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Seriously, being a woman, and being in my 30s, it just made sense."

Test subject

Before her surgery, Egland requested that doctors save both her cancerous and non-cancerous breast tissue.

"Part of me getting control of my life was getting control over the tumor, and for diagnostic purposes, they (doctors) don't use the whole tumor; they only need a small section of it, and a lot of it goes into what's called surgical waste," she said. "And I couldn't bear the thought of that."

"I had them paraffin-imbbed all of the leftover tumor, and then, since I had a double mastectomy, I obviously had normal tissue, and I also had that frozen," Egland said. "I don't want people to think that I'm using my sample and it's tilting the data. I basically use my tissue as a control."

The decision to save her tissue wasn't difficult to make. Egland knew at the time that it would be of great value.

"Normal breast tissue is very hard to get," she said. "It's very valuable, it's an important gift to science. If we're looking at the presence of a protein in normal tissue versus one with cancer, I can use normal tissue of mine and compare it with cancer."

The rural nature of South Dakota, with its few cancer research facilities, allows scientists like Egland to obtain the needed amount of breast cancer samples for research.

"Patient samples are invaluable to research," she said. "Here at Sanford, we can access them. We can get what we need. At places, say, like in San Diego, where you have many universities, the hospitals are overwhelmed with requests for tissue. Here, it's just a matter of getting the word out."

Egland said her experi-

ence with breast cancer taught her the many challenges women face, particularly young mothers who are battling the disease.

"The hardest thing about the cancer was 'the mom factor.' There are so many things that people can do for you — they can cook for you, they can wash your laundry ... but nobody can take the place of holding your children," she said. "With Clark, it was hard because I went from nursing him, and then I stopped, and then I had surgery and I couldn't hold him tight to my chest anymore."

Egland also couldn't pick up her son for six weeks after her double mastectomy.

"What do you do with a 1-year-old? You pick them up, you change his diaper, you put him back down, you carry him from room to room and I couldn't do that," she said. "The bonding with Clark went to Paul. It was tough being a mom and watching that. He got what he needed — the amount of 'skin time' is what I call it — but it's tough. You go from being so bonded to watching him bond with his dad."

She also had to endure the exhausting effects of chemotherapy, that at times, Egland said, virtually makes one's body shut off. "My kids could be screaming, and running through the house, and I would just pass out in the easy chair with my feet up. I had no control."

Her ability to defy breast cancer through proper treatment, Egland said, has made her a better researcher.

"Part of that is because I know what questions patients are asking, and I know what science can answer," she said. "With the research that I'm doing in my lab, I'm trying to focus more on translational projects — ideas that we discover in the lab that I can apply directly to patients."

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elicit an enormous response against them. A white blood cell that secretes antibodies can release 2,000 antibodies per second."

Antibody molecules are very specific. "They only bind to one thing, so therefore, the antibody will target the cancer protein and hopefully elicit a response. We would then be able to detect these antibodies in the blood more efficiently than protein," she said.

Egland's research involves making cancer proteins in the laboratory. "We will then take blood from patients, and see whether or not the patients have antibodies to these proteins," she said.

Antibodies have a remarkable ability to recognize the structure of proteins.

"Antibodies are going to recognize that structure. So if we make those proteins in the lab, sometimes the structure doesn't look like it would in the body. So we have devised a method where we can make these cancer proteins in the lab, and make them look like they do in the human body," she said. "So if the antibodies are present, we would detect them."

Funding for Egland's work comes from Susan G. Komen for the Cure.

The study at Sanford Research/USD is part of this year's \$60 million portfolio of research grants that Komen for the Cure is investing with scientists worldwide to find the cures for breast

cancer and to end the disease for women and men around the globe.

This year, for the Sioux Falls region, Komen awarded \$450,000 in grant money to Egland for her research into a blood test that can spot breast cancer sooner than ever before and without the need for mammography.

This funding will cover three years of Egland's work. She began studying breast cancer in 2000, when she was a post-doctoral fellow at the National Institutes of Health in Bethesda, MD.

"I came to Sioux Falls in 2004, and I brought my breast cancer research with me," Egland said. "I applied for the grant a year ago, and the money started in May of this year, so I've doing this for nearly six months."

Egland can't predict the final outcome of her research.

"We have a hypothesis, and we will learn something," she said. "It may not turn out to be the best diagnostic tool ever, but we will learn more about the immune system and the cancer relationship, and how it interacts."

"We're letting the body tell the physician what's going on, instead of the physician trying to figure out what the body is saying," Egland said. "And as far as milestones, we have all the protocols in place for recruiting patients, and we have begun recruiting patients. So I have breast cancer patients that are signed up for this study, and

now normal, healthy subjects are starting to sign up to give blood for the study."

During the past 27 years, Komen has invested \$400 million to fund research globally, starting with Komen's first grant in 1982 for \$28,000. A decade later, the annual total had grown to 21 grants worth \$590,000 and 10 years after that, Komen distributed \$21 million in research funds. This year, Komen is providing researchers worldwide with \$60 million. In the last three years alone, Komen has invested nearly \$237 million for breast cancer research.

In 2008, Komen created Promise Grants — a new category of multi-year, multi-million dollar grants designed to discover and deliver cures for breast cancer more quickly.

Egland received a Career Catalyst Research Grant, a 3-year, \$150,000 per year grant to fill a critical gap in support and stimulate the transition from training to independence among promising cancer investigators.

A written description of Egland's research proposal notes that "detection of patient antibodies that recognize a panel of tumor proteins can provide an early, specific and personalized diagnosis for breast cancer patients, which will significantly improve outcomes and long-term survival of patients."

"Early diagnosis is essential in the fight against breast cancer and increases the likelihood of a woman being cured. Early detection is the means for a cure."

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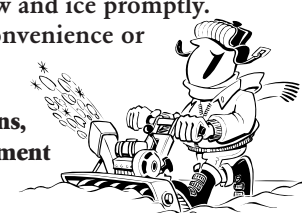
PLAIN TALK

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