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HING WONG, CEO OF ALTOR BIOSCIENCE CORP.

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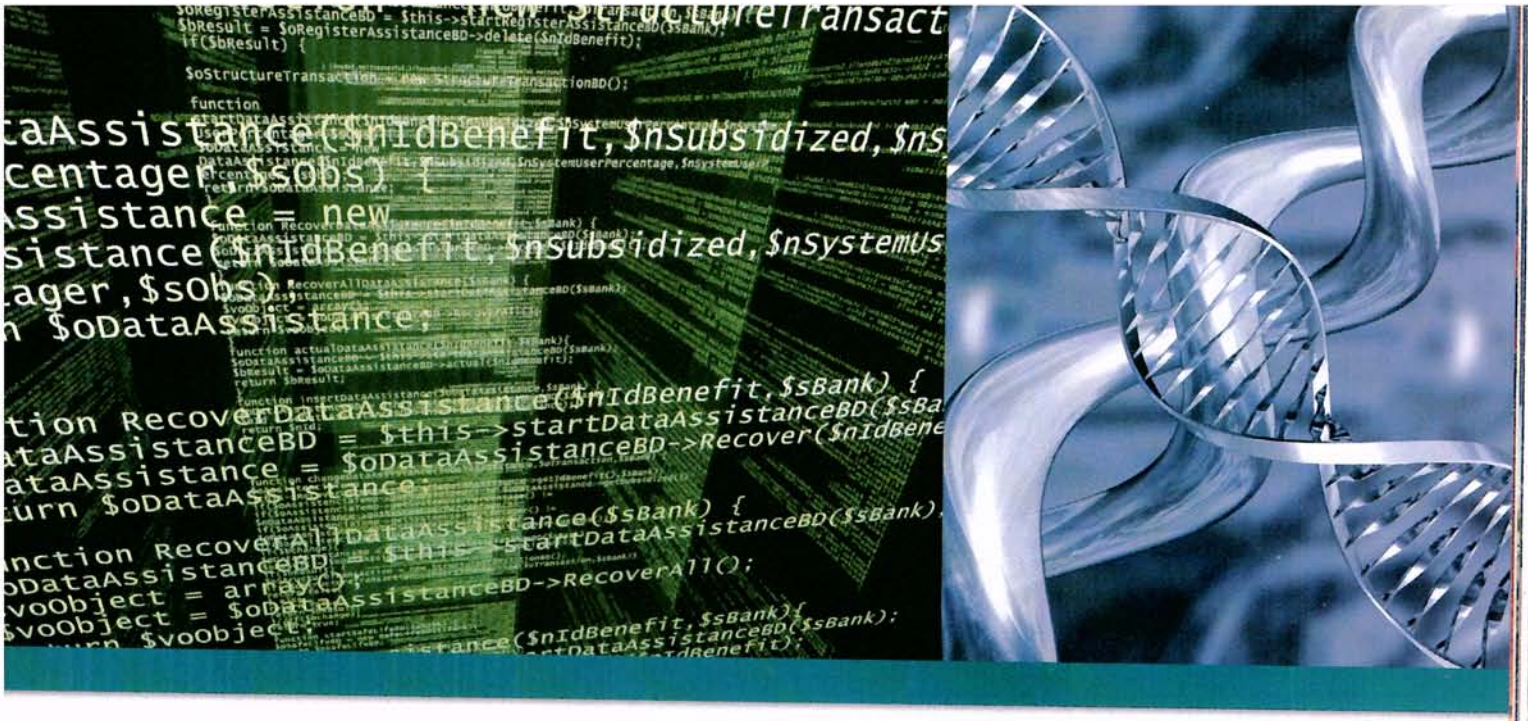
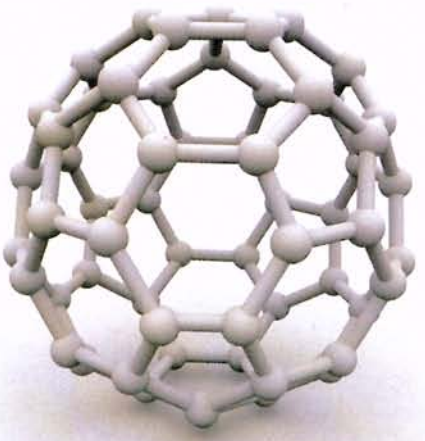


INNOVATIONS

tech/biotech

From cancer-fighting lettuce to anti-counterfeit invisible ink, a look at South Florida inventors building businesses based on innovations in technology and biotechnology.



COMPANY HITS ICEBERG SOLUTION

LETTUCE COULD BE MUCH MORE THAN RABBIT FOOD IF ALTOR BIOSCIENCE CORP. SUCCEEDS IN GROWING ANTI-CANCER ANTIBODIES IN THE LEAFY GREENS.

— BY SUZY VALENTINE

A Miramar-based company's secret weapon in its fight against cancer is the humble lettuce.

Altor BioScience Corp. is experimenting with manufacturing anti-cancer antibodies in the plants, buoyed by a two-year, $1.2 million, grant it received this summer from the National Cancer Institute. Altor creates transgenic lettuce by introducing foreign genes into lettuce DNA, so the plants will produce the antibodies.

Though other companies are conducting similar studies elsewhere in the country, Altor is the only one using lettuce to incubate cells, says the company's vice president of research and development, Peter Rhode. The objective of the research is to make the lettuce produce therapeutic antibodies, which can then be administered to humans to fight cancer.

"People have used corn and tobacco, even rice," to grow antibodies and proteins, Rhode says. "But these present problems with field studies since there are concerns that the engineered crops would spread."

Lettuce, though, can grow in a greenhouse in contained conditions, or even hydroponically — where the vegetable is cultivated in nutrient solutions. "There are no concerns about the genes jumping to another plant," Rhode explains. Also, lettuce is a pretty straightforward medium, unlike some other crops. "Tobacco [for instance] produces a lot of byproducts that prove difficult to remove," Rhode says.

Altor uses either a typical red-leafed lettuce that it purchases from a local grocery store, or introduces antibodies to a lettuce that it grows.

Once the researchers introduce genes to the lettuce, they place it under light for a few days during which time the vegetable produces the desired antibodies. Then the scientists grind up the protein from the leaves.

"Proteins are produced in the plants," Rhode says. "The expressed cells are grown in a steel fermenter. The research is relatively short-term."

It is also relatively inexpensive. Capital-investment costs for facilities used in producing plant-made pharmaceuticals are a fraction of that required for making them in animal eggs (the flu vaccine, for instance, is produced in chicken eggs).

Altor is conducting antibody-growing studies in Broward County, and is also looking for support further afield.

"We're mainly doing research here in our growing room," Rhode says, "though we have contracts with greenhouses elsewhere to make several large batches."

The research is at a fairly elementary stage right now.

"Ultimately, we feel transgenic lettuce technology could represent the breakthrough needed to make low-cost proprietary or biogeneric drugs for existing and emerging markets and stockpiled therapeutic proteins for biodefense purposes," says Hing C. Wong, company CEO and lead investigator for the project. "I am thrilled with the support from the institute to develop this unique platform technology."

The path to market is long. The transgenic research work began in 2002, when Altor acquired a company in New Jersey which had been developing the technology since 1998. Altor is itself a spin-off of another company: Sunol Molecular Corp., which also calls Miramar home.

Once Altor has scaled up production of the anti-cancer antibody in the transgenic lettuce, it will compare its chemical and biological properties to the current version, which is produced, more expensively, in animal eggs. Altor's researchers will study its effectiveness, examine how the body metabolizes it and look for significant side effects.

Altor's scope goes far beyond its transgenic lettuce. It holds patents for a number of different technologies, including targeted cancer drugs, which recognize and selectively attack tumors. (Targeted drugs generally have fewer side effects than traditional chemotherapy methods, which attack all cells indiscriminately.) Altogether, Altor owns 45 patents and has 90 pending.

"Our main goal is making anti-cancer and -viral drugs," Rhode says. "We have unique technology that targets cancer and viruses." He says the company is also investigating making its drugs in the more traditional way: fermenting them in large vats. "Most approved protein drugs are made in that way. The Food and Drug Administration is comfortable with those methods," Rhode explains.

The privately held firm, backed by venture capital groups such as Boston-based Audax Group and Venture Management, is also investigating licensing agreements for its patents, with entities that include Gaithersburg, Maryland-based Biosynexus Inc./GlaxoSmithKline. Altor's strategy is to continue developing new drugs internally, while at the same time exploring licensing opportunities for other products.

Wong says the company has been operating at a minimal loss and will continue to do so until 2009, when he predicts Altor will break even. The cancer-fighting technology should make it to market by 2010, at which point the company hopes to make its first profit.

"We survive through a combination of grants — we anticipate we'll receive another $1 million that way in 2007 and 2008 — and venture capital," Wong says. "Our losses are small. We don't need a lot of capital to push the research along."

C. Russell Allen, incoming president of BioFlorida — the state's independent bioscience organization — in West Palm Beach, is impressed by the technology – something he hasn't heard of in previous roles that include his last as CEO of Atlanta-based BioSouth Inc.

"I see momentum here in the biotechnology sector that I haven't seen elsewhere," Allen says. "That particularly applies to cancer treatment in the form of drugs and therapy. That informed my decision to come here."

MATTHEW PACE

Altor CEO Hing Wong is growing anti-cancer antibodies in both store-bought and specially grown lettuce.