



Review of Cancer Genetics^{©2002}

All cancers develop as the result of changes (mutations) in specific genes that, when working normally, control the growth of cells in the body. Thus, all cancers are “genetic” because they involve changes in the genetic material. Genetic changes that cause cancer can be categorized into three groups:

Sporadic, Familial and Inherited.

- **Sporadic Cancers**

Most cancer (90% - 95%) is *sporadic*, meaning that it occurs by chance. Since we all are at some risk of developing cancer in our lifetimes, family members of a person with sporadic cancer are not at increased risk above the general population to develop cancer.

- **Familial Cancers**

Familial cancers cluster in a family, but do not seem to be caused by a mutation in one gene. The risk of cancer to family members is considered to be modestly increased. Many familial cancers are the result of multi-factorial influences, meaning that a combination of several genes and environmental factors all contribute a small amount to increase cancer susceptibility in a family. We do not yet have the capability of testing these genes or pinpointing causative environmental factors. Thus, in familial cases, testing is not possible. Risks to develop cancer are based on population data.

- **Inherited Cancers**

Only a small percentage of cancers are *inherited* (5% - 10%). At the level of the gene, the difference between *inherited* and *sporadic* cancer is that in the sporadic cases, all of the entire cancer-causing gene mutations are acquired, not inherited. These mutations are only present in the cells that make up the cancer. In contrast, in hereditary cases, one gene mutation is inherited. This single gene mutation was present in the egg or sperm from which the person was conceived and is in every cell of the body. Still, other changes in growth-control genes must occur (be acquired) before a person with an inherited mutation develops cancer. However, since fewer mutations need to occur, cancer can develop at a younger age. When a person has an inherited mutation in a cancer predisposition gene, each child has a 50% chance of inheriting the mutation.

Hereditary cancers tend to differ from *sporadic* ones in the following ways. In families with an *inherited predisposition*:

- Family members tend to be diagnosed at earlier ages
- Multiple family members have similar diagnoses
- Cancer is more likely to develop in more than one site (two separate primaries)
- Rare diagnoses, such as male breast cancer, are present

To make an appointment for a cancer genetic evaluation, please call (404) 296-3981.