Understanding the life of cancer



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Even the word 'cancer' strikes fear into the hearts of people. On the other hand, people are hungry for information about this disease that has decimated so many, so I have recently delved into reading about it and looking at the progress we have made in fighting against it.

We can think of cancer as a group of diseases, since it comes in different forms, according to the organ from which it originates. Hence, cancer of the blood is known as leukemia, and behaves very differently from cancer of a solid organ, such as the breast. Older men commonly get cancer of the prostate, while breast cancer is the most common among women.

Despite these differences, the cause of cancer is the same; it is caused by cells that multiply uncontrollably. At a cellular level, cancer cells have found immortality. If one puts a line of cancer cells in a petri dish and ensures they have the proper substrate, they will never die. The irony is that cancer cells, which could theoretically continue to reproduce forever, actually die prematurely because they kill their host.

Centuries ago, cancer was thought to be due to too much 'black bile,' but medical science has shown that cancer is caused by mutations within our own genes in our cells; the DNA, which gives instructions to the proteins that carry out the functions of the body, mutates, and gives instructions to keep multiplying.

Cancer cells are like a car that does not have any brakes, with the accelerator stuck at full throttle. Normal cells are switched on and off, but cancer cells are running flat out all the time.

Even before the molecular origins of cancer were understood, scientists and doctors were devising empirical means to treat it. Surgeons thought that the answer was to cut as widely as possible around the tumour in 'radical' operations; hence in breast cancer surgeons would not only remove the breast, but also the underlying chest muscles, the lymph nodes and even parts of the ribs. Such treatment left the women scarred and handicapped, and it was later shown that such radical operations did not give better results. Treatment for breast cancer now involves removing the lump itself, or the breast, radiotherapy, chemotherapy, hormone blockers, and, in some cases, using a drug to block one of the cancer genes, an oncogene.

I am a cancer survivor - first getting cancer in 1992 then a recurrence in 1999, and I was treated with chemotherapy, which is a poison aimed at killing multiplying cells. The challenge has been to find particular drugs that completely wipe out the cancer cells, but allow the normal cells to recover.

Too much, and the drug kills the patient, while too little allows the cancer to grow back. I was treated with a drug called Cisplatinum, which has an interesting story.

Researchers were looking for a method to stop bacterial cell growth by passing an electric current through a solution containing bacteria cells. They succeeded and assumed this was due to the electric current, but they had actually created a new molecule, which combined with the bacteria cells and inactivated them. Since this molecule was effective against bacterial cell growth, they tried using it to inhibit cancer cell growth, and found it to be very effective in combination with other drugs against certain cancers.

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Such experimental drugs were used on cancer patients for whom all else had failed, so they became human guinea pigs.

Almost all of these patients eventually died, but some treatments would suppress the cancer growth for a few more months, and by making continuous adjustments in dosage, and combinations of drugs, researchers have come up with increasingly effective treatments. Most of the drugs had terrible side effects, and Cisplatinum caused the worst nausea imaginable. The nurses nicknamed it *'cis flatten em'*, because the retching and nausea was so severe it flattened every patient – which I can personally testify to.

In the sixties and seventies, even while the research establishment was going full blast in search of a cure for cancer, the rate of cancer actually increased, due to a dramatic rise in lung cancer. This eventually led to the discovery of carcinogens: chemicals, which stimulate the genes to mutate into cancerous genes. In this case, it was the tar in cigarettes.

Cancer is one of the most complex diseases that we face, and although progress has been made, there is still much more to understand. However, we no longer believe it is caused by some mysterious black bile, we know that it is caused by mutations of the genes, which can be stimulated by cancer-causing agents (carcinogens) such as tar in cigarette smoke, certain chemicals we ingest, or which exist in atmospheric pollution. We also know that certain viruses, such as HPV, can cause cervical cancer, and bacteria, such as helicobacteria, can cause stomach cancer.

But, perhaps the commonest reason for cancer is simply living longer, because as we get older, our cells make more mistakes (mutations) resulting in cancer. Philosophically, one could say that our cells sense that we are going to die, so they start a desperate, but futile quest for their own eternal life, which is what cancer is – eternal life of the cell, which results in the death of the host and paradoxically kills the cancer cell.

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