Dioxin Poisoning, TCDD Exposure

Dioxin is the name of a group of several hundred substances formed as by-products from factories using chlorine in some of their product development. Examples are pesticides and plastics. Incinerator fumes also contain dioxins. Sometimes the term dioxin is also used to refer to the most studied and one of the most toxic dioxins, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Although dioxins are an environmental contaminant, exposure most often occurs through the food by consumption of animal fats. They are widespread in the environment in developed nations, and low doses have accumulated in the bodies of most people in the industrialized world. Dioxins are particularly concentrated in meat, fish and dairy products because the chemicals dissolve well in fat. The amount of dioxin produced by man has been declining for the last 30 years.

CAUSES

Dioxins are not created intentionally. They often are produced accidentally by a number of human activities.

- They are formed as a result of combustion processes such as commercial or municipal waste incineration and from burning fuels (like wood, coal or oil).
- Dioxins can also be formed when household trash is burned and as a result of natural processes such as forest fires.
- Chlorine bleaching of pulp and paper, certain types of chemical manufacturing and processing, and other industrial processes all can create small quantities of dioxins.
- Cigarette smoke also contains small amounts of dioxins.

HOW LONG DO DIOXINS LAST IN THE ENVIRONMENT?

Dioxins break down slowly so that some dioxins from past releases will still be in the environment many years from now. If human production of dioxins stopped, low levels of naturally produced dioxins will remain. Almost every living creature has been exposed to dioxins.

When released into the air, some dioxins may be transported long distances. Because of this, dioxins are found in most places in the world. When dioxins are released into water, they tend to settle into sediments where they can be further transported or ingested by fish and other aquatic organisms. Dioxins decompose very slowly in the environment and can be deposited on plants and taken up by animals and aquatic organisms. Dioxins may be concentrated in the food chain so that animals have higher concentrations than plants, water, soil, or sediments. Within animals, dioxins tend to accumulate in fat. Because of natural processes, dioxin levels in the environment will never go to zero.

DIOXIN DANGERS

- Increases the risk of several cancers
- Increases the chance of immune system disorders
- Causes liver damage
- Can cause Chloracne (a skin condition like severe acne)
- Possible reproductive or developmental effects

SYMPTOMS

Chloracne is a skin disease with severe acne-like lesions that occur mainly on the face and upper body. It usually comes from large exposures which are the results of accidents, contamination problems, or poisoning. Other effects of exposure to large amounts of dioxin include:

- Skin rashes
- Skin discoloration
- Excessive body hair
- Mild liver damage.
- Gastrointestinal (intestinal or gut) problems and problems with metabolism.
- Other effects from high dioxin doses in humans may include swelling and decreased function of the liver

and a slight increase in blood fats. These effects tend to be mild and not last long.

The health effects associated with dioxins depend on a variety of factors including:

- When someone was exposed
- How long and how often
- The level of exposure

DIAGNOSIS

Dioxin testing is not recommended. Tests for measuring dioxin levels are not routinely available. Laboratories that offer dioxin testing generally are not certified for that testing (as is required for clinical laboratories doing medical testing) and detection levels may not be low enough to detect dioxin levels that occur in the general population. Dioxins in food are at such low levels it is not practical to routinely measure them even using current testing methods.

PREVENTION

- Limit intake of animal fat. Over 95% of dioxin comes through the intake of animal fats. The best strategy for lowering the risk of dioxins while maintaining the benefits of a good diet is to follow the recommendations in the Federal Dietary Guidelines to choose fish, lean meat, poultry, and low or fat free (skim) dairy products, and to increase consumption of fruits, vegetables and grain products. Lean meat includes meats that are naturally lower in fat, and meat where visible fat has been trimmed. For fish and poultry you can reduce fat by removing the skin. Reducing the amount of butter or lard used in the preparation of foods and cooking methods that reduce fat (such as oven broiling) will also lower the risk of exposure to dioxin. You do not have to avoid any foods that you are now eating.
- Avoid burning garbage from your home.
- You should pay attention to local fishing advisories for fish that you catch yourself. Fishing advisories may exist that provide recommended consumption rates of particular kinds of fish from particular water bodies where local contamination has occurred. If you do not know whether a water body that you fish in is covered under fishing advisory, call your local or state health or environmental protection department and ask for their advice. (They are listed in the blue pages of your local telephone directory.) Ask them if there are advisories on the kinds or sizes of fish that should not be eaten from the water body. You can also ask about fishing advisories at local sporting goods or bait shops where fishing licenses are sold.
- For most people, adjusting their diet to fall within the Federal Dietary Guidelines will result in multiple health benefits, including reduced dioxin exposure. The dietary guidelines provide the best scientifically based advice on what makes up a healthy diet and provide guidance on how to plan a varied diet choosing individual foods from a number of food groups. These groups include grain products such as breads and cereals, fruits and vegetables, and meat and dairy products. The U.S. Food Guide Pyramid, based on the Dietary Guidelines, recommends 2-3 servings (3 oz. each) of protein (including lean meats) and 2-3 servings from the dairy group. Some people consume more foods high in saturated fats (meat and dairy) than is recommended in the Dietary Guidelines. For these people, there are well-known and significant health benefits of reducing saturated fat intake that go beyond the potential risks of dioxin. The Dietary Guidelines, however, do not recommend that people avoid all fats, as fats are an important part of balanced nutrition. We need a certain amount of fat for a healthy, balanced diet. Fats supply energy and essential fatty acids, and they help the body absorb fat-soluble vitamins (A, D, E, and K). You need some fat in the food you eat. The federal Dietary Guidelines recommend that fat intake be no more than 30% of your total energy intake, with no more than 10% coming from saturated fats. For a person who consumes 2000 calories this means a total fat intake of 65 grams, including 20 grams or less of saturated fat. See the Nutrition Facts Label on food products for more information on fat content of food items. The Dietary Guidelines do not recommend that you avoid all fats, but recommend an appropriate level of lean meats and low or fat-free dairy products and recommend reducing the use of spreads or cooking fat made from animal fat. This advice regarding saturated fats is consistent with a strategy to reduce dioxin exposure.
- In spite of dioxin in a mother's milk the benefits of breastfeeding for children include fewer cases and less severity of diarrhea, respiratory infections, ear infections, and meningitis, among others. Breastfeeding may

also reduce the risk of sudden infant death syndrome and may lower rates of childhood cancer.

- In addition to the benefits for children, breastfeeding also has benefits for mothers. Breastfeeding has been shown to reduce postpartum bleeding, promote earlier return to pre-pregnancy weight, and reduce the risk of breast cancer.

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