



# Newsletter

CANCER CONSULTANTS OF AMERICA

BRIDGING THE GAP BETWEEN CANCER AND UNDERSTANDING®

## Cancer Answers

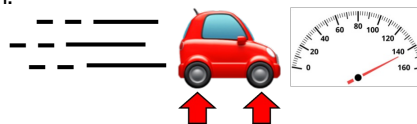
### What is an Oncogene?

Many people are aware of the term "oncology" and its connection to cancer. However, there is much more to know about this compound word. The term oncology is a single word comprised of two words, "oncos" meaning tumor or mass and "-ology" refers to the study of. In a similar fashion, an oncogene is a mutated piece of genetic information (DNA) with the potential to transform a healthy cell into a cancer cell. Building on this information, a proto-oncogene is a healthy gene that is present in the cell and serves as the genetic precursor to a cancer gene. The prefix "proto" means first or foremost. In a healthy context this unmutated proto-oncogene is responsible for healthy growth and cellular replication. However, when a mutation occurs within the proto-oncogene it becomes an oncogene. As a result, this mutated gene functions in a manner that promotes uncontrollable cellular growth, which is a hallmark of cancer (limitless replicative potential). Taken together, a proto-oncogene is present in healthy cells and becomes an oncogene after a mutation occurs within the genetic sequence resulting in uncontrolled cancer growth and development.

To understand the genetic mechanisms within a cancer cell, a common understanding of an automobile can be utilized. The proto-oncogenes are likened to the accelerator pedal and tumor suppressor genes are associated with the front and back braking systems of the car. Under healthy circumstances, both accelerator pedal and braking systems function properly which is similar to controlled cellular growth and replication. In contrast, when mutations occur within these genes, it is similar to these automobile systems not functioning properly. For example, once the proto-oncogene is mutated and becomes an oncogene it is likened to the accelerator pedal always being in the on position. Fortunately, the front and back braking systems (tumor suppressors) prevent movement of the car. If one of the tumor suppressor genes becomes mutated and does not function properly, this mimics the situation of cutting the brake line to one of the braking systems of the car. Despite an activated accelerator pedal and one of two braking systems not functioning properly, the car is still controllable due to the only remaining functional braking system. However, if a mutation occurs within the second tumor suppressor gene, the remaining braking system line is cut and is no longer functional. This results in uncontrolled movement of the car. At the cellular level, growth and replication are now uncontrollable which favors cancer development and tumor growth.

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At the most basic level of our understanding, cancer development can occur with one mutated proto-oncogene (accelerator pedal) and two mutated tumor suppressor genes (front/back braking systems). The study of cancer (oncology) has provided us with this understanding of cancer. Furthermore, information about cancer has been acquired allowing us to develop therapies that target the accelerator pedal and prevent it from being in the on position. The targeted therapies are like taking a mason brick and putting it in between the accelerator pedal and the floorboard of the car to prevent the activation of the accelerator pedal. Using this approach, we are able to control the acceleration of the cancer growth and do not need to focus on the dysfunctional braking systems (tumor suppressors). A class of cancer therapies known as tyrosine kinase inhibitors (TKIs) function in a manner that is similar to blocking the activation of the accelerator pedal. Despite dysfunctional tumor suppressor genes, we can prevent the development of cancer by blocking the accelerating mechanisms of the cancer cell and prevent tumor growth.



Submit your **Cancer Answers** topics to [info@CancerConsultantsOfAmerica.com](mailto:info@CancerConsultantsOfAmerica.com)

### We Are Available to You

Please contact us today if you would like more information about how our services can benefit you and your family.

#### Services:


- Individual and Family Cancer Education
- Medical Appointment Liaison Services
- Information Seminars and Public Speaking Events

### Fun Facts – January

#### Cancer Awareness Month:

- Cervical Cancer (Teal & White)



January 1, 2, 3 – January has 5 WTFs (Wed., Thur., Fri.) 

January 8 – National Bubble Bath Day 

January 11 – International Thank-You Day 

January 23 – Measure Your Feet Day 

January 31 – Backwards Day 


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