

# Rachel's Environment & Health News

## #575 - The Truth About Breast Cancer -- Final Part

December 03, 1997

Cancer occurs when a cell goes haywire and starts multiplying uncontrollably. Modern cancer theory says a cancer is initiated when damage occurs to the cell's genetic material, its DNA.[1] Such damage can arise spontaneously (translation: we don't have any idea what causes it) or it can result from an encounter with a carcinogen, such as an x-ray or a cancer-causing chemical.

Damaged ("initiated") cells are likely to be removed from the body by a natural process called apoptosis. (Therefore anything that interferes with apoptosis may encourage cancer without being recognized as a carcinogen.)

An "initiated" cell that survives apoptosis does not begin to grow uncontrollably until several more things happen to it. The cell has to be "promoted" by agents (such as x-rays or certain chemicals) that interfere with the ordinary messages being transmitted back and forth between the cell and the body it inhabits. In some instances, estrogen (female sex hormone) can "promote" cancer cells. The result of "promotion" is an expanded cluster of abnormal cells, waiting to become true cancers.

Still these promoted cells do not multiply uncontrollably unless something ELSE happens to them. The "something else" is called progression and it results from more physical injury to the cell's DNA --and progression in all likelihood requires more than one physical injury. Again, x-rays and certain chemicals (in cigarette smoke, for example), might cause progression. Thus cancer is a multi-step process, requiring perhaps 5 or 6 (or more) "insults" to a cell before cancer develops.

A cell that has been sufficiently damaged takes on fearsome properties --it becomes more sensitive to hormones, it can spread and invade other parts of the body, and it develops a knack for attracting blood vessels to nourish the growing tumor. It is now a cancer and, left alone, it will multiply (grow) until it kills its host.

Very few things have the ability to initiate cancer AND promote it AND make it progress. Things that can do this are called "complete carcinogens." Radiation is a "complete carcinogen" (including cosmic radiation from outer space, which we cannot avoid) but most carcinogens are not --most carcinogens EITHER initiate cancer OR promote it OR cause it to progress.

In any case, you can compare cancer to a rope hanging from a tree branch. If the rope is cut, then you have a cancer. You can think of carcinogens as bullets being fired at the rope. Most bullets miss the rope completely. A few hit the rope and damage it. As time passes and more and more carcinogens are fired at the rope, eventually the rope may be cut and cancer develops. Luck plays a part here (which is another way of saying we don't understand what's going on).

In sum, cancer prevention means avoiding contact with carcinogens -- avoiding the bullets. This is the truth about cancer, including breast cancer. What percentage of cancers are avoidable?

In 1981, Richard Doll and Richard Peto --famous British researchers -- looked at cancers in every country where statistics were available.[2] They looked for the lowest rates for each type of cancer and on that basis they estimated that the "natural" level of cancer in humans is about 1/5 of the current cancer rate in the U.S. In other words, they estimated that 80% of U.S. cancer cases are avoidable and preventable. [3]

To review the situation with breast cancer: In the U.S., the occurrence of breast cancer has been increasing at the rate of 1% per year since about 1950.[4] The same rate of increase is visible in Canada, Japan, Denmark, the Nordic countries, and elsewhere in the "developed" world. [5] The reasons for this steady increase are not understood. In 1982 mammography screening became widespread and many breast cancers were suddenly discovered earlier. This led to a 3% to 4% annual rate of increase in the incidence of breast cancers during the period 1982- 1987, but by

1991 the "mammography effect" had passed and the rate of increase had dropped back to its historical rate of 1% annual rise. Thus when someone says, "The incidence of breast cancer is dropping" they are describing the end of the mammography effect (the shift from the 4% annual increase back to the 1% annual increase). The incidence of breast cancer is not really dropping --it is still increasing at about 1% each year, for unknown reasons. (On the other hand, the DEATH rate from breast cancer IS dropping slightly because tumors are now being found earlier, so earlier and more successful therapies (surgery, chemotherapy and radiation treatments) are keeping more women alive, at least for the 5 years that officially define a "cure.")

As we have seen (REHW #571, #572, #573, #574), 30% to 50% of breast cancers can be explained by exposure to naturally-occurring estrogens (sex hormones), which a woman's body produces as part of the monthly menstrual cycle. However, this still leaves 50% to 70% of breast cancers unexplained.

In recent years, Devra Lee Davis and Leon Bradlow at Cornell University have suggested that xenoestrogens might account for 10% or 20% of the unexplained breast cancers. Xenoestrogens are industrial chemicals that mimic natural sex hormones. Davis and Bradlow initially proposed their hypothesis in 1993 and they have elaborated upon it since. In the body, estrogen is metabolized into two different chemicals --"good" estrogens and "bad" estrogens (analogous to "good" cholesterol and "bad" cholesterol). Evidence is mounting that some organochlorines and other xenoestrogens help create bad estrogens, which contribute to breast cancer.[6,7,8]

So far, most of the human studies of this subject have focused on DDE (a breakdown product of the pesticide DDT) and PCBs. Last week, we pointed out that these are inappropriate chemicals for determining whether or not xenoestrogens cause breast cancer. PCBs represent a group of 209 chemicals, some of which are estrogenic and others of which are ANTI-estrogenic. (Some ANTI-estrogens, such as tamoxifen, are used for breast cancer therapy, to stop a cancer from spreading. Some women have even been given tamoxifen in an attempt to prevent breast cancer. Unfortunately, tamoxifen has caused other cancers in some of these women.[9]) Regarding DDE, we overstated the case somewhat last week, saying flatly that DDE is not estrogenic. There are two kinds of DDE and one is estrogenic (o,p'-DDE) and the other is not (p,p'-DDE). However, the human studies that have provided the basis for claims that organochlorines don't cause breast cancer have all reported total DDE or p,p'-DDE (the non-estrogenic form).[10] Therefore, our point remains valid: studies of total DDE or mixed PCBs provide no basis for claiming that xenoestrogens aren't implicated in breast cancer. They are not studies of clearly-estrogenic substances.

There are at least three aspects of hormone-disrupting chemicals that make them exceedingly difficult for science to study:

1. Chemicals that interfere with hormones may only be effective at a particular moment in the development of a baby in the womb. In the laboratory, exposing a pregnant rat to dioxin on the 15th day of pregnancy dramatically affects the sexual characteristics of her male offspring after they mature. Dioxin exposure on other days has no such effect. (See REHW #290.) It may be that exposure to organochlorines or other hormone-disrupting chemicals at a particular moment in the womb primes a baby girl's breast cells for later growth of cancer.[8]

2. Furthermore, some hormone disrupters (such as the common pesticide, atrazine) only stay in the body for a few months or a few years. By the time a baby grows into childhood or adulthood, these chemicals are gone and can't be studied. DDE and PCBs are convenient to study because they remain in the body for a long time, but they are not necessarily important chemicals for breast cancer. The important ones may well be gone by the time the research begins.

3. Many of these chemicals work in combinations. Their effects are additive. Two chemicals present at ineffective levels may combine to produce an effect. This has been conclusively shown.[11] Scientists almost never study combinations of chemicals --and most of us have combinations of HUNDREDS of different organochlorines and other xenoestrogens in our bodies, as a result of continuous chemical trespass by corporations.

For these (and other) reasons, science may never solve the puzzle of breast cancer --or it may find answers only after many more decades of research.

In the meantime, prevention can begin now. Breast cancer activists could be advocating a ban on every chemical that shows any tendency to interfere with hormones, or to cause cancer, in any form of life. Activists' determination to ban harmful chemicals should not wax and wane as new studies of DDE and PCBs are misleadingly reported (or ignored entirely) by the NEW YORK TIMES.

The rationale for banning hormonally active chemicals, and carcinogens, is ethical. The molecular biologist and physician, John Gofman, has argued, "If you pollute when you DO NOT KNOW if there is any safe dose, you are performing improper experimentation on people without their informed consent.... If you pollute when you DO KNOW that there is no safe dose with respect to causing extra cases of deadly cancers, then you are committing premeditated random murder." [12] Either way, our human rights are being violated by corporate polluters.

As an ethical principle, the burden of proof should be shifted to the polluter to demonstrate --BEFORE the pollution begins --that living things will not be harmed.

Cancer --including breast cancer --is a political disease. Corporations have hijacked our sovereign power and are using it against us, contaminating our air, water, and food with cancer-causing, hormone-disrupting chemicals. If we are to survive as a species, we will need to reassert the sovereign power of the people to "promote the general welfare" (as the preamble to our Constitution says). We simply have no other choice.

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

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[1] A clear explanation of cancer processes can be found in Sandra Steingraber, *LIVING DOWNSTREAM* (New York: Addison-Wesley, 1997), pgs. 239-245.

[2] Richard Doll and Richard Peto, "The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today," *JOURNAL OF THE NATIONAL CANCER INSTITUTE* Vol. 66, No. 6 (June 1981), pgs. 1191-1308.

[3] Doll and Peto, cited in note 2 (above), said (Table 20, pg. 1256) they "guestimated" (their word, pg. 1235) that 35% of cancers are caused by poor diet but they said the individual estimates that add up to 35% are "uncertain in the extreme" (pg. 1235). They estimated that 30% of cancers are caused by tobacco preparations and 3% by alcohol. They estimated that industrial chemicals (including food additives, occupational exposures, pollution, and industrial products) together accounted for 8% of all cancers, or less. However they also said (pg. 1239) "important occupational [cancer] hazards may quite possibly exist that have not yet been detected...." and, "On present knowledge, therefore, it is impossible to make any precise estimate of the proportion of the cancers of today that are attributable to hazards at work (let alone how many future cancers may arise from past occupational exposure during

the years before 1980), and none of the estimates that have been made are claimed to be anything more than informed guesses." They further said (pg. 1241), "We do not, ourselves, consider particularly reliable any explicit numerical estimates of the proportion of cancers currently ascribable to occupation...." On pg. 1251 they say their upper limit estimate of 5% of cancers being caused by pollution is "rather arbitrary." On pg. 1251 they also say industrial products "...are a class of agents which are so numerous that we can only echo the uncertainty with which we discussed many pollutants in the previous section." And they conclude by saying, "There is too much ignorance for complacency to be justified." (pg. 1251) Unfortunately, their work has been cited again and again since 1981 to justify the very complacency they warned against.

[4] Barry A. Miller and others, "Recent Incidence Trends for Breast Cancer in Women and the Relevance of Early Detection: An Update," *CA--A CANCER JOURNAL FOR CLINICIANS* Vol. 43, No. 1 (Jan./Feb. 1993), pgs. 27- 41. And: Stephanie E. King and David Schottenfeld, "The 'Epidemic' of Breast Cancer in the U.S.--Determining the Factors," *ONCOLOGY* Vol. 10, No. 4 (April 1996), pgs. 453-462. And: Eric J. Feuer and Lap-Ming Wun, "How Much of the Recent Rise in Breast Cancer Incidence Can Be Explained by Increases in Mammography Utilization?" *AMERICAN JOURNAL OF EPIDEMIOLOGY* Vol. 136, No. 12 (December 15, 1992), pgs. 1423-1436. And: J.M. Liff and others, "Does Increased Detection Account for the Rising Incidence of Breast Cancer?" *AMERICAN JOURNAL OF PUBLIC HEALTH* Vol. 81, No. 4 (1991), pgs. 462-465. And: Barry A. Miller and others, "The increasing incidence of breast cancer since 1982: Relevance of early detection," *CANCER CAUSES AND CONTROL* Vol. 2 (1991), pgs. 67-74. And: Emily White and others, "Evaluation of the increase in breast cancer incidence in relation to mammography use," *JOURNAL OF THE NATIONAL CANCER INSTITUTE* Vol. 84 (1992), pgs. 1546-1552. And: Miriam K. Campbell and others, "Cohort-Specific Risks of Developing Breast Cancer to Age 85 in Connecticut," *EPIDEMIOLOGY* Vol. 5 (1994), pgs. 290-296. See Table 2. And: Larry G. Kessler and others, "Projections of the Breast Cancer Burden to U.S. Women: 1990-2000," *PREVENTIVE MEDICINE* Vol. 20 (1991), pgs. 170-182. And: G.C. Roush and others, *CANCER RISK AND INCIDENCE TRENDS: THE CONNECTICUT PERSPECTIVE* [ISBN 0-89116-412-x] (Washington, D.C.: Hemisphere, 1987). Hemisphere is an imprint of Taylor & Francis; telephone 1-800-821-8312. And: Gertraud Maskarinec and others, "Mammography Screening and the Increase in Breast Cancer Incidence in Hawaii," *CANCER EPIDEMIOLOGY, BIOMARKERS AND PREVENTION* Vol. 6 (March 1997), pgs. 201-208. And: Paula M. Lantz, "Mammography screening and increased incidence of breast cancer in Wisconsin," *JOURNAL OF THE NATIONAL CANCER INSTITUTE* Vol. 83 (1991), pgs. 1540- 1546. And: Eric J. Feuer and others, "The Lifetime Risk of Developing Breast Cancer," *JOURNAL OF THE NATIONAL CANCER INSTITUTE* Vol. 85 (1993), pgs. 892-897. And: Theodore R. Holford and others, "Trends in female breast cancer in Connecticut and the United States," *JOURNAL OF CLINICAL EPIDEMIOLOGY* Vol. 44 (1991), pgs. 29-39. And: Robert A. Hahn and Susan H. Moolgavkar, "Nullparity, Decade of First Birth, and Breast Cancer in Connecticut Cohorts, 1855 to 1945: An Ecological Study," *AMERICAN JOURNAL OF PUBLIC HEALTH* Vol. 79, No. 11 (November 1989), pgs. 1503-1507.

[5] John F. Forbes, "The Incidence of Breast Cancer: The Global Burden, Public Health Considerations," *SEMINARS IN ONCOLOGY* Vol. 24, No. 1 Supplement 1 (February 1997), pgs. S1-20 to S1-35. And: Lenore Kohlmeier and others, "Lifestyle and Trends in Worldwide Breast Cancer Rates," in Devra Lee Davis and David Hoel, editors, *TRENDS IN CANCER MORTALITY IN INDUSTRIAL COUNTRIES* [ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Vol. 609; ISBN 0-89766-643-7] (New

York: The New York Academy of Sciences, 1990), pgs. 259-268. And: J. Ranstam and others, "Rising incidence of breast cancer among young women in Sweden," BRITISH JOURNAL OF CANCER Vol. 61, No. 1 (January 1990), pgs. 120-122. And: Michael Grace and others, "The Increasing Incidence of Breast Cancer in Alberta 1953-1973," CANCER Vol. 40 (1977), pgs. 358-363. And: Marianne Ewertz and Bendix Carstensen, "Trends in Breast Cancer Incidence and Mortality in Denmark, 1943-1982," INTERNATIONAL JOURNAL OF CANCER Vol. 41 (1988), pgs. 46-51. And: A.H. Andreasen and others, "Regional trends in breast cancer incidence and mortality in Denmark prior to mammographic screening," BRITISH JOURNAL OF CANCER Vol. 70 (1994), pgs. 133-137. And: Hrafn Tulinius and Helgi Sigvaldason, "Trends in Incidence of Female Breast Cancer in the Nordic Countries," in Knut Magnus, editor, TRENDS IN CANCER INCIDENCE [ISBN 0-89116-235-6] (Washington, D.C.: Hemisphere, 1982), pgs. 235-247. Hemisphere is an imprint of Taylor & Francis; telephone 1-800-821-8312. And: Yuko Minami, "Trends in the Incidence of Female Breast and Cervical Cancers in Miyagi Prefecture, Japan, 1957-1987," JAPANESE JOURNAL OF CANCER RESEARCH Vol. 87 (1996), pgs. 10-17.

[6] Devra Lee Davis, H. Leon Bradlow, and others, "Medical Hypothesis: Xenoestrogens As Preventable Causes of Breast Cancer," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 101, No. 5 (October 1993), pgs. 372-377.

[7] Devra Lee Davis and others, "Medical Hypothesis: Bifunctional Genetic-Hormonal Pathways to Breast Cancer," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 105, Supplement 3 (April 1997), pgs. 571-576. Anyone interested in xenoestrogens, environment, and breast cancer will want to see this ENVIRONMENTAL HEALTH PERSPECTIVES SUPPLEMENT, which is entirely devoted to the topic.

[8] See Devra Lee Davis and others, "Environmental Influences on Breast Cancer Risk," SCIENCE AND MEDICINE Vol. 4, No. 3 (May/June 1997), pgs. 56-63.

[9] Nils Wilking and others, "Tamoxifen and Secondary Tumours," DRUG SAFETY Vol. 16, No. 2 (February 1997), pgs. 104-117.

[10] David J. Hunter and others, "Plasma Organochlorine Levels and the Risk of Breast Cancer," NEW ENGLAND JOURNAL OF MEDICINE Vol. 337, No. 18 (October 30, 1997), pgs. 1253-1258. And: Pieter van't Veer and others, "DDT (dicophane) and postmenopausal breast cancer in Europe: case-control study," BRITISH JOURNAL OF MEDICINE Vol. 315 (July 12, 1997), pgs. 81-85. Studied 265 cases and 341 controls. And: Lizbeth Lopez-Carrillo and others, "Dichlorodiphenyltrichloroethane Serum Levels and Breast Cancer Risk: A Case Control Study from Mexico," CANCER RESEARCH Vol. 57 (September 1, 1997), pgs. 3728-3732. See also Mary S. Wolff and Paolo G. Toniolo, "Environmental Organochlorine Exposure as a Potential Etiologic Factor in Breast Cancer," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 103 Supplement 7 (October 1995), pgs. 141-145. And see: Hans-Olav Adami and others, "Organochlorine compounds and estrogen-related cancers in women," CANCER CAUSES AND CONTROL Vol. 6 (1995), pgs. 551-566.

[11] Ana M. Soto and others, "The E-SCREEN Assay as a Tool to Identify Estrogens: An Update on Estrogenic Environmental Pollutants," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 103, Supplement 7 (October 1995), pgs. 113-122.

[12] Gofman quoted in Sandra Steingraber (see note 1, above), pgs. 339- 340.

Descriptor terms: breast cancer; carcinogens; dde; pcbs; ethics; bans; atrazine; development; endocrine disrupters; radiation; ddt;

pesticides; xenoestrogens; estrogen; tamoxifen; john gofman; burden of proof; hormone disrupters;