

Hereditary Cancer: Background Information

Overview

Cancer arises from the uncontrolled growth of cells. Cells are the units that make up our tissues and organs (for example, our skin, lungs and brain), which in turn make up our entire body. When cells are doing their job well, they know when to grow and when to stop growing. Cells contain genes. Genes are the instructions that tell cells how to function properly, like when to grow and when to stop growing. Cancer is caused by harmful changes in genes, called mutations. These mutations cause the cell to grow without control, and eventually become a cancer.

Most cancers are **sporadic** – they are not inherited and cannot be passed to your children. Because cancer is common, some families may have a few members affected with sporadic cancers just by chance. Sporadic cancers may be the result of environmental exposures. Sporadic cancer may also be due to mutations that occur in genes by chance when a cell divides. Since these mutations occur only in the cancer cells, they cannot be passed on.

Sometimes cancers cluster in families. In these cases, more cancers are occurring than would be expected by chance, yet they do not appear to be clearly hereditary (able to be passed on within the family). It is possible that interactions are occurring between genes and the environment or among several genes that contribute to the development of these cancers. This type of moderately increased cancer risk can be called a “**familial**” risk.

Hereditary Cancer

About 5-10% of cancers are believed to be **hereditary**. Hereditary susceptibility to cancer can be inherited and passed on within a family. Individuals who inherit a mutation in a cancer susceptibility gene have a much greater chance for developing cancer. However, not everyone with a cancer susceptibility gene mutation will develop cancer.

Cancer susceptibility gene mutations can be inherited from, and passed on to, men as well as women. Almost all genes come in pairs. One gene copy of each pair is inherited from the father and the other gene copy is inherited from the mother. Therefore, if a parent has a gene mutation associated with cancer susceptibility, each of his/her children has a 50% (1 in 2) chance of inheriting the gene mutation. Each child also has a 50% chance of inheriting the working copy of the gene, in which case his/her cancer risk would be no higher than that of the general population.

Features suggesting hereditary cancer include:

- early ages of cancer diagnoses (i.e. breast cancer before age 50)
- two or more relatives with the same type of cancer, on the same side of the family
- several generations affected by cancer
- multiple primary cancers in one individual (including breast and ovarian cancer or bilateral breast cancer)
- male breast cancer
- clustering of cancers which are known to be genetically related (such as breast and ovarian cancer, or colon and uterine cancer)
- the presence of certain features which are known to be associated with hereditary cancer (such as moles and melanoma, or polyps and colon cancer)