



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 <u>fatty acids</u> may also increase the risk of breast cancer by stimulating the growth and division of cells of the breast tissue.

« Previous | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Next »

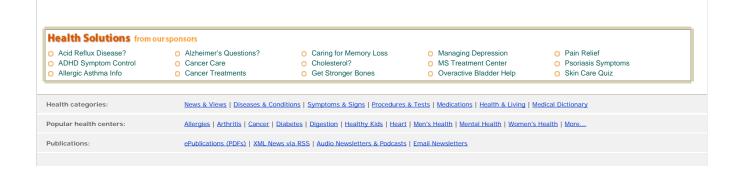
Breast Cancer Prevention Index Glossary

Next: What are the risk factors for developing breast cancer? >>

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