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Food Additives, Contaminants, and Pesticides

Ashley's History
Ashley is a young mother of three small children. She thoroughly washes all fruits and vegetables but is concerned that the imported ones have extra contamination and pesticides. Is her risk higher for developing breast cancer?

The "Delaney clause" of the Federal Food, Drug, and Cosmetic Act, written because of food additives, prohibits the addition of any known carcinogens to food. Currently there are about 3,000 intentional food additives. There are over 12,000 occasionally detected unintentional additives from packaging, food processing, and other phases of the food industry.

FOOD ADDITIVES AND CONTAMINANTS

Chemical food additives and food contaminants have been extensively studied because they come into contact with our bodies. Chemicals are used to prevent contamination and spoilage of food that has to be produced in great quantities, stored, and transported. Chemicals are also used for flavoring and appearance. Chemical contaminants may develop as a result of food processing procedures such as irradiation, cooking, pickling, or smoking. The trouble with the use of chemicals in food is that we are exposed to them constantly, repeatedly, and at

low doses. Therefore, laboratory investigations rather than large population studies must be done to determine whether the chemicals are potentially hazardous.

Intentional food additives are chemicals that are purposely added to food. Cyclamate, for example, has not been shown to cause cancer in humans, but it does produce testicular atrophy (shrinking) in rats. Saccharin produces bladder cancer in rats when comprising 5 percent or more in the diet,[1] but so far, there is no clear connection to human cancer.[2] Xylitol, a sweetener, causes bladder cancer in mice and adrenal cancer in rats. [3] Nitrites are used as preservatives in meats. They also add color to bacon and hot dogs. Nitrites can react with other compounds to form potent carcinogens called nitrosamines.[4] When bacon is cooked, nitrosamines form. There is a low level of nitrites in our saliva and in some vegetables, but there is no information on whether these nitrites can be activated to form nitrosamines. Vitamin C, also found in vegetables, can inhibit the formation of nitrosamines and is usually added to meat cures. Nitrites might be carcinogenic.[5]

Unintentional food additives are those chemicals used to prepare or store the food product; small amounts of these chemicals subsequently, unintentionally, become part of the food. Paraffin wax that lines many food containers, pesticides, and DES are unintentional food additives. Pesticides get into our bodies and are stored in fat cells, since they are fat soluble. These pesticide-laden fat cells can then act as reservoirs to slowly, but constantly, release the pesticide into the bloodstream. DES (diethylstilbestrol) is used to fatten cattle and has been found in trace amounts in dairy products and beef. DES causes cancer of the vagina in young women and cancer of the testicles in men whose mothers had taken DES. Keep in mind that a large amount of DES is needed to cause cancer, and only a small amount is in our food. But small amounts accumulate and do affect us.

Aflatoxin is a food contaminant that causes human liver cancer. Aflatoxin is a product of a fungus, *Aspergillus flavus*, that grows mainly on peanut plants. Other fungal products have

been implicated in human cancers. *Gyromita esculenta*, a common mushroom used in cooking, contains a compound called N-methyl-N-formylhydrazine, a potent animal carcinogen.[6]

Certain food processing techniques, such as smoking and charcoal broiling, produce carcinogens.[7] Smoked food increases the risk of gastric cancer. The carcinogens that result from charcoal broiling appear to come from the fat that drips from the meat and is burned, forming the carcinogen, which then rises with the smoke back up into the meat.[8]

As yet, there are no definite proven cases of human cancers directly related to food additives, but many authorities agree that additives and contaminants do account for a small percentage of human cancers. Those chemicals implicated in animal cancers were removed from the market. However, nitrites are bothersome sources of carcinogens and should be avoided. The reduced incidence of gastric cancer in the United States is directly related to less food additives with the advent of refrigeration. Also naturally occurring food components like aflatoxins do cause human cancer and should be eliminated.

PESTICIDES

Pesticides are now in widespread use throughout the world. They control or kill pests or affect plant or animal life. There are about 1,200 pesticide chemical compounds, combined in 30,000 different formulations. Pesticides have made an important contribution to both food production and disease control. Some estimate that at least one-third of the crops in Third World countries are lost to pests.[8]

Pesticides have aided in the control of malaria, schistosomiasis, and filariasis in tropical countries, but there are still hundreds of millions of cases of these diseases each year. There is no way of knowing and no way of calculating how many lives will be saved or improved by the use of pesticides to control diseases and increase our food production. Likewise, there is no way to calculate how many lives will be lost from pesticide use. Some dangerous pesticides that are banned or restricted in

North America and Europe have been unloaded on Third World countries.

Pesticides enter your body by inhalation, absorption through the skin, or ingestion. And unlike industrial chemicals, which are used in a very controlled manner, pesticides are sprayed, powdered, or dropped as pellets or granules in and around places where the general public may walk or play. In fact, pesticide residues are commonly found in human tissue in almost everyone in the United States, averaging six parts per million in fatty tissue.[9] Pesticides are found in cow milk, human breast milk, and can even cross the placenta to the human fetus.[10]

PESTICIDES INCREASE RISK FOR MANY CANCERS

Table 1 lists pesticides and their roles as human carcinogens.[11-14] Pesticides are associated with, but not necessarily the direct cause of, the following human cancers:[9,15-26]

- Breast
- Brain
- Esophagus
- Leukemia
- Liver
- Lung
- Lymphoma
- Melanoma
- Multiple Myeloma
- Nasal
- Ovarian
- Prostate
- Sarcoma
- Skin
- Stomach

PESTICIDES INCREASE BREAST CANCER RISK

Pesticides increase breast cancer risk because they are found in human breast tissue and human milk.[27] Women are at greater risk than men when exposed to the same amount of pesticides because the Allowable Daily Intake for pesticides as determined by the government is calculated for a 70-kilogram man, not a 50-kilogram woman with more breast tissue.

The 1994 General Agreement on Tariffs and Trade (GATT) allows for substantially higher levels of pesticide residues on U.S. import produce. Specifically, 5000 percent higher levels of DDT than current U.S. standards are permitted on imported peaches, bananas, grapes, strawberries, broccoli, and carrots.

The health of Americans is apparently subordinate to political pressure.

Certain pesticides, such as DDT (an insecticide), are animal carcinogens that get into fatty tissue and are slowly released. Between 1985 and 1991, blood specimens from over 14,000 women in New York City were analyzed for content of these pesticides.[28-30] Women who developed breast cancer had higher levels of these two pesticides than women who did not.[31] In another study, the pesticide HCH (betahexachlorocyclohexane) was found in the breast fat of forty-four breast cancer patients and thirty-three patients with benign breast disorders.[32]

Three pesticides, all animal carcinogens, were found to be 100 times as concentrated in Israeli milk compared to levels demonstrated in United States milk. It was estimated that their concentration was about 800 times greater in breast tissue than in the blood. The pesticides, alpha-BHC, gamma-BHC (lindane), and DDT were banned and a sharp drop in pesticide levels in milk was shown. Breast cancer rates have now dropped according to epidemiological and laboratory findings.[33]

Some pesticides have estrogen-like activity in the human: endosulfan, dieldrin, toxaphene and chlordane. When they are together in various combinations, they have a 150- to 1600-fold greater estrogenic affect than each alone.[34]

The implications of this are enormous. Women are commonly exposed to more than one pesticide and this synergistic action of estrogen activity increases the risk for breast and other cancers. The link of pesticides to cancer is not direct, but these findings are enough to dictate the reduction in pesticide use.

PESTICIDES INCREASE RISK FOR:

- Parkinson's disease[35,36]
- Cardiovascular disease
- Allergies
- Skin diseases
- Hypertension
- Abnormal blood cholesterol
- Liver disease
- Fertility problems

Table 1. Pesticides as Human Carcinogens [11-14]

Pesticide	Definite	Probable	Possible
Aldrin and dieldrin			•
Amitrole		•	
Arsenicals	•		
Atrazine		•	
Benzal chloride			•
Benzotrichloride		•	
Benzoyl chloride			•
Benzyl chloride			•
Carbon tetrachloride	•		
Chlordane			•
Chlorophenols		•	
p-Dichlorobenzene		•	
DDT		•	
Ethylene dibromide		•	
Ethylene oxide		•	
Formaldehyde		•	
Heptachlor			•
Lindane			•
4-chloro-2-methyl acetic			•
Methyl parathion			•
Pentachlorophenol			•
Phenoxy acids			•
Dioxin		•	
2,4,5-Trichlorophenol			•
2,4,6- Trichlorophenol			•
2,4,5-Trichlorophenoxy acetic			•
Vinyl chloride		•	

Endometriosis, affecting over 5 million women in the United States, is a disease whereby tissue from the uterus travels to the abdomen, ovaries, bowels, and bladder, and causes bleeding, infertility, extreme pain, and other problems. Although

specific causes of this disorder are not definite, dioxin has recently been implicated. Researchers have found that dioxin can cause endometriosis in female rhesus monkeys.

Dioxin, also known as Agent Orange, and one of its associated contaminants, TCDD, was used during the Vietnam War. Hundreds of thousands of people were exposed to these agents, and Vietnam veterans and others raised serious allegations that Agent Orange and TCDD caused malignant tumors,[15-26] sterility, spontaneous abortions, birth defects, disfiguring skin diseases, and other illnesses. Most of these studies involved a short period of time between exposure and disease. It now appears that the longer the time from exposure to TCDD, the higher the risk for the development of cancer and the higher the incidence of cancer.[37-39]

MINIMIZING PESTICIDE USE

Nature provides us with biological controls, that is, natural predators that can control insects. For example, ladybugs can fight off aphid predators. Beetles controlled weeds in the western United States in the 1950s, and parasites controlled the citrus fly in Barbados in the 1960s. Wasps have been controlled by parasites in greenhouses more effectively than with chemicals. The bacterium, *Bacillus thuringiensis,* is a good alternative to several toxic insecticides. Silicon and soap can be used in gardens as a nontoxic insecticide rather than the other commonly used pesticides for the garden. Minimize the pests by providing food and habitat for the pest's natural enemies.

Certain farming practices may be employed as well. Crop residues may be removed by plowing or flooding. Pest deterrents, crop rotation, proper drainage methods, and physical controls like traps or blocking of insects and/or other pests can be used.

WHAT CAN BE DONE

The number of tons of pesticides has increased thirty-three times since 1940, and their toxicity has grown tenfold. However, crop losses to microorganisms, insects, and weeds have gone up 35 percent. There are a number of reasons for this. As

new pesticides are developed, insects develop resistance to them. But even more importantly, the government supports prices of various crops, which encourages farmers to produce only a single crop instead of rotating crops to inhibit the pests. By using crop rotation and biological pest control, pesticide use could be cut in half. Food prices would rise by one percent – about $1 billion a year – but the benefits would be enormous. The United States would save billion of dollars per year as a result of decreased cancers and other medical diseases, decreased damage to fish and water supplies, decreased costs of regulating pesticides, and decreased health-care costs for the 20,000 people poisoned each year from pesticides.

While chemical pesticides certainly benefit populations by increasing food production and decreasing certain diseases, it is important to use them only when they must be used and to use the pesticides that cause the least toxicity to human beings and the least damage to the environment around us.

You should learn as much as you can about any pesticides you do use. Acquiring such information is not easy but neither is maintaining good health. Acquire information and use alternatives to the current pesticides. Exposure to pesticides can be controlled. This is yet another risk factor for disease over which you have control.

Ashley is correct to avoid imported fruits and vegetables because foreign countries can use harmful/carcinogenic pesticides that have been banned in the US.