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Commentary

A Brief Description on Oncogenes and Tumor Suppressor Genes

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DESCRIPTION

Two of the most important types of genes involved in cancer are oncogenes and tumor suppressor genes.

Oncogene

Proto-oncogenes are usually genes that help cells grow. If the protooncogene is mutated (altered) or has too many copies, it becomes a "bad" gene that can be activated when it should not be turned on or activated. When this happens, the cells grow out of control and can lead to cancer. This bad gene is called an oncogene. It is convenient to think of the cell as a car. For it to work properly there must be a way to control the speed. The proto-oncogene usually functions like an accelerator pedal. It helps cells grow and divide. Oncogenes are like an accelerator pedal stuck and can cause cells to divide out of control. Some cancer syndromes are caused by genetic variation of the proto-oncogene that causes the oncogene to turn on (activate). However, most cancer-causing mutations involving oncogenes are acquired rather than hereditary.

They generally activate oncogenes by:

Chromosomal rearrangement: A chromosomal change that places one gene next to another and allows one gene to activate the other.

Gene duplication: Extra copies of genes can overproduce certain proteins

Tumor suppressor gene

Tumor suppressors are normal genes that slow cell division, repair DNA errors, and tell cells when they die (a process known as apoptosis or programmed cell death). If tumor suppressor genes do not function properly, cells can grow out of control and lead to cancer. "Apoptosis" is an interesting word from Latin that means "fall" like a leaf falling from a tree. And the leaves fall from the dead tree. And apoptosis refers to a process called programmed cell death, in which cells actually commit suicide in a strange way and when that happens, there are intracellular pathways and scripted mechanism of the entire protein, which are activated and actually kill the cell without causing much disruption. And it usually happens during development, for example hand development. At first, the hands are usually very similar to the duck paddle's feet and webbed fingers. Apoptosis of these cells leads to the finger. There is a human condition where it stops, apoptosis does not occur, and people are born with webbed feet. Apoptosis usually occurs in cells that are long enough to be worn out, so the need to give way to new young cells. If that doesn't happen, it's cancer. Therefore, apoptosis can be normal, and without apoptosis, it can lead to cancer. Too much apoptosis in otherwise normal humans leads to a series of disorders called neurodegenerative disorders. In this disease, cells die when they shouldn't. And they receive messages from somewhere, most of which don't understand and are telling them to die, causing Parkinson's disease in certain parts of the lower part of the brain. It also characterizes Huntington's disease and Alzheimer's disease, Lugeric's disease and many other neurodegenerative diseases.

Tumor suppressor genes are like brake pedals in cars. Brakes prevent the car from speeding up same pattern it retain the cells from rapid division. If these genes are absent then the cell division will become uncontrollable. An important difference between a cancer gene and a tumor suppressor gene is that the cancer gene results from the activation (on) of the proto-oncogene, while the tumor suppressor gene causes cancer when inactivated (off). Hereditary abnormalities in tumor suppressor genes have been found in several familial cancer syndromes. They cause certain types of cancer to occur in the family. However, mutations in most tumor suppressor genes are acquired rather than inherited. For example, abnormalities in the TP53 gene (encoding the p53 protein) have been found in more than half of human cancers. Acquired mutations in this gene occur in a variety of cancers.

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