

#### NO.4 A Sea of the Synthetic Chemical Compounds

The symptoms generally called "allergy" appear through reactions of living creatures against the foreign substance taken into the body from the environment.

The number of individuals who have an allergic reaction with chemical substances not existing in the nature usually increases if some individuals show the allergic symptoms from these chemical substances and, as the result, the density of those substances increases. In other words, allergic symptoms indicate that substances discharged and accumulated into the environment have negative influence on all living creatures and can be a warning sign from the environment species are in danger of extinction. Moreover, there are some carcinogenic chemical substances. It is well known that those substances generate and increase cancer cells in bodies if living creatures take them in more than a certain dose. It is natural that the cancer is more frequently occurred if the density of the carcinogenic substances in the environment increases and there are more occasions that living creatures may contact with those substances.

Many biologists observed that the number of wildlife has been rapidly decreased since the 1950s. Approximately 20,000 to 70,000 species became extinct annually (the U.S. Federal Government Special Investigation Report, 1980). This phenomenon has never been observed on this earth's history except the fall of huge meteorites.

In 1996, "Our Stolen Future" written by Theo Colborn et al. (published by Shoehisha) showed that one of the big causes of fast-speeded extinction is decline of reproductivity (hormonal disturbance) due to the Environmental Hormones (Environmental Endocrine Disruptions, EEDs). Environmental hormones seriously influence not only to wildlife but the reproduction system of human beings. Sperms of human being are halved during the 50 years and the genital disorders during the young age, such as the breast cancer, are rapidly increased. This is considered as signs that the same phenomenon, the extinction of wild animals, is happening to the human beings (Refer to the Attached Data).

Environmental hormones are a certain kind of synthetic chemistry substances which possess "reproductive toxicity" and "carcinogenicity."

These chemical substances have some unique properties.

First, similar to general hormones, this substance acts on human bodies with an extremely small quantity such as ppm (1/million) to ppb (1/billion). Bisphenol A (BPA) activates in 2 ~ 5 ppb (eluted from a nursing bottle when boiling water is poured) and proliferates the breast cancer cells in a laboratory dish. Second, environmental

hormones show a “cocktail effect,” an additive and synergistic effect when two or more different substances are taken. Sometimes it has more than 10 times of effect. Third, when emitted to the environment, those hormones cause a biological concentration through a food chain in the nature. For example in the Lake Ontario, PCB in the lake is concentrated from 250 to 500 times in the plankton, 45,000 times in mysids that eat the plankton, 2 millions times in a trout and 25 millions times in a herring gull, a creature at the top of a food chain in the lake. In other words, it assumes that 0.00001g /L of the PCB in the lake water is concentrated to 2.50 g/L in a herring gull.

DDT is also known to cause the similar biological concentration. This chemical compound therefore has more influence to the living creatures in the higher level of a food chain such as human beings.

DDT blocks hormonal function of a fetus when exposed to DDT during pregnancy and causes genital disorders, immunodeficiency and development disorders (i.e., feminization of fetus and the genital cancer). Those are the different functions of DDT from other toxic substances. The fetus exposed to this compound has sometimes gotten genital abnormality or cancer at the time of birth period sometimes developing obvious genitals abnormality or cancer. However, more symptoms appear during the adolescence when hormone functions drastically change.

DES (diethylstilbestrol) is a typical synthetic hormone developed in 1938. DES was widely used in the stockbreeding industries from the 1950s to the 70s to improve productivity of livestock products. For human beings, DES was used in the prevention of miscarriage, contraceptive, tonic medicine and hair tonic, which were widely sold in the same period. However, there occurred many cases that new born babies got genital cancers, genital disorders, and deformities if they had been given the DES-included medicine for the prevention of miscarriage during their fetus period. Several studies have shown that if mice were given DES during pregnancy, the male babies are intersexual, or androgynous, and female babies have genital disorders such as vaginal cancer. The serious problem of DES is, unlike the case of Thalidomide that the disorders and abnormalities become evident at the time of birth, the abnormal symptoms appear in their adolescence. For more than 30 years, until the cause of those disorders was made clear, medicines with DES have been widely used. The followings are the three serious changes possibly occurred if a fetus is exposed to the synthetic estrogen.

- 1) Genital disorders, such as structural change and intersexuality, which is observed to the naked eye.
- 2) Cells which have a slow-acting influence and cause cancer, which is observed using

the microscope.

- 3) Changes in genetic levels, disruption of hormonal messages, secretion of female's protein by male.

As listed up above, DES causes the serious changes in reproduction and development of the next generation.

Many teenager adolescents were seriously affected because of DES. The use of those chemical substances was finally prohibited in the 1970s.

Although DES was forbidden, a large quantity of other synthetic chemical substances which have the same hormonal actions as DES is accumulated in the global environment and its amount is increasing. This phenomenon seriously affects the reproduction system of not only human beings but also wild animals. Those chemical substances are estimated to have at least 63~144 types, which can be categorized into four groups.

- 1) Industrial chemical substances (i.e., PCB, Bisphenol A, and Butyl phthalates)
- 2) Industrial by-products (i.e., Dioxins)
- 3) Agrichemicals (i.e., DDT, Heptachlor, and Hexachlorohexane)
- 4) Medicaments (i.e., DES and pills)

Of them, the industrial chemical substances may have the most serious influence. A large quantity of those substances are produced and consumed as a component of plastics, synthetic resins, electric products, synthetic detergents, and dye and cosmetics, all of which are necessary for our daily life. More dangerously, if a part of those products are disposed and imprudently burned at low temperature, a highly toxic Dioxin, one of the industrial by-products, is generated.

We are in danger of being contacted to environmental hormones throughout the process of the "producing – using – disposing." In other words, we live in the "sea of environmental hormones." Unfortunately, it has not proven yet the amount of environmental hormones secreted from our daily products and how much those hormones affect living creatures and human beings. Environmental hormones are so widely released to the environment that we cannot investigate them enough.

In order to clarify the environmental hormone problems, an immediate measures should be done in the international level and the preparation of the budget for this problem in the domestic level.

Sex hormones are the identical from fish to human beings. This means the extinction of a variety of wild animals, including fish, in the last 50 years due to the breeding disorders is a warning sign of the human beings' survival.

Even so, we cannot escape from this "sea of the environmental hormones" because those substances are necessary for our convenient life. It is unwise to overreact or to be stressed out. For example, people once overreacted to the dioxin problem because mass media took up this issue. However, we need to cope with this problem in a calm and stubborn manner.

Dr. Iguchi, a professor of Yokohama City University, proposed solutions to the environmental hormone problems in the comments of "Altering Eden: Feminization of Nature" by D. Cadbury (translated in Japanese: Shuei-sha) Please refer to this book for more details. The author also recommends you to read the previously introduced "Our Stolen Future." Environmental hormone problems are too serious and complicated issues to provide precise information in limited number of sheets.

#### Precautionary methods

1. Do not take in much meat. There is a possibility of biological concentration through a food chain (Specifically, less intake of fat is good for your health...by the author).
2. Avoid using the plastic tableware or containers until the safe standard becomes clear.
3. When you use a microwave, do not wrap the food in plastic wrap or put it directly into a plastic container.
4. Avoid using the pill. The pill has a strong action since it is made to improve durability of hormones. Furthermore, you need to acknowledge that the pill is disposed into the environment after its use. It's better not to use it since there is a physical substitution.
5. The agrichemicals with environmental hormone effect should not be used as much as possible.
6. Dental materials can be dangerous because they are used or put in a mouth.

Be aware of those points listed above especially for children, fetuses, and pregnant women.

- Attached Data -

\*\*The number of sperms is decreased in the global level: extracted from "Our Stolen Future"

Denmark (20 countries : 1500 people)

1940

113 millions/ ml

1990

66 millions/ml

\* Adolescents: the testicular cancer shows an increase of 300 %

Scotland (3,729 people)

Born in 1940 120 millions

Born in 1969 75 millions

Belgium (360 people)

1977 – 1980 Normality 39.6%

1990 – 1993 Normality 27.8%

France (men with 30 years old)

Born in 1945 120 millions

Born in 1962 51 millions

\*\* Abnormality of wild animals possibly caused by environmental hormones: extracted and partly revised from “Our Stolen Future” and “Altering Eden: Feminization of Nature”

Snails	World	Embryo developmental disorders Sterility
Sole	England	Ovary development disorders
Topminnow	Italy	Abnormality in genital organs “Imposex”
Alligator	Lake Apopka	Abnormality in genital organs “Reduced penis”
Cormorant	The Great Lakes	Abnormality in genital organs “Eggshell thinning”
Common Tern	Worldwide	Bill deformity
	Massachusetts	Abnormality in genital organs “Intersex”
Gull	The Great Lakes	Behavioral disorders
	Worldwide	Bill deformity
Great Blue Heron	Canada	Brain morphological abnormalities
		Behavioral disorders
Herring Gull	The Great Lakes	Immune system disorders
		Behavioral disorders

Bald Eagle	Florida	Hypo-fertility, Behavioral disorders
Dolphin	US east coast	Immunocompromised "Infectious disease"
Seal	Netherlands	Hypofertility, Immunocompromised
Leopard	Florida	Abnormality in genital organs Immunodeficiency
Polar Bear	The Arctic	Hypo-fertility
Human	Worldwide	Abnormality in genital organs Retained testis Hypospadias Decreased sperms Decline in semen quality Endometriosis Developmental disorders Sexual prematurity Vertebral deformity Immune system disorders Atopic diseases Carcinogenesis Genital cancer Behavioral disorders Hyperanakinesia Mental retardation

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