Shaukat Iqbal Malik, J Cancer Sci Ther, 3:7
doi: http://dx.doi.org/10.4172/1948-5956.S1.19

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference & Exhibition on
Cancer Science & Therapy
15-17 August 2011 Las Vegas, USA

The mechanism & causes of carcinogenesis and mutagenesis in eukaryotes

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A process by which normal cells are transformed into cancer cells is term as Carcinogenesis. Carcinogenic: A carcinogen is any material, radionuclide or radiation that is a cause directly involved in the exacerbation of cancer or in the increase of its proliferation. This may be due to the ability to damage the genome or to the disruption of cellular metabolic processes all cancers involve the failure of genes that control cell growth and division. The process by which cancers develop is called carcinogenesis. This process usually starts when chemicals or radiation damage DNA, of the cells. Viruses induce carcinogenesis by introducing new DNA sequences. Mostly, when DNA becomes damaged the body is able to repair it. In cancer cells, however, the damaged DNA is not repaired and normal cells with damaged DNA die, while the cancer cells with damaged DNA continue to multiply. There is a long time delay between exposure to a carcinogen and the occurrence of cancer. While cellular mutations cause cancer to develop, it is not exactly clear how this happens. Carcinogenesis is a multistep process, in which as many as ten diverse mutations may have to accumulate in a cell before it becomes cancerous. The fact that so many mutations are needed for a cancer to develop indicates that cell growth is normally controlled through many sets of checks and balances. Mutation is the sudden heritable change in the genetic material of an organism. The term mutation is applicable to both the change in genetic material and to the process by which the change occurs. Thus the term mutation is used to define the process as well as the effect. Mutation is simply an alteration in the nucleotide sequence of a DNA molecule. Physical agents like UV or chemical molecules can cause mutations. Molecules or agents that cause mutations are called as mutagens. Mutations occur non specifically and there is no defined process to carry out mutation in a cell or organism.

Recombination on the other hand occurs at a particular time, with the help of a set of enzymes and in a defined process. Thus mutation and recombination are not the same. But mutation and recombination are central events in genetics and evolution. Mutations created in an individual by the process of mutagenesis are called as induced mutations. Damaging to the DNA-such as heat or a lack of oxygen-these also tend to increase the mutation rate in cancer cells.

Biography

Dr. Shaukat Iqbal Malik has earned his PhD Degree in 2004 from the National and Kapodistrian University of Athens & Cancer Cytogenetic and Environmental Hygiene Laboratory, NCSR Demokritos, Athens and two Postdoc 1st from NHEERL, Cancer Biology branch (Cytogenetics section) US Environmental Protection Agency RTP Complex, NC and 2nd from Lineberger Comprehensive Cancer Center, Biomedical Research Imaging Center University of UNC at Chapel Hill, USA. He is Associate prof. in the department of Computer science & Bioinformatics, Mohammad Ali Jinnah University, Islamabad, Pakistan. He has published more than 20 papers in reputed journals and serving as an editorial board member of reputed international journal. He has been received Best Faculty member in 2005 and excellent professor award years 20090-10. His New Cytogenetics Techniques has been published in English, German, French and Greek language. He has been visited about 20 countries including USA and EU for Acedamid and research activities. In 2007 he wins amounting Pak Rs.4.0 Million Research Project under National Research Program for Universities from HEC Pakistan.