

# Researcher Eyes Collagen to Follow Tumor Metastasis

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A Medical Center scientist has been awarded a \$2 million Era of Hope Scholar Research Award to study how breast cancer cells use collagen fibers to spread, and to investigate whether the process can be predicted and disrupted.

Edward B. Brown III, Ph.D., an assistant professor of Biomedical Engineering at the University of Rochester Medical Center, has been working for several years on novel ways to analyze [breast cancer](#) metastasis by focusing on collagen, a connective tissue.

Optics techniques such as second harmonic generation (SHG) or two-photon imaging are a central part of Brown's investigation. Although SHG has been used to view structural properties of cells and fibers inside tissue, its application to tumor biology is just beginning, Brown said.

An advantage of using SHG is that the collagen fibers most visible within the image are also used by cancer cells to spread, according to a series of discoveries made earlier in the decade. A better understanding of the key cells and signals responsible for producing the strong emissions would help scientists look for drugs that might stop cancer metastasis.

Collagen fibers are also characterized by an orderly molecular structure, which could allow tumor cells to use them to move out of the tumor mass toward blood vessels. Brown compares this route of metastasis to a

series of well-tended highways that allow commuters to get around town quickly.

“I believe this work will have great impact on patients in the future,” Brown said. “Any time we can find a way to stratify patients based on their risk of metastasis, we’re another step closer to avoiding overtreatment of patients who may not have a great risk of the cancer returning.”

Brown’s previous research has already shown that treatment by the hormone relaxin, known to alter metastasis, also alters collagen ordering, as quantified with second harmonic generation. This provides important clues about the signaling pathways, which will be exploited in the current project.

In addition, Brown plans to find out if the optical properties of collagen fibers in tumor biopsy samples can predict the likelihood of metastasis, thus helping doctors and patients decide if more aggressive therapy is needed immediately after a diagnosis.

Provided by University of Rochester ([news](#) : [web](#))

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