CRG BREAST CANCER GENES: Myths and Facts

Scientists do not currently know what causes breast cancer or how to prevent it. Research completed over the past twenty years indicates the existence of several risk factors that seem to increase an individual's chance of getting the disease. The two most significant risk factors for breast cancer currently identified are gender and age- In addition, family history and in a small number of cases, genetics can indicate an increased risk for breast cancer.

All women and men are born with two copies of the so-called "breast cancer genes," BRCA-1 and BRCA-2. When functioning properly, these genes are thought to protect against cancer by suppressing abnormal cell growth. If one copy of these tumor suppressor genes becomes damaged, the other copy can act as a "brake" on uncontrolled cell growth. Scientists have identified at least four other genes that may play a role in breast cancer risk.

Several hundred variations of the BRCA genes have been identified so far. Some of these appear to be linked to an increased risk of breast and ovarian cancer, particularly in women with a strong family history of one or both of these diseases. A woman born with one damaged version of a BRCA gene has only one working set of "brakes" for uncontrolled cell growth. If her second BRCA gene becomes damaged by exposure to carcinogens or otherwise, the woman can develop cancer. BRCA variants, in and of themselves, do not cause cancer. However, women who inherit certain variants may be less protected against abnormal cell growth.

Inherited mutations appear to play a role in only about 5% to 10% of breast cancer cases and in as much as 50% ovarian cancer cases. The remaining 90% apparently do not involve inherited mutations.

It is now possible to test women and men to see if they have inherited an altered BRCA gene. The BRCA genetic test may indicate the presence or absence of a particular mutation, but the test cannot predict whether a woman will develop cancer. Such testing offers few clear advantages:

- A positive test for a cancer-associated BRCA variant will not tell a woman if she is going to get breast or ovarian cancer. It simply means that she has one of many possible factors which may increase her likelihood of getting cancer, and therefore she may have a higher than "average" lifetime risk of developing this condition.

- A negative test for a BRCA variant does not mean that a woman will not get breast or ovarian cancer. It means that her risk is approximately the "average" lifetime risk of the general population for breast cancer. The lifetime risk for women in the United States is one in eight; in 1960, it was one in fourteen.

- There is no known effective prevention for breast or ovarian cancer. The surgical removal of healthy breast and ovarian tissue is believed to lower a woman's risk of cancer, but it cannot eliminate it.

Getting tested for the presence or absence of the BRCA mutations can have many adverse effects:

- Testing positive can have devastating

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psychological effects- This can impact not only the individual who is tested but also her entire family, all of whom may share her genetic risk status.

• Positive test results can lead to discrimination. Healthy people who carry genes linked to risk of future disease are vulnerable to discrimination in insurance, employment and other arenas.

• Tests with limited predictive value may lead to women having unnecessary surgery, such as prophylactic mastectomies and oophorectomies.

• The overemphasis on genetic factors in cancer, when environmental carcinogens are known to make major contributions, takes attention away from environmental clean-up measures that could, in fact, reduce the incidence of cancer. Current research has identified links between cancer and a host of non-genetic factors, including some organochlorides, estrogen and estrogen-like chemicals, pesticides, radiation, bovine growth hormone, diet and exercise. The "geneticization" of cancer creates a blame-the-victim mindset that obscures social and environmental factors.

Until we liave effective prevention strategies, tests for variants of so-called "cancer genes" benefit mainly the companies that market them, who stand to make huge profits by exploiting women's justifiable fear of cancer. The marketing of genetic tests by companies to health care providers and the general public is inherently promotional, and continues to compound the social, legal and ethical challenges posed by genetic information.

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