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TECHNOLOGY

Infusion device could improve drug delivery

Tiny dosing system would give a patient constant medicine.

By Tom Henderson
Special to The Detroit News

YPSILANTI — A tiny meter in a belt will someday monitor dosages of up to 12 drugs needed around the clock by patients with diabetes, cancer or AIDS.

The dime-sized device is being developed by Integrated Sensing Systems Inc., with the help of a $2 million federal grant.

The meter could "improve control of drug delivery dramatically," according to the National Institutes of Standards and Technology, which awarded the two-year Advance Technology Program money to the company.

The device will make sure patients are receiving the correct drug in the right volume at the right flow rate. It will hook into a drug controller that attaches to a patient's belt. The controller, about 2.5 inches by 1 inch, will deliver drugs from an attached reservoir to the patient.

The system, as envisioned, will simultaneously deliver up to 12 drugs in units as small as nanoliters, or billionths of a liter.

Such a device will help people who need continuous drug treatment, including those with bacterial infections, chronic pain and hepatitis.

"The drug-infusion system has the potential to save millions of patients, particularly people affected by infectious diseases, and billions of dollars in hospitalization and insurance costs," said Dr. Marcus Zervos of William Beaumont Hospital in Royal Oak.

The hospital is a grant partner with Integrated Sensing Systems. Zervos, director of Beaumont's Research Institute, will serve as a research consultant.

Heading up the project for the Ypsilanti-based high-tech company is executive vice president Douglas Sparks, a former research scientist at General Motors Corp.

The company will make the meters in a "clean room" where filters scrub the air clean and workers wear gowns and head gear. S3 Engineering of Ann Arbor will manufacture the system components.

Integrated Sensing Systems, founded in 1995 by a University of Michigan graduate and two professors, specializes in microelectromechanical systems (MEMS), which combine the same integrated-circuit technology that powers computers with tiny gears, levers or tubes to add mechanical functions to fast data processing. The device is part of this technology.

The firm grew out of Nader Najafi's research as a U-M doctoral student in electrical engineering. He was a survivor of the Iran-Iraq war who emigrated to the United States to study at U-M. He began working for IBM in 1992 and left about three years later to start Integrated Sensing Systems with his brother, Khalil, and Kensall Wise, both U-M engineering professors.

"Being at a big company and trying to do something different is like being a lion in a cage and looking at a meadow," says Nader Najafi, company president and CEO.

The latest grant for the meter is the second Advance Technology Program award for the company. In 2000, it won a three-year, $2.78 million grant to build wireless, batteryless implantable sensors to monitor fluid pressure for patients with hydrocephalus or glaucoma, for example.

Development of the sensors continues under a recent $600,000 grant from NASA.

The firm has provided manufacturing or engineering services for small MEMS companies that can't afford their own labs and even for such large, publicly traded companies like Motorola.

Intergrated Sensing Systems sells a hand-held, fluid-density meter that it says can analyze a liquid with just one microliter of sample, versus 1-3 milliliters for the competition. It weighs about two pounds and sells for about $7,800.

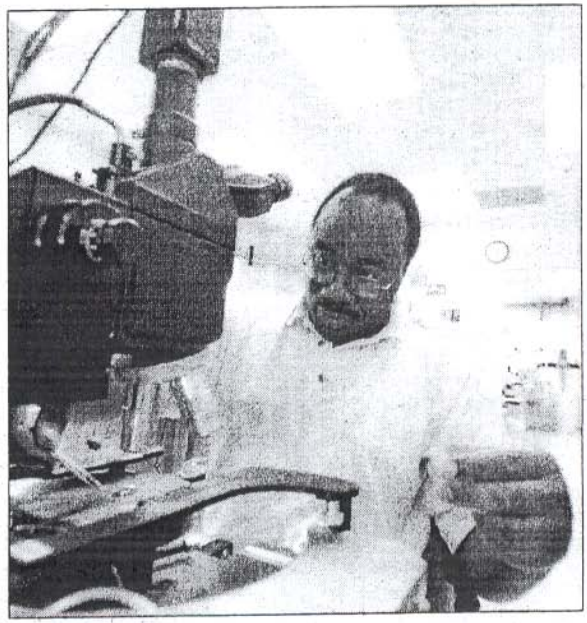
Tom Henderson is a Metro Detroit free-lance writer.

Integrated Sensing Systems Inc.

Located: Ypsilanti

Number of employees: 20, with projections of 100 in two years as new products ramp up production.

Niche: Microelectromechanical systems (MEMS) devices for the medical industry and monitoring and analyzing quality of liquids for the beverage and petrochemical industries.



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Dr. Alexander Chimbyo is a chemical engineer at Integrated Sensing Systems in Ypsilanti, which won a grant to develop a small drug delivery device.