

The Wingspread Statement--Part 2 MAJOR CHALLENGE TO "BUSINESS AS USUAL"

An international group of 21 scientists¹ met at Wingspread in Racine, Wisconsin in July, 1991 to discuss evidence that chemicals in the environment are causing changes in the sexual development of wildlife and conceivably in humans as well. (See *RHWN* #263.) The group produced a five-page "consensus statement."

Sexual development in wildlife, as in humans, is controlled by the endocrine system, a group of organs, tissues and cells that secrete hormones; the hormones interact with other cells, initiating chemical/biological reactions with far-reaching consequences. Male hormones are called androgens; female hormones are called estrogens.

It is now known that some chemicals disrupt the endocrine system. The Wingspread statement identifies the following: "Chemicals known to disrupt the endocrine system include: DDT and its degradation products [DDE and DDD], DEHP (di-(2-ethylhexyl)phthalate), dicofol, HCB (hexachlorobenzene), kelthane, kepone, lindane and other hexachlorocyclohexane congeners [forms], methoxychlor, octachlorostyrene, synthetic pyrethroids, triazine herbicides, EBDC fungicides, certain PCB congeners [forms], 2,3,7,8-TCDD and other dioxins, 2,3,7,8-TCDF and other furans, cadmium, lead, mercury, tributyltin and other organo-tin compounds, alkyl phenols (non-biodegradable detergents and anti-oxidants present in modified polystyrene and PVCs), styrene dimers and trimers, soy products, and laboratory animal and pet food products."

In animals, and in humans, sexual characteristics are established at a particular point during development in the womb or egg. For example, Dr. Theodora Colborn of the World Wildlife Fund (Washington, DC) points out that a single dose of dioxin, administered to a pregnant rat at day 15 of the pregnancy--near the time when gender is established--results in demasculinization and feminization of male offspring.²

Samples of herring gulls from Lake Ontario collected in 1975 and 1976 showed cellular and anatomical changes in embryos and in newly hatched chicks that caused feminization of male chicks and overdevelopment of female reproductive organs. Elevated concentrations of DDE [a break down by product of DDT] and other residues were found in eggs from the same population. To test

whether these sexual problems might be linked to the presence of the DDT, laboratory experiments were conducted in which Western gull eggs were injected with concentrations of DDT similar to those found in the Great Lakes environment. Male chicks became feminized, developing ovarian tissue and oviducts.³

What is becoming clear is that the older picture of chemical toxicity underestimates the number and kinds of effects that chemicals can have in fish, birds, and mammals. For decades, U.S. regulatory officials have focused their attention almost exclusively on cancer. Meanwhile, many of the chemicals that have been dumped into the environment, and are now coursing through food chains, cause many other detrimental effects besides cancer.

For example pesticides such as DDE, dieldrin, lindane, mirex, toxaphene, and PCBs, block communication between cells. Normal metabolism [energy use] and development of a cell may be disrupted because movement of nutrients, electrolytes, and hormones in and out of a cell is blocked by the presence of these poisons.⁴

Furans, benzo[a]pyrene, 2,3,7,8-TCDD [dioxin], DDE, dieldrin, HCB [hexachlorobenzene], lindane [beta-HCH], mirex, toxaphene, and PCBs induce enzyme activity. [Enzymes are large protein molecules that promote chemical activity in the body; the presence of particular enzymes makes possible particular chemical reactions that would not otherwise be possible.] When the enzyme activity is induced, normal products of the endocrine hormonal system can be released into the bloodstream. This can disrupt the role of steroid hormones, affecting growth and sexual maturation.⁴

The structure of DDT and DDE are, themselves, quite similar to estrogens and thus may mimic female hormones. In addition, DDE induces enzymes that break down male hormones. Under different circumstances, dioxin acts like an estrogen, or it may act as an anti-estrogen (what causes the same chemical to have opposite effects is not understood).⁴

At one Superfund site where data are available, humans are experiencing abnormalities of sexual development. At the Brio site south of Houston, Texas, where a housing development was built atop a chemical dump, girls 4 to 5 years old have developed pubic hair and enlarged breasts. One child (now four years old) was born without any genital organs; chromosome tests revealed that this is a male child, though he has a birth canal.

This information, and other data about abnormal sexual development of children at the Brio site, is contained in a unique database of information that resulted from a health survey of the community by a local group (HELP) and by the Environmental Health Network (EHN) in Harvey, Louisiana.⁵ Such surveys--providing an unusually valuable source of information about health problems near chemical dumps--are under way in several Superfund communities, looking for patterns of problems, including the kinds the Wingspread statement warns of.

The Wingspread statement presents a major new challenge to advocates of "business as usual." The participants in the conference represent 17 different fields of scientific inquiry. They have many thousands of data points on which they have based their conclusions. If they are right, we are all being exposed, on a daily basis, to chemicals that threaten out reproductive health, and the health of our offspring.

Because hormones and hormone disrupters do their work at extremely low concentrations, the only "safe" dose of an endocrine-system disrupter is zero. Thus any new sources of these chemicals should be aggressively discouraged while we figure out how to minimize exposure to the quantities of these chemicals already in the environment.

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¹ Participants in the Wingspread meeting included the following individuals (whose institutional affiliations are given for identification purposes only): Dr. Howard A. Bern, Professor of Integrative Biology (emeritus) and Research Endocrinologist, University of California-Berkeley; Dr. Phyllis Blair, Professor of Immunology, University of California-Berkeley; Sophie Brasseur, Marine Biologist, Research Institute for Nature Management, Texel, The Netherlands; Dr. Theo Colborn, Senior Fellow, World Wildlife Fund, Washington, DC; Dr. Gerald R. Cunha, Developmental Biologist, University of California-San Francisco; Dr. William Davis, Research Ecologist, Environmental Research Laboratory, U.S. Environmental

Protection Agency, Sabine Island, FL; Dr. Klaus D. Dohler, Director, Research, Development & Production, Pharma Bissendorf Peptide GmbH, Hannover, Germany; Glen Fox, Contaminants Evaluator, National Wildlife Research Center, Environment Canada, Quebec, Canada; Dr. Michael Fry, Research Faculty, Department of Avian Sciences, University of California-Davis; Dr. Earl Gray, Section Chief, Developmental and Reproductive Toxicology Division, Health Effects Research Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC; Dr. Richard Green, Professor of Psychiatry in Residence, School of Medicine, University of California-Los Angeles; Dr. Melissa Hines, Assistant Professor in Residence, School of Medicine, University of California-Los Angeles; Timothy J. Kubiak, U.S. Fish and Wildlife Service, East Lansing, MI; Dr. John McLachlan, Director, Division of Intramural Research, National Institute of Environmental Health Sciences, Research Triangle Park, NC; Dr. J.P. Myers, Director, W. Alton Jones Foundation, Charlottesville, VA; Dr. Richard E. Peterson, Professor of Toxicology and Pharmacology, School of Pharmacy, University of Wisconsin-Madison; Dr. P.J.H. Reijnders, Head, Section of Marine Mammology, Research Institute for Nature Management, Texel, The Netherlands; Dr. Ana Soto, Associate Professor, Tufts University School of Medicine, Boston, MA; Dr. Glen Van Der Kraak, Assistant Professor, University of Guelph, Ontario, Canada; Dr. Frederick vom Saal, Professor, Division of Biological Sciences, University of Missouri-Columbia; Dr. Pat Whitten, Assistant Professor, Department of Anthropology, Emory University, Atlanta, GA.

² David J. Hanson, "Dioxin Toxicity: New Studies Prompt Debate, Regulatory Action," *C&EN [Chemical & Engineering News]* August 12, 1991, pg. 13.

³ Theodora E. Colborn and others, *Great Lakes Great Legacy?* (Washington, DC: Conservation Foundation, 1990), pg. 139.

⁴ Theodora E. Colborn and others, cited above, pg. 142.

⁵ For more information about the Brio site, contact HELP: 10904 Scarsdale Boulevard, M263, Houston, TX 77089; phone (713) 992-1867. For advice about health surveys, contact Linda King, Environmental Health Network, P.O. Box 1628, Harvey, LA 70058; phone (504) 362-6574.

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