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RACHEL'S HAZARDOUS WASTE NEWS #279

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**NEW STUDY LINKS BREAST CANCER TO DDT, PCBS AND OTHER
CHLORINATED CHEMICALS**

A new study^[1] of women with breast cancer reveals that their breast tissues contain elevated levels of DDT, DDE and PCBs, compared to breast tissues of women with non-cancerous breast disease. DDT is a well-known, persistent pesticide banned in 1972; DDE is a byproduct of the natural breakdown of DDT in the environment; PCBs are persistent industrial toxins banned in 1976.

"This is a very important study," said Dr. Richard Clapp of the JSI Center for Environmental Health Studies in Boston, and former director of the Massachusetts Cancer Registry. "We should all pay close attention to this one," he said.

Although the number of women involved is small, the new study adds to a growing body of evidence indicating that many chlorinated hydrocarbons mimic female hormones and disrupt the human reproductive system and immune system. PCBs, DDT, and DDE are all chlorinated hydrocarbons, and all have been found to mimic female hormones in recent studies of wildlife and of laboratory animals.^[2]

The new breast-cancer study will appear in the March/April, 1992, ARCHIVES OF ENVIRONMENTAL HEALTH.^[1] A team of researchers from University of Michigan, Mt. Sinai School of Medicine (New York), and Hartford Hospital in Hartford, Connecticut, led by Dr. Frank Falck, Jr., conducted the study of 40 women who had been examined at Hartford Hospital between May and September, 1987 for palpable breast mass or mammographic abnormality. Tissue biopsies had been done for diagnostic purposes and this study looked at chemical contaminants in the tissue samples. Half the women had been diagnosed with breast cancer and half had been diagnosed with non-cancerous breast disease (mostly benign cysts).

The two groups of women were comparable in age (average of 63 among the cancer cases, and 59 among the non-cancer control group). There were appreciably more smokers among the non-cancer controls (15 out of 20) than among the cancer group (6 out of 20). Average height and weight were nearly identical for the two groups.

The average (mean) concentration of PCBs, DDT, and DDE were 50% to 60% higher in the women with cancer. Concentrations in the fatty tissues of the cancer cases were: DDT 216 ppb [parts per billion], DDE 2200 ppb, PCBs 1965 ppb.

The causes of breast cancer are not well understood. Known risk factors include age at which menstruation begins (later is safer), and onset of menopause (earlier is safer). Both these factors suggest that female hormones may be involved in this particular cancer. Nevertheless, when all the known risk factors for breast cancer are taken into account, they explain less than half the 179,500 cases that occur each year among U.S. women. Therefore, researchers are looking for evidence that perhaps chemicals in the environment, mimicking hormones, may cause breast cancer in humans, as well as causing other disturbances of the reproductive and immune systems.

Two weeks ago, scientists concerned about chlorinated hydrocarbons in the environment held a symposium in Washington, DC, to share information on the hormone-like qualities of DDT, DDE, PCBs, dioxins, furans and others.^[2] Scientists at the symposium, which was initiated by Dr. Theo Colborn of the World Wildlife Fund, examined the growing body of knowledge about environmental chemicals that mimic female hormones.

The symposium emphasized disruptive effects of these chemicals on fetuses. SCIENCE TIMES (a section of each Tuesday's NEW YORK TIMES) reported some of the findings from the symposium this way:

THE EFFECTS OF THE CHLORINATED ORGANIC CHEMICALS ARE MOST SIGNIFICANT IN FETUSES. THEY INCLUDE PARTIAL RETENTION OF SEX GLANDS OF THE OPPOSITE GENDER, PROFOUND CHANGES IN SEXUAL BEHAVIOR, AND REDUCED FERTILITY. IN SOME STUDIES, LABORATORY RODENTS EXPOSED AS FETUSES TO EVEN SMALL DOSES OF PCBs AND DIOXINS WERE BORN AS 'FEMINIZED' MALES OR 'MASCULINIZED' FEMALES....

STUDIES WITH RATS, MICE AND SEA GULLS HAVE SHOWN THAT FETUSES EXPOSED TO VARIOUS ENVIRONMENTAL HORMONE MIMICS FAIL TO DEVELOP NORMAL SEX ORGANS, OR EVEN DEVELOP PARTLY FORMED DOUBLE SETS OF SEX ORGANS.

DR. [MICHAEL] FRY [A WILDLIFE RESEARCH PHYSIOLOGIST AT UNIVERSITY OF CALIFORNIA, DAVIS] REPORTED THAT UNUSUAL SEXUAL BEHAVIORS HAVE BEEN OBSERVED AMONG GULLS IN THE WILD IN CONTAMINATED REGIONS LIKE THE SEAS OFF SOUTHERN CALIFORNIA AND THE ISLANDS IN THE GREAT LAKES. MALE GULLS

IGNORED BREEDING COLONIES, AND PAIRS OF FEMALE GULLS TRIED TO NEST TOGETHER, AS IF ONE WERE MALE. THERE APPEARED TO BE A CORRELATION BETWEEN THE AMOUNTS OF POLLUTANT CHEMICALS IN THEIR BODIES AND THE DEGREE OF UNUSUAL SEXUAL BEHAVIOR....

A SECOND STUDY [BY DR. DICK PETERSON OF THE UNIVERSITY OF WISCONSIN SCHOOL OF PHARMACY], IN WHICH MOTHER RATS RECEIVED FROM 0.064 MICROGRAM TO 1 MICROGRAM PER KILOGRAM OF BODY WEIGHT OF TCDD [DIOXIN], SHOWED THERE WERE STRIKING ALTERATIONS IN SEX-LINKED BEHAVIOR AMONG THE MALE OFFSPRING AT MATURATION. THE MALES SHOWED A MARKED RELUCTANCE TO MOUNT A SEXUALLY RECEPTIVE FEMALE COMPARED WITH A CONTROL GROUP OF MALES THAT HAD NOT BEEN EXPOSED TO TCDD IN UTERO [BEFORE BIRTH]. THEY ALSO PRODUCED HALF THE USUAL AMOUNT OF SPERM AND TOOK TWICE AS LONG TO EJACULATE.

"WE FOUND THAT PERINATAL [NEAR THE TIME OF BIRTH] TCDD EXPOSURE ALTERS SEXUALLY DIMORPHIC RESPONSES THAT AFFECT THE BRAIN," DR. PETERSON SAID. "IT DECREASES THE EXPRESSION OF MASCULINE SEXUAL BEHAVIOR. AND IT INCREASES THE EXPRESSION OF FEMININE SEXUAL BEHAVIOR." HE SAID THE EFFECTS ON BRAIN FUNCTION THAT APPARENTLY OCCURRED WHEN THE RATS WERE FETUSES AND NEWBORNS WERE PROBABLY PERMANENT AND IRREVERSIBLE....

HORMONE-LIKE CONTAMINANTS IN THE ENVIRONMENT MAY PRODUCE SEVERAL OTHER SORTS OF DAMAGE, RESEARCHERS SUGGESTED, INCLUDING SUPPRESSION OF THE IMMUNE SYSTEM, THYROID DYSFUNCTION, DECREASED FERTILITY, AND BIRTH DEFECTS.

It would be unthinkable to experiment on humans to see if they suffer from similar aberrations after exposure to dioxin or other hormone-mimicking chemicals while in the womb or shortly after birth. Nevertheless, the symposium was told, the now-banned drug diethylstilbestrol (DES) may have served as a human experiment of sorts. The drug, once prescribed to millions of women, mimics natural sex hormones just as chlorinated organics are now thought to do.

Both sons and daughters of DES-treated women have suffered from malformed reproductive systems, infertility, and rare cancers. The sons and daughters were exposed to DES in the womb, but the consequences did not become clear until they matured.

Dr. John McLachlen, director of the Laboratory of Reproductive and Developmental Toxicology at the National Institute of Environmental Health Sciences said, at this point researchers are sure of only three points: that certain chemicals act like estrogens [female hormones] in the environment; that in experimental animals you can perturb the reproductive system with these chemicals; and that you see some of the same effects in humans exposed to DES.

One other thing seems certain: American women have been exposed to chlorinated hydrocarbons for decades and they carry these chemicals in their breast tissues and milk.

A study by EPA (U.S. Environmental Protection Agency) of Americans in 1975-76 revealed that 99% of American women had detectable levels of DDT and DDE in their breast milk. The average concentration of DDT in the lipid (fat) portions of the milk had 553 ppb (parts per billion); the average DDE concentration was 3521 ppb. Other chlorinated hydrocarbons, such as PCBs, are present in breast milk as well.^[3] Chlorinated hydrocarbons are more soluble in lipids than in water, so they tend to concentrate in body fat and milk fat. In women, lactation is the principle route by which such chemicals are excreted from the body.

Many scientists emphasize that the benefits of breast-feeding still outweigh the adverse consequences. Because breast-fed babies receive immunity to disease with their mother's milk, breast-fed babies have fewer infections than those who are bottle-fed, studies show. The important lesson from this information is not to discourage breast feeding, but to phase out or ban chlorinated hydrocarbons.

--Peter Montague, Ph.D.

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[1] Frank Falck, Jr., Andrew Ricci, Mary S. Wolff, James Godbold, and Peter Dreckers, "Pesticides and Polychlorinated Biphenyl Residues in Human Breast Lipids and Their Relation to Breast Cancer." ARCHIVES OF ENVIRONMENTAL HEALTH Vol. 47 No. 2 (March/April, 1992), pgs. 143-146.

[2] Jon R. Luoma, "New Effects of Pollutants: Hormone Mayhem," NEW YORK TIMES March 24, 1992, pgs. C1, C9.

[3] U.S. Environmental Protection Agency, NATIONAL STUDY TO DETERMINE LEVELS OF CHLORINATED HYDROCARBON INSECTICIDES IN HUMAN MILK, 1975-76. Available from National Technical Information Service [NTIS]; telephone (703) 487-4650 and request publication no. PB284393; price: \$35.00. Thanks to Carol Van Strum of Alder-Hill Associates, Tidewater, OR for this. Regarding PCBs, see: Allan Astrup Jensen, "Background Levels in Humans," in Renate Kimbrough and Allan Astrup Jensen, editors, HALOGENATED BIPHENYLS, TERPHENYLS, NAPHTHALENES, DIBENZODIOXINS, AND RELATED PRODUCTS (NY: Elsevier Science Publishers, 1989), pgs. 345-380.] Thanks to Tom Webster, CBNS, Queens College, Flushing, NY, for this.

Descriptor terms: breast cancer; pesticides; dde; pcbs; health; reproductive hazards; mt sinai school of medicine; hartford hospital in hartford; birth defects; sexual behavior; thyroid dysfunctions; infertility; des; cancer; dioxin; estrogen; epa;

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