



USING DEODORANT CAN LEAD TO BREAST CANCER.

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 October 13, 2007

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What are the biological causes of breast cancer?

Breast cancer, like all cancers, develops because of defects in the [DNA](#) of a single cell. The human body is composed of trillions of cells. Inside the inner core ([nucleus](#)) of each cell are [chromosomes](#). Every human cell has two sets of 23 chromosomes. Each set is inherited from one parent. DNA exists as long, spiraled strands on these chromosomes. Different segments along the DNA strands contain information for various genes. Genes are blueprints that govern the growth, development, and behavior of every cell. Human DNA is thought to contain approximately 50,000 to 100,000 genes. Most genes carry instructions for the types and the amount of [proteins](#), [enzymes](#), and other substances produced by the cells. Genes also govern the sizes and the shapes of the organs by controlling the rate of division of the cells within these organs. (During cell division, a cell makes a duplicate copy of its chromosomes and then divides into two cells). Some genes restrict cell division and limit tissue growth.

Defects on the DNA strands can lead to gene coding errors, which in turn can cause diseases. When genes that normally restrict cell growth and divisions are absent or defective, the affected cells can divide and multiply without restraint. The cells that divide and multiply without restraint enlarge (forming a tumor) and can also invade adjacent tissues and organs. These cells can further break away and migrate to distant parts of the body in a process called [metastasis](#). The ability to multiply without restraint, the tendency to invade other organs, and the ability to [metastasize](#) to other parts of the body are the key characteristics of cancers - characteristics that are due to DNA defects.

The cancer-causing DNA defects can be acquired at birth (inherited) or may develop during adult life. The inherited DNA defects are present in every cell of the body. On the other hand, DNA defects that develop during adult life are confined to the descendants (products of cell divisions) of the single affected cell. Generally, inherited DNA defects have a greater tendency to cause cancers and cancers that occur earlier in life than DNA defects that develop during adult life.


Research has shown that 5 to 10% of breast cancers are associated with mutations (defects) in two genes known as breast cancer-associated (BRCA) genes, BRCA1 and [BRCA2](#). These genes function to prevent abnormal cell growth that could lead to cancer. Every cell in the body has two BRCA1 or BRCA2 genes, one inherited from each parent. A woman who has received one defective

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BRCA1 or BRCA2 gene from one parent and a healthy gene from the other is called a carrier of the defective BRCA gene. Even though only one healthy BRCA1 or BRCA2 gene is needed to help prevent cancerous growth of cells, the one remaining healthy BRCA gene is vulnerable to damage during adult life by environmental factors such as toxins, radiation, and other chemicals such as free-radicals. Therefore, women bearing a defective BRCA1 or BRCA2 gene are at an increased risk of developing breast and [ovarian cancers](#). Women carrying defective BRCA1 or BRCA2 genes also tend to develop these cancers earlier in life.

Other rare genetic mutations are also associated with an increased risk for the development of breast cancer, including mutations of the tumor suppressor gene [p53](#), the CHEK-2 gene, and the ATM ([ataxia-telangiectasia mutation](#)) gene.

Since inherited DNA defects account for only 5% to 10% of breast cancers, the majority of breast cancers are due to DNA damages that develop during adult life. Environmental factors that can cause DNA damage include free radicals, chemicals, radiation, and certain toxins. But even among individuals without inherited cancer-causing DNA defects, their vulnerability to DNA damage, their ability to [repair DNA](#) damage, and their ability to destroy cells with DNA damage, are likely genetically inherited. This is probably why the risk of cancer is higher among first-degree relatives of breast cancer patients even among families that do not carry the defective BRCA1 and BRCA2 tumor suppressing genes.

Some of the errors in the normal control mechanisms allow the accumulation of additional errors in other parts of the system. These errors may lead to gene silencing of critical control genes or the over activity of other growth stimulating genes by activation of promoter sites adjacent to these otherwise normal genes.


Other substances such as estrogen (a female hormone) and certain [fatty acids](#) may also increase the risk of breast cancer by stimulating the growth and division of cells of the breast tissue.

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