not to multiply. Without this control, the cell multiplies into 2 cells, then both cells divide again, and again, until there is a mass of cells that can be detected by touch or by other screening methods. A tumor that contains one million cells is just visible to the naked eye. There are many different types of cells in the breast and not all have the same capacity to become cancer cells. The cells that most often turn into cancer are those that make the tubes, called ducts, that carry the milk to the nipple. The cells that make up the milk producing glands (also

called lobules) are the second most likely to develop into cancer (see diagram on the right). Breast tissue also contains fat, lymph nodes, blood vessels and a tissue called, connective tissue.

There are 4 main stages to breast cancer, where stage 1 is the earliest stage. In stage 4, the cancer has spread beyond the breast and lymph nodes to other organs in the body, a process called metastasis. At SDBRI our scientists are working to prevent the spread of cancer cells to other organs.



Breast cancer research at SDBRI It is estimated that over 330,000 new cases of breast cancer will be diagnosed in the U.S. in 2018. For many of these women, even after treatment, their breast cancer will come back at some point in their life and spread to other organs, but we have no way of telling who will have a recurrence or when.

Genes that have the capacity to turn normal cells into cancer cells are called oncogenes. Dr. Wael ElShamy of SDBRI has discovered a gene that, if left uncontrolled, can turn a normal cell into a cancer cell. The gene is called IRIS. IRIS is present in very high amounts in cancer cells from women with triple negative breast cancer, the most aggressive form of breast cancer. In an experimental system Dr. ElShamy has shown that if the function of IRIS is blocked, the cancer cannot spread. Ultimately we would like to develop a drug to block IRIS in patients with triple negative breast cancer to prevent the spread to other organs.

SDBRI scientist, Dr. Barbara Mueller, studies how cancer cells interact with their surrounding non-cancer cells that allows them to more easily grow and spread to other organs. She has discovered several molecules that are so important that cancer cells fail to grow and move without them. The Mueller group is now focused on understanding how these molecules work by teasing out which signals they send into the cancer cell that tell it to divide and move. Using all of this information, new drugs can be designed to inhibit the activity of these all-important cancer molecules, and stop the spread of cancer.

Frequently Asked Questions!

What are the reasons people develop breast cancer? There are many factors that can increase or decrease the chance that a woman will develop breast cancer. Some are genetic, others are caused by medical treatments and still others are lifestyle factors. The risk factors that have the most dramatic effect in increasing the chance that a woman will develop breast cancer are mutations in certain genes, including BRCA1 and BRCA2. BRCA1 and BRCA2 mutations can be inherited from either the mother or the father. Radiation therapy to the chest in young adult life and the use of menopausal hormone therapy for more than 5 years also increases the risk of breast cancer in later life. According to the United States National Cancer Institute, the lifestyle factors that most strongly associate with risk of breast cancer are exercise, weight and alcohol intake. Women who are less physically active are at greater risk of breast cancer than women who exercise regularly, and postmenopausal women who are overweight or obese are at greater risk of breast cancer than those who have a healthy weight. In addition, the risk of breast cancer increases with increased alcohol intake.

Does exercise really help to reduce the risk of breast cancer? Studies have shown that women who exercise regularly after breast cancer diagnosis have a 40% to 50% lower risk of breast cancer recurrence than those who do not exercise. The U.S. Department of Health and Human Services recommends that adults engage in at least 150 minutes of moderate physical activity or 75 minutes of vigorous activity spread throughout the week.



SDBRI scientists at the 2017 Susan G. Komen Race for the Cure

What is the deal with weight and cancer risk? According to the National Cancer Institute, there is a strong association between being obese and the development of breast cancer. It is not known for sure whether obesity causes cancer or whether people who are obese are more prone to developing cancer for other reasons. What is clear though, is that the more body fat a person has, the more at risk that person is to developing cancer. For postmenopausal women, obesity increases the risk of breast cancer by 20-40% compared to non-overweight women.

Is it true that men can be diagnosed with breast cancer? Yes, breast cancer can occur in men but it is about 100 times more common in women.

How is breast cancer treated? Breast cancer is normally treated with combinations of surgery, radiation, chemotherapy and hormone therapy depending on the cancer stage, type, and genetic susceptibility. Immunotherapy has been used successfully for some cancers, but is not currently approved for breast cancer. Ongoing clinical trials are testing the effect of immunotherapy drugs on breast cancer. The five-year survival rate for breast cancer is 90% with a ten-year survival rate of 83%. If the cancer is found only in the breast the five-year survival rate is 99%.

Next Issue:


Take a closer look at HIV associated neurological disorder.


Location

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