Diet, Nutrition and Cancer

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Cancer is one of the major health problems of the world and incidence of cancer is increasing day by day. Increased life expectancy of people, industrialization, rural/urban migration with excess consumption of tobacco and alcohol all have been attributed for the increased cancer burden.

Definition

Cancer, in simple terms is an uncontrolled growth of cells. In a normal tissue, they stop growing after attaining appropriate numbers and size but in cancer, cells have acquired the ability to multiply and spread without restriction. This growth of cells invades local tissues and spreads to distant parts of the body. It depletes the body of nutrients & impairs normal functions.

Factors that trigger cancer

Various factors are seen to trigger initiation of cancer, progression & spread to the other tissues. Some of the dietary constituents are also implicated as carcinogens.Some of them are:

- Plant products like pyrrolizidine alkaloids in Senecio, Crotalaria & Heliotropium may contaminate the food grains and are known to be carcinogens when consumed.
- Plant oestrogens, methylxanthines,cycasin,tannins,coumarins and hydrazines are carcinogens.
- Alcohol per se can act as a carcinogen, co-carcinogen or promoter. It facilitates the transport of other carcinogens, induce enzymes which bio activate carcinogens. It produces nutrient deficiencies and immuno-suppression which may enhance carcinogenesis.
- Smoking has synergetic effect with alcohol in respiratory tract cancer.
- Hepatic injury and cirrhosis due to alcohol may lead to hepatomas

- Hepatic injury and cirrhosis due to alcohol may lead to hepatomas.
- There is positive relation between chronic alcohol intake and incidences of breast cancer or colorectal cancers.
- **Mycotoxins:**Aflatoxin is a carcinogen. There is correlation between the aflatoxins & primary liver cancer, stomach, colon & lung, etc.
- **Nitrate, Nitrite and Nitrosamines :**
  - Nitrates are per se nontoxic. However, they may get reduced to nitrites under certain circumstances in food and in the body.
  - Nitrite is also added to foods particularly in the curing of meat and fish. Nitrite is toxic but it is also processor of N-nitroso compounds that are more toxic.
  - Nitroso amines can be seen in foods like meat, fish, several vegetables and malted beverages like alcoholic drinks. Cooking practices like smoking, grilling & frying may increase the N-nitroso compounds. High consumption of such foods containing nitrosoamines is found to increase the oesophageal cancers, naso-pharyngeal & stomach cancers.
- Nutrients such as Vitamins C, and E prevent nitrosation reactions & hence are protective against cancer.
- Food additives : Many non-permitted food colours and preservatives are found to be carcinogenic.
- Foods stored in polyvinyl chloride (widely used for packaging and storing foods) are known to be carcinogenic. They are known to be associated with liver, brain, respiratory track & lymphatic system.
- Pesticides like polychlorinated biphenyls are associated with malignant melanomas.

Dietary influences on cancer

Macronutrients and Cancer

- Obesity is a greater risk of colorectal, breasts,prostate, pancreas and ovary cancers.
- Lower the body weight, greater is the risk of lung cervical and probably oral,oesophageal and stomach cancers.
- Fibre : High intake of fibre in the diet is protective against colonic cancers.
- Fats and animal protein may increase the risk of colon, breast and prostate cancer.
- Poor intake of protein and excess complex carbohydrates may increase risk of oesophageal/gastric cancers.
- Other complicating factors are high salt, low fibre and high cholesterol.

Micronutrients and Cancer

- As many micronutrients act as antioxidants, they are found to be protective against cancers.
- Low intake of vitamin A and β carotene rich foods such as green and yellow vegetables is associated with increased risk of cancers at several sites such as lungs,larynx, pharynx, oral cavity, oesophagus, stomach, large bowel, pancreas, urinary bladder, prostate, ovary, endometrium, cervix and breast.
- Vegetables and other rich sources of vitamin A and β carotene are found to have protective

effect in high risk groups such as those who smoke, drink and consume meat daily.
- Vitamin E is protective against breast, lung and stomach cancers This may be because of its antioxidant action.
- Vitamin C is seen to be protective against childhood brain tumours.
- Trace minerals like Zinc and Molybdenum deficiency is associated with oesophageal tumours.
- Iron deficiency is associated with cancers of upper alimentary track.
- Selenium deficiency is inversely related to lymphomas, gastro intestinal tumours,lung, breast and ovary cancers. Organic selenium has better protective effect than inorganic selenium.
- Iodine deficiency and gastric is associated with thyroid cancers.
- Calcium and vitamin D are protective against colon cancer.

Other anti carcinogenic substances:

Many non nutrients are inhibitors of carcinogenesis. They are components of vegetables,fruits, legumes and nuts and cereal grains. Among vegetables, Brassica family and Allium species (onion & garlic) are more protective. Curcumin in turmeric is a known anticarcinogen.

Source: Portal Content Development Team