

FACE OF BUSINESS

Nuclear physicist Ed Flynn takes cancer cure to heart

BY KEVIN ROBINSON-AVILA | NMNW STAFF

Dr. Edward Flynn might not find the cure for cancer, but as president and CEO of Albuquerque's Senior Scientific LLC, his work could save many, many lives.

Flynn, 75, is drawing on 54 years of experience as a nuclear physicist to develop new, ground-breaking technology that can detect breast and ovarian cancers much earlier than current diagnostic techniques. His work has produced an innovative method to more accurately determine if leukemia patients are benefiting from chemotherapy treatments.

Breakthroughs by Senior Scientific, which Flynn formed in 1999, grabbed the attention of high-tech investment firm Manhattan Scientifics Inc. in October, leading to a non-binding letter of intent by Manhattan to commercialize Flynn's technology. The two firms are close to signing a definitive agreement, said Manhattan Chairman and CEO Manny Tsoupanarias.

"This technology is particularly enticing, because in our opinion, it's very close to commercialization," Tsoupanarias said.

Beyond marketable technology, Flynn's genuine, dogged determination to tackle cancer for the good of humanity is particularly attractive to Manhattan, Tsoupanarias said.

"His commitment and sincerity is a breath of fresh air," Tsoupanarias said. "His integrity and passion for finding a cure for cancer and his all-around, down-to-earth nature is a rarity in today's world. He's a great person to work with, and that's key for us."

Dale Huber, a principal member of the technology staff at the Center for Integrated Nanotechnology (CINT), said Flynn is driven by his commitment to tackling cancer, not by the prospect of selling an invention.

"He's a brilliant scientist and he has a particular grudge against cancer," Huber said. "It's not about money with him. He's absolutely driven by the goal of curing cancer."

Senior Scientific operates out of a 3,500-

square-foot lab at the University of New Mexico's Science and Technology Park. It has received about \$3.5 million in research grants from the National Institutes of Health since 2003 to develop its technology.

Flynn's staff conducts some research at CINT, which is jointly run by Sandia National Laboratories and Los Alamos National Laboratory. Apart from providing access to high-tech equipment, CINT scientists assist companies in their work.

That CINT opened its labs to Senior Scientific reflects the caliber of Flynn's achievements, Huber said.

"Outside experts carefully evaluate and choose who gains access to CINT," Huber explained. "By admitting Senior Scientific, the scientific community clearly sees great promise in Flynn's work."

Flynn's technology is based on magnetic nano particles injected into the body. The particles carry antibodies that bind with cancer cells to pinpoint the exact location of diseases, both for diagnostics and for targeted therapies.

Flynn developed the process based on his previous work at LANL on magnetoencephalography, which uses highly specialized equipment to measure and analyze magnetic fields that are generated by brain activity. Scientists use "Squids" – superconducting quantum interference devices – to measure biomagnetic activity, Flynn said.

"There are neurons in brain cells with currents flowing through them that tell the body to do things, such as moving your arm," Flynn said. "Those currents produce magnetic fields that are extremely small – like a billion times smaller than Earth's magnetic field. So we use squids, which are very sophisticated physics devices, to measure those small magnetic fields."

In 1998, after his wife, Maureen, survived breast cancer, Flynn started thinking about using magnetic particles to detect cancer cells. The nano particles, which are made with magnetized iron oxide, are about 10,000 times smaller than human hair. Once injected into the body with cancer-binding antibodies, they can be located with squid sensors.

Flynn said the technique can detect much smaller breast cancer tumors than mammograms.

"We can detect it with about 100,000 cancer cells, while mammograms need about 1.0 million cancer cells for detection," Flynn said. "If we can detect the cancer much earlier, before it spreads, then there's more likelihood for successful treatment."

It could lead to more targeted treatment, because the technology detects precisely where cancer is located.

Richard Larson, vice president

for translational research at UNM's Health Sciences Center, said Flynn's technology is very promising, although a lot more research is needed. Larson and other members of his team have assisted Senior Scientific in developing the technology.

"The nano particles are like little magic bullets that hone to specific cancers, allowing us to image the tissue where the particles are to determine if the patient has cancer," Larson said. "We've demonstrated the ability to image breast and ovarian cancer in mice, but there's still a large path to development."

This year, Senior Scientific will initiate clinical trials for a magnetic biopsy needle that Flynn developed to better detect leukemia. Flynn said the needle can detect leukemia with 50 times fewer cells than current methods. It could help doctors determine how successful chemotherapy is in leukemia patients.

Flynn's current work culminates more than 50 years in nuclear physics. He graduated in 1956 with a bachelor's degree in physics from the University of Illinois, and later earned a doctorate from UNM.

He joined LANL in 1958 and spent most of his early career smashing atoms to measure and analyze nuclear physics.

In 1980, Flynn's first wife died after 18 months in a coma, caused by an unexpected plummet in her potassium levels. That pushed him into the field of magnetoencephalography at LANL to better understand how the brain works.

He started and ran the lab's Biophysics Group, which grew to more than 40 people by the time Flynn retired from LANL in 1996.

Flynn helped create the National Foundation for Functional Brain Imaging in 1999, and served as its director until 2001. The Foundation later became the Mental Illness and Neuroscience Discovery (MIND) Institute, now called the MIND Research Network, on UNM's north campus.

Dr. Apostolos Georgopoulos, a neuroscience specialist at the University of Minnesota and founding member of the MIND Research Network, said Flynn has made huge contributions in the world of nuclear physics and medicine.

"He's a phenomenal, distinguished physicist who makes a big impact in everything he does," Georgopoulos said. "He's a remarkable man."

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