Cancer Insights

Prevention Education Awareness Treatment Care

The Nature of Cancer

Understanding why cancer operates the way in which it does, helps us to fight it more effectively. In a nutshell, cancer is a group of diseases characterized by mutated, dysfunctional and disorganized cells, which exhibit uncontrolled growth, and have the ability to invade and destroy nearby tissue and distant organs (*metastasis*). The development of cancer occurs through genetic and environmental influences acting on our normal cells causing them to transform. Those transformed (mutated) cells acquire the ability to make their own blood supply (*angiogenesis*), allowing the cluster of newly formed, mutated cells (*neoplasm*) to grow rapidly. These new abnormal cells keep going through further mutations (structural changes in the genes of the cell's DNA) every time they divide and replicate (every few hours or days). While the new cells become more dysfunctional to the host (person), they gain additional harmful characteristics allowing the cluster to flourish and proliferate. Among other things, the neoplastic cells (now also known as malignant or cancer cells) acquire the properties of motility, invasion, adherence, and metastasis, while losing the behavior of normal cells which are regulated by *contact inhibition*, *apoptosis* (normal, programmed cell death), and adhering to itself. Normal cells stick to each other, stop multiplying when they bump into other cells

(contact inhibition), and have a scheduled cell death when they are worn out (apotosis). Cancer cells, instead of sticking to their own group of cells, drop off and adhere to a nearby different type of tissue, start growing and invading that tissue, and don't die. They multiply faster than normal cells and crowd out the healthy functioning cells. If, for instance, this took place in the bone marrow where blood cells are made, the person would either have too little of healthy functioning platelets, red, or white cells, or, they might have an abnormally high count of any or all of those blood cells, but the cells would be rapidly dividing immature cells, unable to perform the needed function of that organ. Consequently, the person may be (anywhere from a minor to a severe life threatening degree) anemic, prone to infections, or to uncontrolled bleeding.

Important to the process of either the prevention or the development of cancer, are three specific types of genes in our normal cells: *Proto-oncogenes, TumorSuppressor Genes,* and *DNA RepairGgenes.* Proto-oncogenes promote normal necessary cell growth, but should those genes become damaged, they can mutate into *oncogenes* which can then promote excessive cell growth leading to uncontrolled tumor proliferation and cancer. Tumor Suppressor Genes slow down or suppress normal cell growth to keep cells in balance. These genes have a role in apotosis, which in addition to programming normal cell death according to the cell's life span, also are involved with initiating the death of irreparably damaged genetic material, and thereby help in preventing cancer. Therefore, when Tumor Suppressor Genes are either absent, or they themselves have been assaulted and become mutated, the body has lost a huge natural cancer weapon. DNA Repair Genes repair any damage in a cell's DNA, before that cell goes through *mitosis* (division and replication). If the DNA Repair Gene is functioning properly, it will not allow Proto-oncogenes to mutate into oncogenes, and the DNA Repair Gene will also repair damage to the Tumor Suppressor Gene allowing it to continue its protection again cancer. However, should the DNA Repair Gene become inactivated through damages leading to mutations, the body's protection against cancer will be seriously compromised.

What causes damages that lead to genetic mutations and result in cancer? What role do stem cells play? How do we treat cancer and restore the body to health?

Look for this discussion in the next issue of Cancer Insights in your Continuum Care newsletter.

The **Cancer Insights** newsletter series is brought to you by **Continuum Care VI**, as a multi-part series, with the goal being to educate and empower. **Cancer Insights** is written by St. Croix' own **Gwen Skeoch, Nationally Certified Oncology Nurse (OCN),** and published author.