

POST-OP CHECKUP

Microchip would alert patient and surgeon when something goes wrong

Lindsay Purchase, Special to The Record

Surgery can be fraught with risks, and the challenges don't end when the patient leaves the operating room. The potential for complications can result in a barrage of further tests and procedures.

NERv Technology Inc. wants to make recovering simpler and safer, starting with abdominal surgeries.

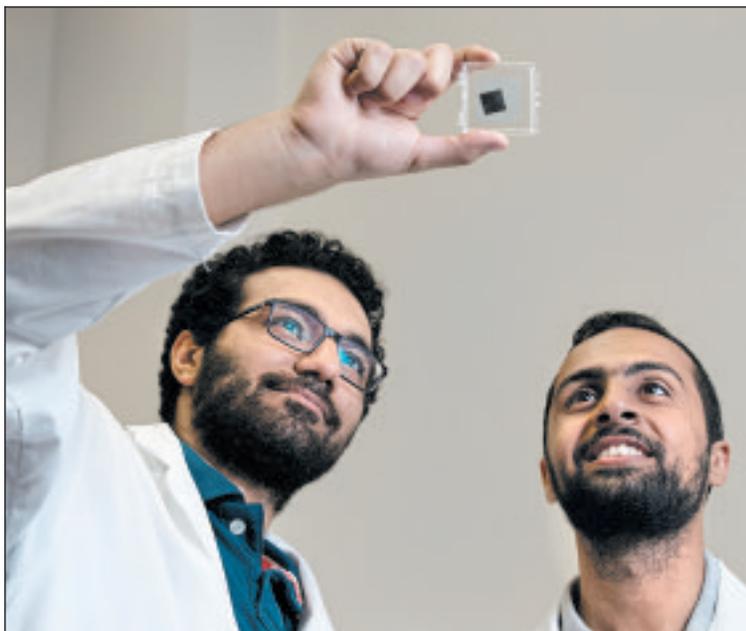
The Waterloo-based startup is developing an implantable biochip to detect post-operative complications in real time. When a complication such as internal bleeding or infection occurs, multiple sensors embedded in the chip would immediately detect the problem and digitally transmit the information to a doctor. The patient would also receive a digital notification warning them to seek medical attention.

The device would collect data for 29 days after surgery and then stop transmitting information. To avoid the risk of further post-op complications, the chip (measuring approximately one by 1.5 centimetres) would not be removed.

Co-founder and chief operating officer Amr Abdelgawad says the product would reduce the burden on doctors, patients and the health-care industry by eliminating unnecessary procedures to detect complications.

Both Abdelgawad and NERv co-founder and CEO Youssef Helwa have family members working in the medical field. They are confident this is a product doctors will demand.

"A lot of surgeons told us they wish this device had been



VANESSA TIGNANELLI, RECORD STAFF

NERv Technology founders Youssef Helwa, left, and Amr Abdelgawad have developed an implantable biochip that is designed to detect post-operative complications.

around yesterday. They told us that right now it's still a struggle for them to identify post-op complications as soon as possible," Abdelgawad says.

Dr. Lamiaa Elsebay, a consultant obstetrician and gynecologist who is NERv's medical adviser, says doctors she has spoken to were encouraged by NERv's biochip.

"They are very amazed with the technology itself," Elsebay says. Early detection of a problem would be "a very good advancement in preventing post-operative complications."

NERv is facing a long — and costly — road to bring the product to market. Two years after the company was created while its founders attended the University of Waterloo, the team is eyeing 2023 for market launch, at the earliest.

Before that, NERv will have to undergo animal and clinical

trials, acquire approval from Health Canada and the U.S. Food and Drug Administration, and commercialize the product.

They estimate it will cost \$70 million to get the biochip into the hands of surgeons.

By the end of August, NERv had raised just over \$250,000 through grants, competitions, family contributions and funding from a small venture capital group. This includes Abdelgawad's \$10,000 first-place finish in an Enactus Canada competition that named him 2017 Student Entrepreneur National Champion.

Abdelgawad says attracting investors can be challenging.

"Fundraising is definitely a tricky job and it gets even harder for a medical device startup and for an implantable medical device startup," Abdelgawad says. "It just raises the bar and the challenge really high ... You

know you're a long way from market and it's not easy to convince people that this could be a success one day."

Abdelgawad and Helwa, both with nanotechnology backgrounds, have also faced a steep learning curve. Twice they have scrapped their vision of their product and started fresh.

NERv initially planned to have its chip detect a variety of post-operative complications for many types of procedures. Consultations with industry experts convinced them to start with a specialty: abdominal surgeries.

Helwa explains: "You do the research and see what market best fits you. And what complications do you want to help — which market basically will we be able to save the most lives and help the largest number of people."

Feedback from surgery patients also convinced them to focus on high-risk procedures, rather than aiming to have the biochip used for all operations.

With market placement years away, Abdelgawad says their 10-person team focuses on short-term goals and celebrates each milestone it passes. However, they never lose sight of their main objective: helping surgery patients.

"The moment when we can see our device relieving the stress from that one patient who was going to suffer (during) his life from really an unnecessary complication, (that) is what we're hoping to do," Helwa says.

When success means breaking new technological ground to make life better for others, NERv Technology is happy to be in it for the long haul. ■