

Environmental Factors, Genes and Human Cancers

N. Parsa ¹

In the past 50 years, researchers have made a remarkable progress in identifying the biological (bacteria, viruses), biochemical (chemical compounds) and biophysical (ionizing radiation) cause of human cancers. The term "Cancer" refers to 277 forms of cancer diseases. Scientists have discovered the process of cancer formation from a consequence of accumulating multiple mutations in human genome. These genetic disruptions would eventually change the normal pathway of cellular proliferations and differentiation. These genetic alterations are frequently indicative of poor prognosis for most human cancers. Both nonhereditary and hereditary cancers are caused by genetic accidents that change the cellular growth control systems. Genes associated with human cancer formation include four classes of genes: 1. Oncogenes, 2. Tumor suppressor genes, 3. DNA repairing genes, 4. Apoptotic genes. Over activated oncogenes which cause cellular proliferation. In contrast, inactivated tumor suppressor genes lose their inhibitory effect which is crucial to prevent inappropriate growth. DNA repairing proteins fix the damage and apoptotic proteins cause the pre-cancer cell to commit suicide. We have over millions genes in each somatic cell of our body. After sequencing all human genome in 2003, we noticed that Only 23,500 genes are active which encode over 400,000 proteins needed for physiological functions. 99.9% of genome is identical in all humans worldwide. Only 0.1% of the whole genome differ which cause the genetic variations. Up to 93% of all human cancers are non-hereditary and the remaining 7% are hereditary. A wealth of information indicating the potential use of molecular techniques for cancer screening, prognosis and monitoring of the efficacy of anticancer therapies. In recent years, molecular genetics have greatly increased our understanding of the basic mechanisms in cancer development. The essential outcome of these molecular studies is that cancer can be considered as genetic disease of the cells.

Keywords: Biological carcinogens, Molecular alterations, Human cancers.

1. Professor of Medical Sciences and Genetics. National Institutes of Health, USA.
Email : nzparsa@yahoo.com