

PINC trial launched to test new treatment for pre-invasive breast cancer

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Can a drug that has been used to treat malaria for years possibly be used to treat breast cancer before it becomes invasive? That's what researchers at George Mason University's Center for Applied Proteomics and Molecular Medicine (CAPMM) and Inova Breast Care Institute (IBCI) are trying to prove.

In January, the IBCI and CAPMM launched the PINC Trial, short for Preventing Invasive Breast Neoplasia with [Chloroquine](#). This three-year clinical trial will test the effectiveness of the anti-malarial drug chloroquine in treating 90 women with ductal carcinoma in situ (DCIS), a type of breast cancer in which the cancer cells start in the milk ducts but have not yet become invasive and spread in the breast. Once the cancer cells start to spread in the breast and throughout the body, the condition is considered invasive and can often be fatal.

With an estimated 254,650 patients diagnosed in 2009 alone, breast cancer is the most common form of cancer in women according to statistics by the American Cancer Society. Approximately one quarter of those patients will have DCIS. Many more women are being diagnosed with DCIS, non-invasive breast cancer, with the routine use of screening mammography.

According to Kirsten Edmiston, MD, the trial's principal investigator and medical director of cancer services at Inova Health System, the trial is designed to prevent breast cancer cells from becoming deadly by killing pre-invasive cancer cells using a novel therapy with chloroquine, which

has been used to treat malaria in the past.

"We have identified a particular cellular process called autophagy that is very involved in the survival of DCIS. In pre-clinical work, our team found that if we block autophagy in DCIS cells with chloroquine, that it kills the cells so that they're not able to become invasive," says Edmiston. "What this trial is proposing is to treat DCIS patients with chloroquine, an autophagy blocker before they receive standard of care surgery to treat their DCIS disease. We believe that the treatment will kill the DCIS cells before they become invasive and shrink the size of the DCIS. We may be able to prevent someone from needing a mastectomy and offer them breast conserving surgery."

Once patients have consented and enrolled, the size of their breast tumor will be measured through a non-invasive imaging technique called magnetic resonance imaging (MRI). Tissue samples will be taken from patients by Inova's doctors and transported to CAPMM for analysis. The PINC trial will combine chloroquine with Tamoxifen depending on the patient's tumor profile. After treatment, the MRI will be repeated to see if the tumor has shrunk and the patient will then proceed with surgery and follow up therapy.

What made the researchers think to use a malaria drug to treat breast cancer? According to Ginny Espina, a CAPMM research assistant professor, it works by starving the cancerous cells.

"Pre-cancerous cells have adapted to survive inside the milk duct without a blood supply and with very few nutrients. They overcome starvation through a process called autophagy. It's a way for a cell to make its own food and store it in a 'cookie jar.' In the breast ducts, the DCIS cells use these 'cookies' to survive and potentially spread. Simply put, chloroquine goes into the cell's 'cookie jars' and prevents the cells from using that food so that they eventually die from starvation," says Espina.

Of note, researchers are also using chloroquine in patients with unique types of brain tumors.

The treatment of DCIS is controversial because most DCIS lesions remain dormant and do not become invasive. Physicians do not want to over treat DCIS and cause unnecessary side effects if the DCIS does not become aggressive. However, chloroquine is a relatively safe treatment that does not have the severe side effects of typical chemotherapy.

"I think the most exciting thing is that we are able to offer women a new clinical trial using a well tolerated therapy in a new way to help prevent the development of [invasive breast cancer](#) and hopefully, ultimately, it will keep them from needing any additional treatment or surgery," says Edmiston. "We look forward to a future where all [breast cancer](#) can be prevented or destroyed."

Provided by George Mason University

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