Public/Lay Abstract

For 20-30% of patients diagnosed with early stage breast cancer, the cancer will spread to other parts of the body, including bone. When breast cancer spreads to bone, it crowds out normal bone and bone marrow tissue and causes severe pain, nerve compression, and leeches calcium from the bones, putting the patient at risk for bone breaks. Like all metastatic cancer patients, breast cancer patients with bone metastatic disease are at a higher risk of death from their cancer. Our preliminary research showed that breast cancer bone metastases overexpress EphA2, a protein located on the surface of cancer cells that tells cancer cells when to grow and move. Bone metastases have more EphA2 protein as compared to brain, liver, and lung metastases. We believe that EphA2 makes bone metastatic tumors worse by tricking bone tissue into making more cells that break down bone. These cells, called osteoclasts, destroy normal bone, giving the metastatic cancer more room to grow at the expense of the patient's body. We want to test an experimental drug blocking EphA2 to see if it stops bone destruction and shrinks existing bone tumors in our laboratory models. We will see if our drug stops EphA2 from tricking bone tissue into making bone-destroying osteoclasts, which should in turn reduce tumor growth in bone. An early clinical trial showed a positive response in stage IV breast cancer patients with bone metastases when treated with a drug that less specifically inhibits EphA2 as a secondary target combined with zoledronic acid (FDA approved bisphosphonate treatment for breast-to-bone metastatic disease). Thus, we will also see if our experimental EphA2 inhibitor works better when combined with zoledronic acid in our laboratory models. Our ultimate goal is testing this new EphA2 inhibiting drug in clinical trials. The studies proposed in this application will provide the foundation for bringing a highly effective and less toxic treatment option to patients with stage IV metastatic disease so they can survive and thrive.

I was first diagnosed with breast cancer in 2018, was later diagnosed with residual disease in early 2020, and I remain at risk for progression to stage IV. Having worked in cancer research for 20 years and then battling this terrible disease myself, I am absolutely committed to translational research that will help the more than 281,000 women diagnosed with breast cancer each year, especially the tens of thousands of breast cancer patients living with stage IV disease, beat this disease. It is my mission to help bring new, effective treatments that do not debilitate patients with the terrible side effects that come with chemotherapy and radiation.