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What causes cancer and how to prevent it

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The prevention of cancer has been considered a fantasy in the past, but experiments have proved that it can be prevented. The maxim 'Prevention is better than cure' is equally applicable to cancer. There is a common belief that cancer is one disease whose cause is not known. But the fact is that it is a group of diseases caused by many agents. Many dangerous substances are associated with the initiation of this fell disease. The WHO Expert Committee on the Prevention of Cancer reports that 75 per cent of all human cancers are preventable, if the causative agents are removed from the human environment.

Different factors are involved in the etiology of cancer—physical, chemical, genetic and viral. Some of them have already been proved to be responsible for causing cancer in animals and human beings. There is a latent period, maybe decades, before cancer develops as the result of a factor. The older a person, the greater is the risk he runs of being afflicted with cancer.

Certain chemicals—the carcinogenic compounds—can cause cancer in animals and human beings. About 500 of them are already known and more are being discovered. The cancer of chimney-sweepers was detected to be caused by soot. Tar-workers are also liable to a higher incidence of this disease. 3, 4 benzpyrene (BP) is an easily detectable carcinogenic compound. It

is present in smoked meat and overheated fats. Food may be contaminated from the BP in the cigarette smoke. Benzene has already been proved to be a leukaemogenic agent in the case of man. Phenols, cresols, turpentine oils, "Tween²" and "Span" increase the risk. If BP is extracted from the tar, its carcinogenicity is reduced to one-sixteenth.

At least 7 chemicals are known to be present in tobacco smoke or tar which can cause this fatal disease. There exists a direct relationship between the incidence of lung cancer and the smoking of cigarettes. Mortality due to lung cancer among smokers is 1,000 per cent higher than that among non-smokers. The smokers also have a high incidence of cancer of other organs which are exposed to smoke or its contents, e.g. 440 per cent cancers of the air passage, 310 per cent of the mouth and 240 per cent of the oesophagus. The use of pipes of clay or metal in smoking increases the risk of lip cancer.

A higher incidence of the cancer of the penis among uncircumcised men and the cancer of the cervix of their wives is well established. This higher incidence has been attributed to the accumulation of smegma—a whitish irritating substance that collects under the male foreskin. It is known to be carcinogenic. The cancer of the penis has almost never been seen in men circumcised in early childhood. The patients of syphilis run

a higher risk of developing cancer. The cancer of the cervix is virtually unknown among Catholic nuns. A woman who starts her sex life before she is 20 has double the chance of developing this disease. The disease is much commoner among the lower social classes. The frequency of sexual intercourse does not affect the incidence but marrying a second or third time increases the risk two to four times.

The relation between cancer and radiation has been established. In the beginning, many pioneers of radiology and the workers in radiochemical industry died of this disease. Even now, the incidence of leukaemia is 10 times greater among radiologists than among physicians. Radiation used in diagnosis also contributes to the arising of mutations which may result in malignancy. There occurs a higher incidence of leukaemia among children who were exposed to radiation while in the uterus. Therefore exposers should be avoided. Excessive exposures to sunlight are also associated with a higher incidence of malignancy, but it is lower among Negroes because of the presence of the higher content of melanin—the pigment responsible for the colour of the skin.

Betel-nut is associated with a high incidence of the cancer of the mouth and pharynx in Asian countries. Drinking hot tea also increases the risk. Coffee is mutagenic, but has not been proved to be carcinogenic. Lung cancer is quite common among persons exposed to air pollution with nickel, chromium, arsenic and asbestos. Dyestuff and industrial workers have a higher incidence of bladder cancer. Iron has not been so far included in this list. The inhaling of smoke and the fumes of kerosene, diesel and snuffing are potentially carcinogenic or cocarcinogenic. Food contaminated with aflatoxins, certain detergents, and the chemi-

cals used in food-processing are harmful to the human body.

Insecticides, arsenic compounds, DDT, aldrin, Armité and some herbicides have been proved to be toxic and carcinogenic. When sweetening agents, like dulcin and saccharin, were fed to animals, they developed tumours. Their adverse effects on man are not available yet. Food contaminated with tin from utensils and with lead from the solder can produce kidney tumours in rats. Lead compounds used in theatre makeup have been discontinued. Most of the cosmetics have not been screened for carcinogenic constituents.

Some drugs have been associated with a higher incidence of cancer. Certain derivatives of sulphonamides had to be removed from clinical use, as they were proved to be causing the cancer of the urinary tract. INH, the most useful drug used in the treatment of tuberculosis, has been proved to produce lung cancer in mice. At the moment we cannot even think of removing this drug from clinical use because of its minor potential risk of carcinogenesis. Many compounds used in the treatment of cancer are themselves carcinogenic, e.g. nitrogen mustard and chlorambucil.

External hormones interfere with the natural balance in the body, thus predisposing the users to cancer. The use of hormone creams by old women increases the risk of hormone-dependent mammary cancer. The constituents of some spermicidal contraceptives and skin ointments have been proved to be carcinogenic. This disease of the endocrine glands and accessory sex glands has been associated with oestrogens. Oral contraceptive pills are not regarded as carcinogenic. Hormones may be present in animals and foods when these secretions were supplied to enhance their growth. Breast

cancer is common in single and childless women and almost non-existent in men.

The incidence of the cancer of the bladder is high in Egypt because of the known irritation due to scistosomiasis. Persons with poor dental hygiene or improperly fitting dentures have a high risk of oral cancer owing to constant irritation. Chronic ulcerations of gunshot wounds, knife wounds and thermal burns may lead to cancer after a latent period of 12-40 years.

Viruses play an important role in malignancy. The viruses responsible for malignancy are known as oncogenic viruses. Mice leukaemia is caused by a virus. Burkitts lymphoma, a cancer of human beings, is considered to be because of oncogenic viral infection. The cancer of human beings due to viral infection has not been established.

House rats or mice may act as reservoirs of oncogenic viruses. Anticancer vaccines may play an important role in the prevention of cancer in the future.

Heredity also comes into play. The incidence of this disease among children of parents, both of whom had it, is four times greater than those with normal healthy parents. Malnutrition also contributes to increased chances of this disease. Liver malignancy is common in persons eating foods deficient in vitamin B₁. Iron-deficient diets and alcohol increase the risk of the cancer of the oesophagus.

It is up to man himself to avoid being inflicted with certain forms of cancer. The removal of harmful habits and customs will lead to a better prevention of cancer.