

Environment and Cancer



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Current biological mechanisms of cancer suggest that all cancers are originated from genetic alterations or mutations. There are two types of mutations, namely somatic and germline mutations. Almost over 90 – 95% of all cancers arise from somatic mutations and less than 5% of cancer are accounts for germline mutations. Germline mutations are mutations which get transferred in family. However, the somatic mutations are mutations which occur in one's own life time. Environment, diet, water and habits are the causes for genetic alterations in somatic mutations. Apart from this sometimes genetic can occur during cell division without any of the above-mentioned causes.

In a broader sense, the environment is the external conditions influencing the development of people, animals or plants.

In the public mind “environmental cancer” is a term often limited to cancers resulting from chemical exposures, especially manmade, although most research workers use it in the wider sense to cover all conditions that impact on human cancer. Carcinogen is a more precise term which denotes any substance that has a direct

correlation to the exposure of the substance and developing cancer. Many different sources, processes, and pathways can lead to exposure to an environmental hazard.

There is universal agreement that tobacco is the most important preventable cause of cancer and causes one third of all cancer deaths in developed countries. Progressive reduction in the use and exposure of tobacco is the way to go forward. There are various other risk factors also, which contribute to the development of cancer.

Environment pollution is one of the rising causes of cancer.

There have been many studies linking cancer and air pollution, particularly ambient air. For example, urban air contains thousands of chemicals. Some authors suggest that lung cancer, in particular, may be increased by ambient air pollution, chiefly due to the incomplete combustion of fossil fuels.

In addition to ambient air pollution, the potential contribution of indoor air pollution, particularly environmental tobacco smoke to the risk of lung cancer, has been increasingly recognized. Levels

of substances in indoor air are related to the activities of the occupants (for example, smoking, cooking), fitting and furnishings (for example, formaldehyde in insulating materials). Combustion of firewood and cow dung for cooking is also a major risk factor in our country, especially among the rural population.

Water contamination is another area of concern. Potential contaminants include arsenic, which at high doses has been shown to cause skin cancer when ingested. The byproducts of chlorination of water—primarily halogenated organic compounds, including trihalomethanes such as chloroform—have been associated with an increased risk of both bladder and rectal cancers, although both are not studied in detail.

Contamination of food by environmental chemicals such as dioxins, polychlorinated biphenyls (PCBs), and pesticide residues is of considerable public concern. It has been established that the food chain is the primary pathway of human exposure to dioxins and PCBs, particularly from meat, dairy products, and fish. The widespread exposure to these substances can be exemplified from the fact that they can be detected in most human adipose tissue.

Exposure to all forms of radiation, including ionizing radiation, UV light, and low frequency sources can also lead to a higher incidence of cancer. Ionizing radiation may cause up to 4% of all cancers, mostly as a result of natural radiation from radon and cosmic rays, external radiation from radionuclides in rocks, soils, and building materials, and internal radiation from naturally radioactive traces in food.

The ever-increasing amounts of waste that is generated on a daily basis in our country is also a worrying matter. The vast amount of household and commercial waste, together with smaller quantities of industrial and specialized wastes, including that from hospitals, is disposed of

mainly through incineration or in landfill sites. The potential health effects of the substances emanating from both these sources have been the subject of many studies. Incineration can give rise to a wide range of gases and aerosols, including fine particulate matter and a large number of metals and organic chemicals, many of which have potential toxic properties. Highest public concern has been raised about dioxins, PCBs, and polycyclic aromatic hydrocarbons (PAHs). Many of these are established carcinogens.

Environment pollution can be cut down by planting more trees, reducing our carbon foot print and encouraging organic farming thereby reducing food contamination. The progressive reduction of exposure levels to occupational hazards and environmental carcinogens have to be achieved through regulation and it should be ensured that environmental exposures will contribute to only a small proportion of future cancer incidence.

