Late last month the NEW ENGLAND JOURNAL OF MEDICINE (NEJM) published a study (by David J. Hunter) comparing the levels of DDE and PCBs in the blood of two groups of women, one group with breast cancer, the other without.[1] The Hunter study failed to find a positive relationship between breast cancer and DDE or PCBs in the blood. DDE is a breakdown product of the organochlorine pesticide DDT, which was banned in the U.S. in the mid-1970s; PCBs are a group of 209 chlorinated industrial chemicals, also banned in the U.S. The Hunter study is the largest of its kind to date, comparing 236 pairs of women for DDE and 230 pairs for PCBs.

The NEW ENGLAND JOURNAL OF MEDICINE put a far-reaching title on the new study: "Plasma Organochlorine Levels and the Risk of Breast Cancer." (Plasma is the part of the blood that contains fat-soluble chemicals such as organochlorines.) The title seemed to suggest that a study of two chemicals --DDE and PCBs --could tell us something definitive about all of the 15,000 different organochlorine compounds in relation to breast cancer.

In case we missed the message, the editors of the JOURNAL provided an editorial that spelled it out. The editorial, by Stephen H. Safe, a Texas researcher whose work is often funded by the Chemical Manufacturers Association, had a slightly different though equally far-reaching title: "Xenoestrogens and Breast Cancer." (Xenoestrogens are industrial chemicals that interfere with normal sex hormones such as estrogen.)

Dr. Safe's editorial in NEJM began, "Chemophobia, the unreasonable fear of chemicals, is a common public reaction to scientific or media reports suggesting that exposure to various environmental contaminants may pose a threat to health." Surely this is an odd message from a scientist. He is saying, if you fear chemicals because scientific reports indicate that they might harm your health, you are suffering from irrational phobia. Perhaps Dr. Safe did not write the editorial in his capacity as a scientist.

Dr. Safe concludes his chemophobia editorial saying it is time we all stopped worrying about organochlorines and breast cancer. He writes, "The results of Hunter along with those of other recent studies should reassure the public that weakly estrogenic organochlorine compounds such as PCBs, DDT and DDE are not a cause of breast cancer."[2] Estrogenic organochlorine compounds such as DDT, DDE and PCBs are not a cause of breast cancer. Case closed.

If we still didn't get the point, Gina Kolata of the NEW YORK TIMES interviewed Dr. Safe, giving him an opportunity to amplify his message. Dr. Safe told Ms. Kolata it is time to quit researching the relationship between organochlorine chemicals and breast cancer. "For advocates [of the idea that the two are connected], it's never ending. But for other people, there may be times when we want to spend our money on other things," Dr. Safe said.[3] No more research needed. Case closed.

Three days later in the Sunday TIMES, Gina Kolata delivered the message once again, summarizing the Hunter study this way: "One more environmental scare bit the dust last week as scientists from the Harvard School of Public Health reported that their large and meticulously done study found no evidence that exposure to the chemicals DDT and PCB’s [sic] are linked to breast cancer."[4] Another scare bit the dust. Case closed.

Including the recent Hunter study, there are now 11 published studies of organochlorine compounds (DDE, PCBs, methoxychlor, beta-hexachlorocyclohexane, and chlordane --the last 3 being pesticides) in relation to breast cancer. Four studies, including the largest two of the 11, have shown no relationship between DDE, PCBs and breast cancer.[5,6,7] Six smaller studies have indicated a positive relationship, suggesting that some organochlorines may be implicated somehow in breast cancer.[8,9,10,11,12,13] One additional study was equivocal, subject to differing interpretations.[14]

The equivocal study was by led by Nancy Krieger, who examined DDE and PCB levels in the blood of 150 women with breast cancer and 150 women without breast cancer. The 300 women were chosen to represent racial/ethnic groups: 100 whites, 100 African-Americans and 100 Asian-Americans. Taken together, the 300 women showed no statistically-significant relationship between DDE, PCBs and breast cancer. However, when the racial/ethnic groups were studied individually, the whites and the African-Americans with breast cancer showed elevated levels of DDE in the blood, compared to whites and African-Americans without breast cancer.[14] Asian and recently-immigrated Asian-American women tend to have a much lower incidence of breast cancer than white Americans, perhaps because of a protective effect from their diet.[15,16] Omitting the Asian-Americans from the Krieger study essentially reverses the study's conclusions.

Thus out of 11 studies, 4 are negative and 7 show elevated levels of organochlorines of one kind or another in tissues of women with breast cancer. One of those seven were not statistically significant. Is it time to close the book on this inquiry?

Stephen Safe and Gina Kolata obviously want us to think so. Dr. Safe and Ms. Kolata both try to make us believe that recent work has revealed that breast cancer can be completely explained by "known risk factors." Listen to Dr. Safe: "Robbins and coworkers recently showed that the high incidence of breast cancer in women from the San Francisco Bay area can be accounted for by known risk factors, including parity [how many children they've had], age at first-term pregnancy, months of breast-feeding, age at menopause, age at menarche [when a woman's period commences], and alcohol consumption."[2] Ms. Kolata takes the argument even further: "Dr. Hunter said that perhaps it was time to question the assumption that much breast cancer is caused by unknown environmental agents. A recent study, for example, found that the high rate of breast cancer in the San Francisco Bay area can be completely attributed to known risk factors like a woman's age when she starts to menstruate, has a first child, and when she begins menopause."

Dr. Safe and Ms. Kolata both make it sound as if this new study of women in San Francisco has revealed that all breast cancer can be explained by "known risk factors." If true, this is important news.

In fact the Robbins study of women in the San Francisco Bay area did not even try to explain the origins of all breast cancer.[17] Robbins observed that white women near San Francisco Bay have a 14% higher incidence of breast cancer than the national average (and African-American women in the Bay area are 10% above the national average), and he set out to see if he could explain the 14% and 10% increases. He and his coworkers found that women in San Francisco tend to have fewer children, have them later in life, breast-feed them less, and so forth, thus explaining the 14% and 10% increases by "known risk factors." The 50% to 70% of breast cancer that can't be explained anywhere else in the U.S. also can't be explained in San Francisco --despite the false impression that Dr. Safe and Ms. Kolata managed to create.

What about Stephen Safe's conclusion (amplified by Ms. Kolata), that, based on four negative studies of DDE and PCBs, we should stop trying to find the links between environmental estrogenic chemicals and breast cancer?

Stephen Safe knows that DDE is not estrogenic. DDT is estrogenic, but DDE is not. DDE is a potent anti-androgen (it blocks the action of male hormones).[18] DDE does interfere with sex hormones, but it doesn't mimic estrogen and there's no good reason to think it would make a major contribution to breast cancer. Likewise, many PCBs are not estrogenic --on the contrary, they are ANTI-estrogenic. Dr. Safe's own research has shown this again and again.[19] Thus there is no good reason to think that DDE and a
randomly-selected group of mixed PCBs will cause breast cancer. Listen once more to Dr. Safe's editorial (titled "Xenoestrogens and Breast Cancer"). He writes, "The results of Hunter along with those of other recent studies should reassure the public that weakly estrogenic organochlorine compounds such as PCBs, DDT and DDE are not a cause of breast cancer." But DDE is not estrogenic, and neither are many PCBs. This is a false argument and Dr. Safe--and the editors of the NEW ENGLAND JOURNAL OF MEDICINE--know it.

There are good, strong reasons to think that many estrogen-mimicking chemicals, some of them organochlorines, might be associated with breast cancer, and these should be carefully examined. But DDE and mixed PCBs are not in that category. They have been studied because they are convenient to study, not because they are particularly estrogenic. When Stephen Safe tells Gina Kolata we might want to end research on organochlorines and breast cancer based on studies of DDE and mixed PCBs, Dr. Safe is sounding like a camp follower of the Chemical Manufacturers Association, not like a scientist.

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

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[7] 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. Studied 141 cases & 141 controls; 562 ppb for cases, 505 for controls, but not statistically significant.


[10] Mirjana V. Djordjevic and others, "Assessment of chlorinated pesticides and polychlorinated biphenyls in adipose tissue using a supercritical fluid extraction method," CARCINOGENESIS Vol. 15, No. 11 (1994), pgs. 2581-2585. Found elevated levels of DDE, PCBs, chlorodane, oxychlordane and transnonachlor in breast tissue of 5 women with breast cancer vs. 5 women without rhe disease.


[13] M. Wassermann and others, "Organochlorine Compounds in Neoplastic and Adjacent Apparently Normal Breast Tissue," BULLETIN OF ENVIRONMENTAL CONTAMINATION & TOXICOLOGY Vol. 15, No. 4 (1976), pgs. 478-484. Organochlorine compounds (DDT and PCBs) were higher in breast cancer patients than in 5 controls, and in cancer patients the cancerous tissue contains significantly more organochlorines than adjacent normal tissues.


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