

# Researcher studies obesity's role in breast, ovarian cancers

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Mandi Murph in the University of Georgia College of Pharmacy is focusing her research efforts on the role of obesity in the promotion and development of women's cancer, both breast cancer and ovarian cancer.

A grant from the National Institutes of Health is supporting her studies on identifying which biomarkers occurring in blood and body tissue might indicate the development of these cancers.

"Breast cancer remains the most frequent malignant tumor among North American women," said Murph, an assistant professor in the college's department of pharmaceutical and biomedical sciences. "Research indicates that even though standard treatment modalities have improved the overall outlook and quality of life for these cancer victims, obesity in post-menopausal women has become a major risk factor for [breast cancer](#)."

Since fat cells and cancer cells feed off one another, she proposes they communicate their whereabouts early during tumorigenesis—the production or formation of a tumor or tumors—so that cancer cells can hone in on the location of fat. Together they create a symbiotic environment where [cancer cells](#) thrive.

"We expect to develop a biomarker profile to show who might be at risk," she said, noting that her lab is conducting studies using transgenic mouse models genetically altered for obesity. "Not all obese mice develop breast cancer but some will, and the differences in biomarkers

in obese mice with breast cancer as compared to the non-cancer group might confirm the likelihood of developing breast cancer."

Female reproductive organs are highly sensitive to fat in the body. Polycystic ovarian syndrome, for example, develops in women of childbearing age due to ovulation and cysts on ovaries. The occurrence in lean women is only 5 percent, but rises to 28 percent in obese women.

Most people realize that diet and exercise promote good health, said Murph, an American Cancer Society Research Scholar and a Georgia Research Alliance Distinguished Cancer Scientist. However, easy access to a high calorie diet and a sedentary lifestyle has produced an increase in obesity with profound medical and socioeconomic implications. Lifestyle preferences play a leading role in the development of obesity in that consumed but unexpended calories are stored as fat, yet diet and exercise have become low priority solutions to weight gain, especially in the older population.

Current pharmacological and surgical strategies for weight loss and weight maintenance are largely aimed at reducing caloric consumption. However, factors that are at least partially under genetic control may also influence susceptibility to obesity.

Using transgenic mouse models that have been genetically altered for obesity—those having a body mass index of 30 or higher—have provided Murph with important information relating to the initiation and progression of breast cancer and have emerged as powerful tools for preclinical research.

"Our study of 250 female obese mice that have been bred and given birth to multiple litters will show that roughly 50 percent of them spontaneously contracted breast cancer by 12 to 18 months of age," she said.

In her research, Murph is specifically looking at fragments of microRNA material in the [obese mice](#) involved in the regulation of cancer gene expression.

"MicroRNAs are small noncoding RNAs, 18 to 25 nucleotides in length, that negatively regulate gene expression," she said. "The mere existence of microRNA in biological systems reveals complex layers of epigenetic regulation that govern the outcome of cellular signaling. It also reveals the possibility for an alternative therapeutic strategy for exploitation among disease states, particularly cancer."

However, Murph emphasized that the transition from bench to bedside in the development of therapeutics is a long and challenging process, where sensitivity and accuracy of biomarkers is critical. So far the biomarkers used in breast cancer aid long-term treatment decisions, but none are predictors of non-familial malignancy.

Many scientists, she said, are studying whether circulating microRNA are actually analogous to the signals sent by hormones in the body. Murph believes that hypothesis and is investigating specific kinds of microRNA circulating in the blood.

"There is so much anxiety about breast cancer that we need much more information about its cause and growth," she said. "Cancer can take years to develop, so time is on our side if we know what to look for. The more information we have then the better our decisions on how to act."

Provided by University of Georgia

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