Breast cancer risk tied to grandmother's diet

April 19 2010

Eating too much fat in pregnancy may be an indulgence that has a less-than-beneficial effect on generations to come, say researchers at Georgetown Lombardi Comprehensive Cancer Center. Their unique study in rats shows that pregnant females that ate a high fat diet not only increased breast cancer risk in their female daughters but also in that daughter's offspring - the "granddaughters." Details of the study will be presented at the AACR 101st Annual Meeting 2010.

The researchers say they don't know why this risk is passed on through two generations, but they believe it occurs through as-yet unknown "epigenetic" changes that result in an increase in terminal end buds in the breast tissue - an increase that apparently can then be passed on through generations. These buds are believed to be the structures where breast cancer can develop, and having more of these structures seems to increase breast cancer risk, says the study's lead investigator, Sonia de Assis, Ph.D., a postdoctoral fellow in Leena Hilakivi-Clarke's laboratory at Lombardi. "That is our theory, but we really don't know how it is happening - just yet."

The researchers add that while the grandmother ate a diet that was 43 percent fat, she didn't eat more calories than a control population of rats, and both her daughters and granddaughters ate a normal chow.

The researchers also found that the risk appears to not only extend from mother to daughter and granddaughter, but also from mother to son to granddaughter. For example, the daughters of male and female rats born from mother rats that ate a lot of fat had an 80 percent chance of

developing breast cancer, but the risk was about 69 percent if the granddaughter's mother or father was born from a rat that ate normally and the other parent came from a high-fat-consuming parent. By contrast, granddaughters of grandmother rats who ate a normal chow had a 50 percent chance of developing breast cancer.

They also studied a different control populations of rats given estradiol- a form of estrogen - and saw no increase in breast cancer risk in granddaughters. That suggests that the increased estrogen production related to eating more fat is not the source of the problem, they say.

"The implications from this study are that pregnant mothers need to eat a well balanced diet because they may be affecting the future health of their daughters and granddaughters," says de Assis.

Provided by Georgetown University Medical Center