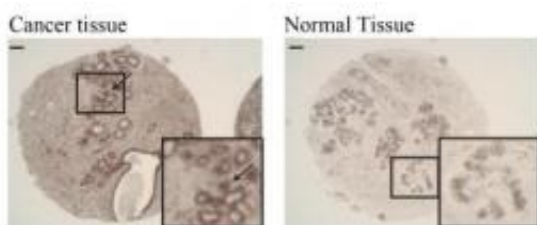


# Biologists uncover surprising connection between breast cancer cells and surrounding tissue

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These are images of Cadherin-23 expression in healthy breast cells and cancerous breast cells. Credit: Ligon/Rensselaer Polytechnic Institute

Rensselaer Polytechnic Institute Biologist Lee Ligon has found a previously unknown connection between breast cancer tumor cells and the surrounding healthy tissue. The results provide new information on the earliest stages of breast cancer metastasis.

The results were published March 7, 2012, in the journal [PLoS One](#), in a paper titled "Cadherin-23 Mediates Heterotypic Cell-Cell Adhesion between Breast Cancer Epithelial [Cells](#) and Fibroblasts." Ligon was joined in the research by Rensselaer doctoral student Maria Apostolopoulou. The research was funded by the [American Cancer Society](#).

The research shows that a specialized type of molecule called

Cadherin-23 can be found in and around breast cancer tumors. The molecule, which had never been associated with [breast tissue](#) or cancer, helps connect [cancerous tumor](#) cells to its neighboring healthy tissue, called the stroma.

"Something happens once [cancerous cells](#) enter the stroma and the cancer can very quickly become invasive," Ligon said. "Pathologists studying cancerous tissues have often noted that tumor cells make contact with the cells in the stroma, but they assumed the connections were unimportant."

Ligon and her team sought to uncover exactly what molecules were involved in attaching the tumor cells to the surrounding tissue to determine if those initial points of contact play a role in the progression of cancer through the body.

In the human breast, tumors most often originate in what are known as epithelial tissues. These tissues are made up of a specialized type of cell called epithelial cells. Epithelial cells line the interior of many structures and organs within the human body. In the breast, they line the interior of milk ducts. When epithelial cells start to divide uncontrollably, they eventually break out of the duct and literally spill into the surround tissue or stroma. The stroma is comprised of cells called fibroblasts and extracellular material such as [collagen fibers](#). In many cases, the invading cancerous epithelial cells will glom onto nearby fibroblasts in the stroma.

Ligon and Apostolopoulou worked to pick apart how the epithelial cells attached themselves to the fibroblasts. One of the primary tools the body uses to glue cells together is a family of molecules called cadherins. In the human genome there are over 80 different cadherin family members. In most cases, cadherins stick two cells of the same type together. In the case of the [breast cancer tumor cells](#) and fibroblasts, two very different

cells were sticking together. Ligon sought to determine which cadherins were involved in this odd interaction.

At first, their findings were not surprising. They found cadherins associated with [epithelial cells](#) as well as cadherins associated with fibroblasts. It was the discovery of the highly specialized and unusual cadherin, Cadherin-23, that really surprised them, according to Ligon.

"Cadherin-23 has never before been associated with cancer," Ligon said. "In fact, it has previously only been shown in the sophisticated inner workings of the ear and retina."

It is still largely unknown what happens once the cells have made a connection, but the appearance of Cadherin-23 in elevated levels in cancerous tissues suggests that it might play a real role in the earliest stages of metastasis, according to Ligon. Cadherin-23 is a new and potentially very important new component in the progression of cancer for scientists to investigate, she said.

Provided by Rensselaer Polytechnic Institute

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