Integrated Nano-Technologies, LLC

History

Integrated Nano-Technologies (INT) is a fast-growing company at the forefront of a new and exciting industry. INT integrates DNA and microelectronics to develop innovative identification systems for a range of markets. Founded by Dr. Michael Connolly in Rochester, New York in 2000, INT will be the first company to market a portable, electronic biological agent identification system that rapidly generates accurate results outside the lab. This initial product, called BioDetect™, has applications in biosecurity, clinical diagnostics, environmental testing, food safety, forensics, and fraud prevention.

Dr. Michael Connolly
CEO, Integrated Nano-Technologies

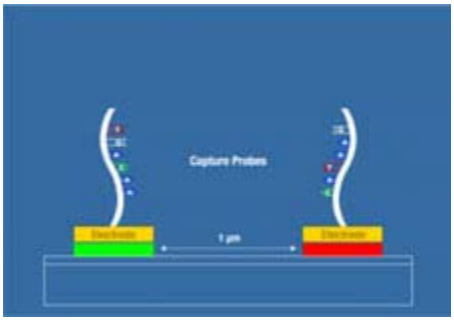
The inventor of the company's core technology, Dr. Connolly began his career as a molecular biologist, and later became a patent attorney. His developing interest in the science surrounding DNA continued, as he worked on biotech patent law in the Rochester offices ofNixon Peabody. Through his reading of scientific journals, he came across an article on metalized DNA molecules and thought he could commercialize the technology. During subsequent nights and weekends, Connolly wrote his own patent applications, and discovering no impediments began developing the business plan that became INT.

In the fall of 1999, Dr. Connolly started scouting for funding, and by the next year had raised $3 million from local investors in his hometown of Omaha, Nebraska. INT began

with three employees in July of 2000, within three months a lab was constructed, and by the end of that year, the company had seven employees. Since its inception, INT has raised more than $9 million in funding from angel investors and grants. The company now employs 32 people and plans to grow three to fourfold in 2004.

Background

The BioDetect™ system works by electronically detecting the binding of DNA from a target molecule to sensors on an INT microchip. The DNA forms a bridge between two electrically separated wires. The bound target DNA is then chemically developed to form a conductive wire which "turns on" the sensor much like an on/off switch.

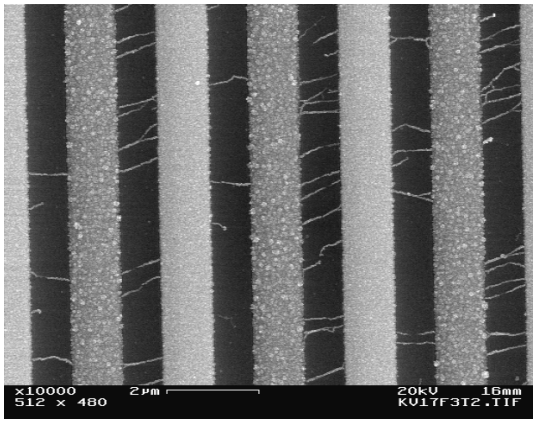


Capture Probes attached to Electrodes on a BioDetect™ Microchip

INT designs and manufactures its own microchips, each of which contain multiple independently addressable sensors. Each sensor can be “programmed” with capture probes for different target DNA molecules from the same or different organisms. Each sensor has hundreds of wires containing billions of probes.

Using a proprietary process, INT attaches capture probes to the sensors on the chip. Since the efficiency of the sensor is directly tied to the number of capture probes available, INT's researchers have spent considerable effort improving probe attachment and binding efficiency. Using radioactively labeled capture probes, INT can count the number of capture probes on the chip. With billions of capture probes per sensor, the level of sensitivity ready for final development into a product.

The final step in the detection process is to metalize the DNA bridge to form a DNA wire. After metalization, bridges can be readily detected by measuring the resistance of the sensor. A measurable result can be achieved with only a single bridge/wire formation.



Electron microscope image of metalized DNA Bridges/Wires

Situation Analysis

BioDetect™ is a portable, biological agent identifier that will generate accurate results in the field. Unlike results from a traditional laboratory, which can take several hours or even days, BioDetect™ can achieve accurate results in minutes. Using an entirely new patented process, accurate detection and identification will now be possible in a wide spectrum of previously untouchable environments.

The system has undergone extensive prototype testing with initial commercial availability planned for 2004. The current prototype is about the size of two reams of paper and weighs around 12 pounds. INT is also developing smaller, lighter and even more portable versions of the BioDetect system. Eventually, this technology will be available in a pocket-sized handheld unit. As the system evolves, even more space and weight sensitive applications will be served.

In both current and developing forms, BioDetect has immediate applications in biosecurity, clinical diagnostics, environmental testing, and food safety. Uses range from placing an automated system on an unmanned vehicle to continuously monitor buildings and subway trains. The biggest potential market for INT is the military, being able to screen for biowarfare agents like anthrax or smallpox. The company has been talking with defense contractors in an effort to set up partnerships and development contracts. INT is also expected to tap the $25 billion DNA testing market and longer

term, putting BioDetect in doctor's offices in order to get a wide range of test results immediately.

BioDetect™ Test Card

Current BioDetect™ Analyzer with Embedded Touch-screen PC

Conclusion

Several BioDetect units are heading out for field-testing at medical centers and military laboratories around the United States before the end of 2003. The company is anticipating commercial availability of the product during the first quarter of 2004. As a result of the success of its R&D operations, INT recently announced a $15 million expansion to create manufacturing and production capabilities at its facilities in Henrietta, just outside Rochester, New York. The expansion will create at least 105 new biotechnology jobs in the next three years, more than quadrupling INT's current workforce.

The company has reached a critical period in its development where it requires more space to continue growing and to begin the manufacture of products. This investment will allow INT to acquire additional space, purchase new equipment, and renovate existing facilities for future needs.

INT feels it has a significant technological and intellectual property advantage over other companies developing similar devices. The company believes that BioDetect™ will be the first commercially available device of its kind. Being first to market with a new product has distinct benefits and INT intends to take advantage of them.

Additional products INT will be able to develop based on its core technology include: the NanoSyringe™, a site-specific drug delivery system, which will allow for the delivery of therapeutic agents directly to specific cells within the body, such as tumors. It will drastically reduce adverse drug reactions, as drugs will only interact with the targeted cells and not with surrounding healthy tissue. The NanoSyringe™ will be most applicable to the treatment of cancers, drug resistant infections, and gene therapy.

High Resolution Imaging Arrays will be developed using nano-scale electronic components created through an INT patented process, which joins DNA with semiconductors. Nano-CCD (charge-coupled devices) when assembled in an array will produce imaging resolutions thousands of times greater than current technology.

Flat Panel Displays can also be created using nano-scale electronic components created through an INT patented process, which joins DNA with semiconductors. In this case, a two-dimensional matrix of Red Green and Blue nano-LEDs would produce a display with extremely high resolution while consuming very little power.

With its expansion and promising new products, the future looks very bright for Integrated Nano-Technologies. As the company grows in Rochester, this region in Upstate New York continues to be in the forefront of technological advancement. INT says their accomplishments are proof Rochester is an ideal place for companies to locate, especially for those in need of a highly skilled workforce for research & development or high tech manufacturing. The region's skilled labor force, strong work ethic, reasonable wage levels and exceptional quality of life combine to form an unbeatable combination primed for any company's success.