

BCERC research sets the stage for answering tough questions

Which foods, chemicals and other environmental factors might affect breast cancer risk? The scientific community currently has few answers, but the Breast Cancer and the Environment Research Centers (BCERC) has set the stage to bridge that gap, said Gwen Collman, Ph.D., of the National Institute of Environmental Health

This is where the BCERC comes in, she said. The centers originated in response to earlier efforts led by the National Cancer Institute and National Institute of Environmental Health Sciences (NIEHS). During the 1990s, she said, the two institutes funded studies that focused primarily on DDT and its metabolites (the chemicals into which DDT breaks down in the body), on PCBs and other industrial chemicals, and on polycyclic aromatic hydrocarbons, which are present in cigarette smoke and air pollution, she said. They also created a geographical information system, or GIS, to map contextual and ecological information about exposures, which ran the gamut from water records to the locations of Superfund sites.

"As those efforts continued, we decided at the NIEHS that we needed some mechanistic science that would look at the timing of a variety of environmental exposures to see if you could find any elevated risk of developing breast cancer in laboratory-based animal or experimental models," Dr. Collman said. The institute solicited grants and funded a number of projects. At the same time, it was actively working with the National Breast Cancer Coalition and other advocacy groups. "We had a very strong appreciation for the role of the advocates for their voice, for their comments, and for their oversight as being an important part of the research."

The melding of views became more pronounced during a 2002 brainstorming meeting. "We used the results of that advocacy-scientist partnership meeting to come up with a number of areas that we thought would fill bottlenecks and gaps in the research, and we started to craft a program (which would become the BCERCs) that would integrate some of those components as much as possible into a working structure. One of the most interesting points of the brainstorming meeting surrounded the real lack of information about puberty and the changes that occur in the mammary gland structure and function at that time." With such information about the process of breast development and sexual maturation, she said, "we could learn about exposures during puberty that would possibly affect later breast cancer risk as an adult."

Based on that meeting, the BCERC program formed. It is a network of four, collaborative research centers, which include scientists, clinicians and advocates, with a charge to "define in depth how a discrete set of environmental factors interacts with a woman's genetic makeup to influence puberty." Each center also has a Community Outreach and Translation Core to interact with advocate and community organizations.

The potential contributions of the BCERC are many, she said. The initiation of new research through this seven-year program will permit studies that follow girls through the critical period of puberty. "For example, we have very limited information in the literature or even in a database that says: "If I dose at a particular chemical at a

certain time – whether it is gestation, early childhood or puberty – this is what happens at the molecular level to the mammary gland." We hope to be able to have information available on a number of exposures, dosed at different times, and their effects on breast tissue in animal models during these windows of vulnerability. That will be an enormous contribution." Journal articles resulting from these and other studies will form the foundation for future scientific projects as well as discussions about environmental stressors and breast-cancer risk.

The studies may also influence government policy, she said. "Congressional staffers are being asked to look at bills to support more work in this area, but they need to see additional evidence that it is worth the taxpayers' dollars to continue to move in this direction."

By the end of the BCERC program's seven-year run, she envisions a much greater opportunity for researchers to conduct targeted studies that will begin to tackle the public's questions. "There's a lot of work to do. There are a lot of chemical exposures, non-chemical exposures like radiation, and dietary factors, and all of those things are part of the center projects. If, after amassing in seven years a body of literature that is peer-reviewed, scientifically accepted and published, we show compelling evidence of a link between environment and breast cancer risk, then the next generation of scientists will have a better basis from which to look at different strategies and questions more directly related to breast-cancer risk."

Summary of Dr. Collman's overview presented at the November 2005 BCERC Scientific Symposium.

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