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Interventional Radiologists Provide Hope in Delaying Growth, Spread of Breast Cancer

Keeping Cancer Dormant: Researchers Target Tumor Metabolism by Blocking Energy Production Required for Malignant Cancer Growth

CHICAGO, Ill. (March 29, 2011)—The growth and spread of breast cancer tumors may be delayed with a promising treatment that combines two innovative strategies: blocking the enzyme needed to “energize” cancer cells and infusing a potent drug directly into the tumor, with minimum exposure to healthy tissues, indicate researchers at the Society of Interventional Radiology’s 36th Annual Scientific Meeting in Chicago, Ill.

“Once breast cancer metastases have been detected, current treatments (such as surgical resection or tumor removal) may be ineffective. We’ve found a way to keep a breast cancer tumor dormant—thus potentially increasing the likelihood that a tumor can be treated successfully,” noted Jeff H. Geschwind, M.D., FSIR, professor of radiology, surgery and oncology and director of vascular and interventional radiology at Johns Hopkins University School of Medicine in Baltimore, Md. “Our study shows that an ultrasound-guided intra-tumoral treatment with a drug called 3-bromopyruvate (3-BrPA) may be a very promising new therapy for patients with breast cancer that delays tumor growth and spread,” added Geschwind, who is also the director of the Interventional Radiology Center at Johns Hopkins University School of Medicine.

“Breast cancer is the most commonly diagnosed cancer and the second leading cause of cancer death in women in the United States,” said Geschwind. It was estimated that 207,090 women would be diagnosed with—and 39,840 women would die of—cancer of the breast in 2010—thus affecting one in eight women during their lives. “The development of new treatment options for this lethal disease is imperative,” said Geschwind, indicating that once metastasis is detected, a patient may have (on average) only 18 to 24 months to live.

Increased awareness and screening has increased the likelihood of diagnosing early-stage cancer tumors, and breast cancer is treated in several ways, depending on the kind of breast cancer and how far it has spread, said Geschwind. “However, a significant number of patients experience treatment failure, developing local tumor recurrence or metastatic disease after an initial response to treatments (like chemotherapy and radiation),” he explained. “Metastatic spread may occur in 50 percent of cases with apparently localized breast cancer, and nearly 30 percent of patients with lymph node-negative disease will develop distant metastases within five years—underlining the importance of the development of novel, targeted, minimally invasive treatment strategies for tumor control and prevention,” he added.

In animal studies, the research team has shown how interventional radiologists are uniquely positioned to combine their basic science knowledge—in this case resulting in the exploitation of tumor metabolism as a target for breast cancer therapy—with their vast experience in minimally invasive treatment strategies. “Breast tumor cells depend on a metabolic pathway called glycolysis to generate the energy required for their malignant growth. By inhibiting a specific enzyme with the anti-glycolytic agent 3-BrPA, the energy production required for tumor cell growth and spread is blocked,” said Geschwind. “Disrupt glycolysis and cancer cells are unable to produce enough energy to survive,” he said.

The researchers were then able to maximize the amount of drug delivered to a tumor by infusing the potent drug directly into the tumor—using imaging to guide them—and minimizing exposure of healthy tissue to the therapy, explained Geschwind. “The biological targeting abilities of anti-glycolytic treatment combined with an image-guided minimally invasive delivery strategy is a promising approach to reducing the growth and spread of breast cancer in patients,” he emphasized.

“In our study, a statistically significant difference in tumor volume was observed. Our results support the continuing development of this highly innovative interventional radiology approach for the safe and

effective treatment of breast cancer,” he added. “Before we can test our novel treatment strategy in individuals with breast cancer, it is important to perform additional animal studies of a larger size to confirm the efficacy of the treatment and to verify that there are no toxic effects on the normal tissues,” noted Geschwind.

More information about the Society of Interventional Radiology, interventional radiologists and minimally invasive treatments can be found online at www.SIRweb.org.

Abstract 8: “Anti-Glycolytic Therapy Combined With an Image-guided Minimally Invasive Delivery Strategy for the Treatment of Breast Cancer,” M. Buijs, J.F. Geschwind, S. Ganapathy-Kanniappan, R. Kunjithapatham, P.P. Rao, S. Ota, L. Syed, M. Vali, all radiology, Johns Hopkins University, Baltimore, Md.; and B. Kwak, radiology, Johns Hopkins University, Baltimore, Md., and Chung-Ang University Hospital, Seoul, Republic of Korea, SIR’s 36th Annual Scientific Meeting March 26–31, 2011, Chicago, Ill. This abstract can be found online at www.SIRmeeting.org.

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About the Society of Interventional Radiology

Interventional radiologists are physicians who specialize in minimally invasive, targeted treatments. They offer the most in-depth knowledge of the least invasive treatments available coupled with diagnostic and clinical experience across all specialties. They use X-ray, MRI and other imaging to advance a catheter in the body, such as in an artery, to treat at the source of the disease internally. As the inventors of angioplasty and the catheter-delivered stent, which were first used in the legs to treat peripheral arterial disease, interventional radiologists pioneered minimally invasive modern medicine. Today, interventional oncology is a growing specialty area of interventional radiology. Interventional radiologists can deliver treatments for cancer directly to the tumor without significant side effects or damage to nearby normal tissue.

Many conditions that once required surgery can be treated less invasively by interventional radiologists. Interventional radiology treatments offer less risk, less pain and less recovery time compared to open surgery. Visit www.SIRweb.org.

The Society of Interventional Radiology is holding its 36th Annual Scientific Meeting March 26–31 at McCormick Place (West Building) in Chicago, Ill. The theme of the meeting is “IR Rising: Leading Image-guided Medicine,” chosen to reflect interventional radiology’s continued revolutionizing of modern medicine.

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