Small company working toward what could be a breakthrough: a drug that kills only cancer cells

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Maybe Hugh McTavish wasn't so tough after all. Seven years ago, doctors told McTavish he needed chemotherapy to treat his non-Hodgkin's lymphoma. McTavish, then a 40-year-old patent attorney, was young and fit, so he asked for a higher dose. The doctor smiled and politely declined.

Good thing, too; after one treatment, McTavish was sick and exhausted.

"I was kind of a wuss about it," he recalled.

Hoping to avoid surgery and even more nausea, McTavish underwent a new treatment that combined insulin and chemotherapy. The therapy's success inspired McTavish, also a biochemist with a doctoral degree, to explore ways of taking the sting out of cancer drugs.

The result is IGF Oncology, a startup that's developing a drug that tries to kill only cancer cells. Regular chemotherapy causes side effects such as fatigue because it wipes out both the cancer and red blood cells that distribute oxygen throughout the body. By programming the drug to target an insulin-sensitive receptor found on cancer cells, doctors can avoid damaging healthy cells.

"There's so much potential to being able to use" this treatment, said John Offerman, a former biotech executive who advises McTavish. Doctors

can use "a much milder chemotherapy that's more effective." Offerman, now president and chief technology officer of Novus Energy, is also an investor.

IGF Oncology has raised about $130,000 from angel investors and the University of St. Thomas in St. Paul, Minn. The company has completed a small animal study and is looking to raise $5 million to fund a Phase I human clinical trial.

In the late 1980s, scientists linked cancer to insulin, a chemical that helps cells convert sugar into energy. Today, researchers are focusing on insulin growth factor (IGF), a hormone that's related to insulin. Several companies are testing antibodies that can slow the disease by blocking the cancer cells' ability to absorb IGF.

Companies such as IGF Oncology are trying a new "Trojan horse" strategy: attaching a chemotherapy drug to an IGF molecule. Because cancer cells covet IGF, the therapy can better target sick cells. While regular drugs just "float around," the cancer cells fully absorb the Trojan horse because the molecule binds with the cell's IGF receptor, McTavish said. IGF also causes the cells to divide, making them more vulnerable to the chemotherapy, he said.

"There's a lot of promise in it," said Dr. Paul Haluska, a consultant and assistant professor of oncology at the Mayo Clinic in Rochester, Minn. "IGF is active in most cancer cells. Killing only cancer cells is a huge barrier" in chemotherapy.

Haluska, who is not connected to IGF Oncology, was speaking generally about IGF therapies. Researchers, though, need to know if the IGF/drug molecules harm normal cells because they also contain IGF receptors, he said.

Companies "need to delivery enough therapy to kill cancer cells but limit the toxic effects on other cells," Haluska said.

Working with two University of Minnesota scientists, IGF Oncology recently conducted a study that showed IGF molecules that were attached to the anti-cancer drug methotrexate significantly shrank tumors on mice. The results were published in the June issue of Translational Research, a Midwest medical journal.

Scientists warn that such therapies are experimental and there could be unexpected health effects. Since cancer cells are known to mutate and develop resistance to certain drugs, it's not yet clear whether IGF Oncology can create effective IGF/drug molecules beyond methotrexate.

Still "the translational approach taken by McTavish has transformed a seemingly trivial basic science finding into a novel anticancer agent," Translational Research said in an editorial.

IGF Oncology, however, is essentially a one-man company trying to raise money for a costly trial in a state that typically favors medical devices over pharmaceuticals. Even IGF Oncology's investors have their doubts.

"I was initially skeptical," said Mike Moore, director of William C. Norris Institute at the University of St. Thomas. "But I thought the basic strategy made a lot of biological sense. It has a lot of compelling possibilities. But it's so hard for a one-person company with very few resources to do an adequate investigation of a new therapy like that." The Norris Institute invested $50,000 into the start-up.

McTavish has no illusions of becoming a Pfizer or Merck. He hopes to get the necessary clinical results on humans to license or sell the technology to another drug company.

"It may cure some people of cancer," McTavish said. "I don't really think it will be a cure for everyone. But you never know. The results may be more spectacular than I expected. There's no reason why they can't be, I guess."

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