

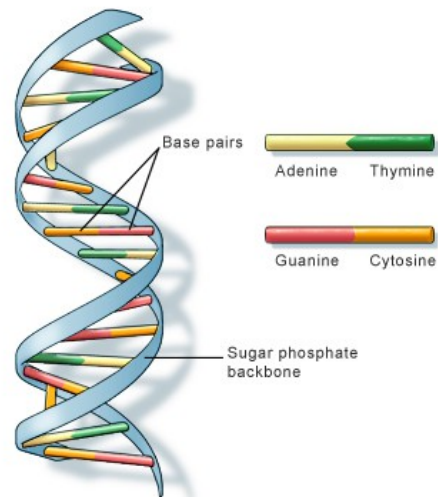
Recent Advances in Cancer Treatment

a Selection of Readings

Before you begin on readings in new treatments for cancer, it's important to know what cancer is. The term “cancer” is actually an umbrella term for literally thousands of different kinds of illnesses. The common element that makes all of those illnesses cancers is that they all begin when a mutated cell begins to multiply rapidly. Cell mutations occur in the body all the time, but most of the time they are considered “benign”, because those mutations don't lead to excessive cell growth or the release of bio-toxins, or the mutation is readily caught by our immune system, so those cells are killed and disposed of. When a cell mutation occurs that is able to evade our immune system, cause the release of toxins that inhibit other bodily functions, or reproduce mutated cells so rapidly that they crowd out healthy tissues or compete for bodily nutrients, then you have a cancer.

Cancer Genomics

Cancer genomics is a wide-ranging field that includes studying genetic markers that make one predisposed to cancer, and developing genetic profiles of tumor types, and observing the effects that medications have on the tumor sub-types associated with particular genetic profiles.



U.S. National Library of Medicine

This first link provides an intro to the topic: What is Cancer Genomics?

<http://cancergenome.nih.gov/cancer/genomics/whatisgenomics/whatis>

For a review of the underlying biology of different cancer types, read the *About the Science Fact Sheets*.

<http://cancergenome.nih.gov/newsevents/forthemedia/factsheets>

Shell molecules for cancer drug delivery

Shell molecules are from a field known as *pharmaceutical nanomaterials*, and refers to protective coatings that are added to drugs so they can be delivered to a particular region of the body before they dissolve. One way to picture this technology is to think of the coatings that are added to pills that you take orally, and how those coatings can be modified to prevent the release of the medication until it reaches the stomach, or even to slow the distribution of the medicine as it passes through the digestive system. The difference is that now nanoparticles are being used for drugs that are delivered through an IV or with a needle, providing extremely precise targeting of diseased cells.

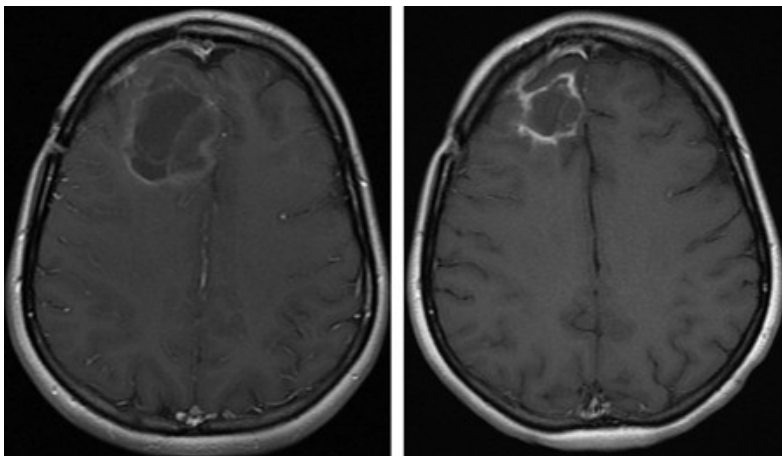
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3834952/>

Immune system stimulation

One of the factors that leads to a particular cellular mutation being identified as a cancer is that the mutation does not trigger an automatic response from the immune system. The overwhelming majority of cellular mutations that occur in the body trigger a response from the immune system, so that the cells are disposed of quite rapidly. Immune system stimulation involves developing molecules that "paint" a diseased cell, so that cell does attract the attention of the immune system, and the body's natural defenses attack the diseased cells.

<https://www.cancer.gov/research/areas/treatment/immunotherapy-using-immune-system>

Polio viruses to treat brain cancers



Patient treated on PVS-RIPO
2 months after treatment

Same patient treated on PVS-RIPO
9 months after treatment

A radical new treatment being investigated at Duke Medical Center involves injecting a modified form of the polio virus directly into brain tumors. The modified virus infects and kills tumor cells, but has been modified so that it won't escape into the body and infect healthy tissues.

<https://www.cancer.duke.edu/btc/modules/Research3/index.php?id=41>