

Can We Avoid a New Silent Spring?



Endocrine disrupters—chemicals mimicking hormones—may be the cause of widespread reproductive anomalies.

BY DONELLA H. MEADOWS

In late 1987, Dr. Ana Soto walked into her lab at Tufts University Medical School and found her tissue culture plates overrun with breast cancer cells. In years of research, she had never seen anything like it.

Soto and her colleague, Dr. Carlos Sonnenschein, were trying to isolate the inhibiting factor in blood that normally keeps cells from multiplying wildly into cancer. They grew various kinds of cells in the presence of different fractions of blood serum. If an inhibitor was present in the fraction, the cells didn't grow. If it was absent, they did. Or so it had always worked, until that day in 1987.

Most of the cells in the lab were behaving properly, only the breast cancer cells were going wild. Soto knew that those cells are sensitive to the hormone estrogen. Their walls contain receptor sites that bind estrogen, which then blocks the growth inhibitor. The rampant growth Soto was seeing had to be a result of estrogen contamination.

It took the researchers four months to figure out where the estrogen was coming from. They checked their procedures, their cell lines, their chemicals, the way they washed their hands, their equipment. They locked the lab, fearing they might be targets of some kind of sabotage. On the remote chance the air was somehow imbued with estrogen, they changed labs. The estrogen-sensitive cell lines kept growing lustily.

Finally, they changed the supplier of the plastic tubes in which the blood serum was kept. Once again, the inhibitor stopped the growth of the breast cancer cells, as it was supposed to.

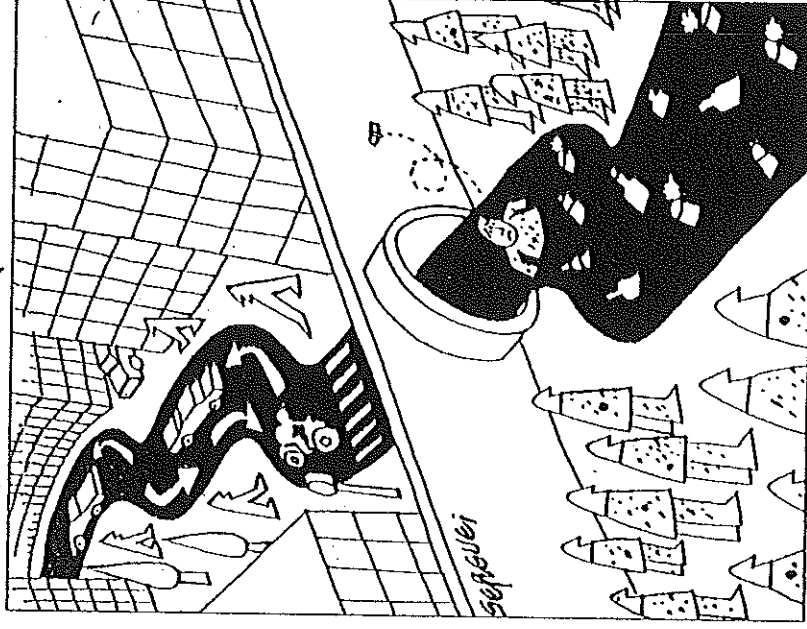
The maker of the original tubes, Soto and Sonnenschein discovered, had switched to a new plastic resin. The company refused to reveal its contents. So the researchers had to find out for themselves what was leaching out of the plastic and behaving like estrogen.

To make a long chemical detective

story short, the culprit was p-nonyphenol, an antioxidant sometimes added to plastics to make them less breakable. Hundreds of millions of pounds of p-nonyphenol and related compounds are used annually in packaging (including food packaging), other plastic products and cleaning agents.

In 1993, endocrinologists at Stanford University identified another estrogen mimic that lurks in plastic. Called bisphenol-A, it is added to polycarbonate, used in many kinds of packages, including drinking-water bottles and the linings of food cans.

This story comes from a new book,



SERGIO GOZAUKSHAS, Paris

"Our Stolen Future," by Theo Colborn, J.P. Myers and Dianne Dumanowski. The book pulls together an astounding number of research findings about industrial chemicals that act like hormones. Called "endocrine disrupters," they can either block or falsely stimulate cell-wall receptors, turning secretion, metabolism or replication on or off. The evidence suggests that endocrine disrupters are the cause of falling human sperm counts, female birds that act like males, male alligators with shrunken penises and birth defects or reproductive failures in everything from polar bears to Great Lakes fish.

Another example from the book tells what Pierre Bland of Canada's St.

Lawrence National Institute of Ecotoxicology found when he dissected beluga whales to see why their populations are declining: "Malignant tumors, benign tumors, breast tumors and abdominal masses. One had bladder cancer, like many of the workers at the aluminum plant on Quebec's Saguenay River, a tributary where some of the whales spend a good deal of time... A large number also suffered from endocrine disorders, including enlargement of and cysts in the thyroid gland." One whale had both male and female reproductive organs. Many had breast malfunctions that prevented nursing.

The bodies of these whales contained high loads of industrial chemicals. One carcass of a young whale had a concentration of PCBs (another endocrine disrupter) 10 times higher than it would take to classify the animal under Canadian law as hazardous waste.

"Our Stolen Future" is being called another "Silent Spring"—the 1962 Rachel Carson book that alerted us to the dangers of pesticides. It will be interesting to see whether in the 34 years since the first "Silent Spring" we have learned how to react constructively to news that we are poisoning ourselves and our fellow creatures.

There is no need to panic. There is no need to deny the problem. There is no need to turn out hastily drafted, politically soothing legislation that guarantees end-les litigation, chemical by chemical, costing corporations billions of dollars while failing to protect either people or nature.

If we come at this problem seriously, with an intent to solve it, we will recognize that it is generic, if we emit massive quantities of untested chemicals into the environment, some of them are bound to end up in places that surprise us, doing things that endanger us. Endocrine disrupters are not the first and won't be the last.

The way to end these lethal surprises is not to focus on a single chemical or set of chemicals, but to step back and ask hard questions about all the chemicals we use. Which ones do we really need? Is it necessary to dump them into our life-support systems? Are they worth what we pay for them in money, in health, in environmental damage? How, from their invention to their disposal, should we test and control them for long-term common good in a way that won't stop, but could limit, short-term private gain?

Donella H. Meadows is an adjunct professor of environmental studies at Dartmouth College.