Oncogene Encyclopedia Article

Oncogene

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Oncogene

An oncogene is a special type of **gene** that is capable of transforming host cells and triggering carcinogenesis. The name is derived from the Greek *onkos*, meaning bulk, or mass, because of the ability to cause tumor growth. Oncogenes were first discovered in **retroviruses** (**viruses** containing the enzyme reverse transcriptase, and **RNA**, rather than **DNA**) that were found to cause cancer in many animals (e.g., feline leukemia virus, simian sarcoma virus). Although this is a relatively common mechanism of oncogenesis in animals, very few oncogene-carrying viruses have been identified in man. The ones that are known include the papilloma virus HPV16 that is associated with cervical cancer, HTLV-1 and HTLV-2 associated with T-cell leukemia, and HIV-1 associated with Kaposi sarcoma.

Studies of humans led to the discovery of related genes called proto-oncogenes that exist naturally in the human genome. These genes have DNA sequences that are similar to oncogenes, but under normal conditions, the proto-oncogenes do not cause cancer. However, specific **mutations** in these genes can transform them to an oncogenic form that may lead to carcinogenesis. So, in humans, there are two unique ways in which oncogenesis occurs, by true viral infection and by mutation of proto-oncogenes that already exist in human cells.