DIET AND CANCER

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The evidence, reviewed by the Committee of National Cancer Institute (NCI) Of USA, suggested that cancers of most major sites are influenced by dietary pattern and in principle should therefore be preventable. NC! also points out that different dietary components have a specific role in the incidence or prevention of cancer of specific sites[1]. Vitamin C reduces the cancer risk of oral and laryngeal cancers in addition to other sites[2,3]. The protective effect of vitamin C and beta carotene intake has also been reported in pharyngeal cancers[4]. Epidemiological evidence shows people with above average blood retinol levels or beta carotene intake are at low average risk of cancer[5-7]. Other studies have shown an association between dietary fat, especially the saturated fat and the occurrence of cancer at several sites[8-10]. Diet is responsible for 60% of cancers in women[1]. International differences in breast cancer morbidity and mortality are substantial and suggestive of the influence of environmental factors[11]. Although it is difficult to rule out a small contribution of genetic factors to such differences, studies of population migration[12] indicate that environmental factors (diet) predominate in the incidence of breast cancer. Dietary factors such as sugar[13], butter[14,15], cheese, liquid milk and green vegetable intake[16] and particularly total fat intake[8,13-19] were also correlated with breast cancer. Graham et al[20] reported cruciferous vegetables to have a protective effect (benzpyrene hydroxyl activity against cancer development) in a case control study. Studies in buffalo have proposed a biological rationale for this hypothesis[21].

Following foods and nutrients are regarded as the most important factors among causes of cancer and are related to cancer in a complex manner[22]:

Table. Dietary risk factors for selected cancers[23].

Site of cancer	High risk factors	Low risk factors
Stomach	Salty foods Fish (salted or dried fish) Large amount of rice (grains as a staple food) Hot drinks and foods Irregular meals	Milk and dairy products Raw vegetables Fruits Miso soup (?)
Colorectum	High fat diet Low fibre diet Beer (rectal cancer) Low level of serum cholesterol	Fibre-rich diet (grains, pulse etc.) Good protein-rich diet (cheese, beef, fish etc.)
Oesophagus	Alcoholic beverages Hot drinks and foods Diet poor in protein, vitamins and minerals	Vegetables, fruits Diet rich in good protein, vitamins and minerals
Breast	High fat/calorie diet	
Lung	Cholesterol	Green-yellow vegetables Carotene, vitamin A

1. Grains (such as peanuts and corns) growing in the hot and humid countries are contaminated with carcinogenic mycotoxins such as aflatoxin B1 produced by aspergillus flavus.
2. Some kinds of foods additives such as AF2 and butter yellow are mutagenic and carcinogenic.
3. Some types of mutagens/carcinogens are produced by heating foods.
4. From foods or their components which are non-carcinogenic, some types of carcinogens are formed in the gastrointestinal tract. For example, nitrosamines are formed in the mouth or stomach when nitrites contained in the saliva and foods or nitrites reduced from nitrates contained in pickled vegetabies and some other foods, react with the low grade amines contained in the meat of fish.
5. High fat and low fibre diet is regarded as a high risk factor for colorectal cancer through abnormal metabolisms of bile acids.
6. High concentration of salt is regarded as a high risk factor for stomach cancer from epidemiological and experimental studies. $
7. Vitamin A (carotene) and vitamin C have inhibitory effects for carcinogenesis.
8. It is possible that poor nutritional status increases the susceptiblity to viral infection (including on-cogenic viruses) and conversely over nutrition promotes cancer growth. In addition to these factors, hardness and volume of foods, eating practices (such as chewing and regularity of meals) and the methods of preserving foods (salting, smoking, refrigeration and freezing) have been suspected to be

related directly or indirectly to carcinogenesis[22]. The following table[23] summarizes the relationship between food/nutrients and cancers which are frequent or increasing in Japan and which have been suggested to be associated with dietary habits in the previous epidemiological studies.

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