Hereditary vs sporadic cancer: analysis

\n[toc title="Table of Contents"]\n

\n \t

1. Sporadic cancer \n \t
2. Hereditary \n \t
3. Links between mutations and cancer – briefly \n

\n[/toc]\n \n

Cancer is a common disease, so most families will have some members who have had cancer. Cancer that is not due to inherited gene changes is called “ sporadic cancer.” It is believed that most- perhaps 90%-of all cancers are sporadic. This means even if cancer does not run in a family, a family member can still be at risk for some type of cancer in his or her lifetime.

Sporadic cancer and hereditary cancer differ in several ways that may affect health care decisions:

Hereditary cancer often occur earlier than the sporadic form of the same cancer, so experts often recommend different screening, at a younger age for people with hereditary cancer in their family.

Hereditary cancers are caused in part by gene changes passed on from parents to their children. Other blood relatives may share these same gene changes. Sporadic cancers are believed to arise from gene damage acquired from environmental exposures, dietary factors, hormones, normal aging, and other influences. Most acquired gene changes are not shared among relatives or passed on to children.

Individuals who have inherited a gene change may be at a higher risk for more than one type of cancer. For cancer survivors, this may affect cancer treatment options or follow-up care.

In people with sporadic cancer, certain cells in their body developed mutations that led to cancer.

In sporadic cancer, only the tumor cells have mutations. In hereditary cancer, every cell in the person’s body has a mutation.

Sporadic cancer

Most cancers are considered sporadic. In people who have sporadic cancer, they did not inherit cancer-causing mutations from their parents. Instead, certain cells in their body developed mutations that led to cancer. These mutations can be caused by sun (which can lead to skin cancer), exposure to radiation or some chemicals, or even random events within the cell.

Cancer-causing mutations generally interrupt the function of genes that either keep the cell dividing at a normal rhythm or prevent mutations from accumulating. It usually takes more than one mutation to cause cancer. But if the first mutation occurs in a gene that repairs or prevents other mutations, then additional changes can quickly accumulate. Eventually, the cell has enough mutations that it begins to divide out of control. When this happens, the cell divides rapidly and forms a mass called a tumor. Only the cells within the tumor contain the spontaneous mutations.

Researchers are starting to identify genes that are commonly mutated in sporadic cancers. These studies can tell a doctor important things about how

the sporadic cancer develops and how it will respond to treatment. However, finding these genes does not provide any information about a person's hereditarycancer risk or the risk of other members of their family.

Hereditary

People with hereditary cancer inherit a mutated gene from their parents. Every cell in the person's body contains the mutation. Most importantly, cells of the ovaries and testes – which make the sperm and eggs – contain the mutation and can pass that altered gene along to children.

It generally takes more than just one mutation to cause cancer. But people who have inherited a mutation are one step closer to cancer than those who haven't. Eventually, additional mutations accumulate in a cell, and that cell begins dividing quickly to form a tumor. In the case of hereditary cancer, the tumor cells usually contain some mutations that aren't found in the rest of the body, but also contain one critical mutation that every cell shares. Because these people were born with a cancer-related mutation, they are more likely to develop cancer and to develop it at a young age than are people who do not inherit a mutation.

The genes that cause hereditary cancer are often the same ones that are mutated in sporadic cancers. For example, people with the hereditary cancer syndrome called Li-Fraumeni have a mutation in a gene called p53. Mutations in p53 are also commonly found in sporadic cancers. Again, the difference is that people with sporadic cancers can't pass their mutated p53 gene on to their children, whereas people with Li-Fraumeni can.

Links between mutations and cancer – briefly

However, just a small portion of cancer is inherited: a mutation carried in reproductive cells. We all have two healthy gene. If one is broken, I believe you can fix it through changing your diet, exercising etc.

Cancer is a disease of genes gone awry. Genes that control the orderly replication of cells become damaged, allowing the cell to reproduce without restraint and eventually to spread into neighboring tissues and set up growths throughout the body.

All cancer is genetic, in that it is triggered by altered genes. However, just a small portion of cancer is inherited: a mutation carried in reproductive cells, passed on from one generation to the next, and present in cells throughout the body. Most cancers come from random mutations that develop in body cells during one’s lifetime – either as a mistake when cells are going through cell division or in response to injuries from environmental agents such as radiation or chemicals.

a. Cells do not require mutations to become cancerous but acquire them as they divide.

b. Only a mutation can stop a cell once it becomes cancerous.

c. Some mutations cause cells to lose control over cell division.

d. Any point mutation will cause a cell to start proliferating without control.

e. Cells lose the ability to mutate their DNA and evolve once they become cancerous.

WHAT IS A MUTATION?

A mutation is a permanent change in the DNA sequence of a gene. Mutations in a gene’s DNA sequence can alter the amino acid sequence of the protein encoded by the gene.

How does this happen? Like words in a sentence, the DNA sequence of each gene determines the amino acid sequence for the protein it encodes. The DNA sequence is interpreted in groups of three nucleotide bases, called codons. Each codon specifies a single amino acid in a protein.

WHAT IS A cancer?

Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems.

Cancer is not just one disease but many diseases. There are more than 100 different types of cancer. Most cancers are named for the organ or type of cell in which they start – for example, cancer that begins in the colon is called colon cancer; cancer that begins in basal cells of the skin is called basal cell carcinoma.

- Carcinoma – cancer that begins in the skin or in tissues that line or cover internal organs.
- Sarcoma – cancer that begins in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue.

- Leukemia – cancer that starts in blood-forming tissue such as the bone marrow and causes large numbers of abnormal blood cells to be produced and enter the blood.
- Lymphoma and myeloma – cancers that begin in the cells of the immune system.
- Central nervous system cancers – cancers that begin in the tissues of the brain and spinal cord.