

London in a biotech world | Part 1



Anything is possible

With more funding and a bit of luck, London's biotech researchers hope to make the city a hub for the industry.

- 8,000 B.C.
Man first domesticates crops and livestock.
- 4,000-2,000 B.C.
Egyptians figure out how to leaven bread and ferment beer.
- 1797
A child is injected with a viral vaccine to protect him from smallpox.
- 1920
The human growth hormone is discovered.
- 1933
Hybrid corn that produces huge crop yields is marketed.
- 1953
Watson and Crick's discovery of DNA is published in Nature magazine.
- 1972
Human DNA is found to be 99-per-cent similar to gorillas and chimpanzees.
- 1980
U.S. Supreme Court allows Exxon to patent oil-eating micro-organism.
- 1981
Chinese researchers clone first fish, a golden carp.
- 1982
U.S. officials approve first biotech drug, insulin produced in bacteria.
- 1984
The DNA fingerprinting technique is developed.
- 1988
Harvard scientists are awarded the first-ever animal patent for their genetically altered mouse.
- 1995
A baboon-to-human bone marrow transplant is performed on an AIDS patient.
- 1997
Dolly the sheep becomes the first animal cloned from an adult cell.
- 2003
GloFish, marketed as the first biotech pet, hits stores.
- 2003
Dolly the sheep dies of lung disease.

Source: The Biotechnology

PATRICK MALONEY



FREE PRESS REPORTER

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You've heard the word biotechnology before — but what is it?

It's been explained as an industry built on fundamental breakthroughs in genetics or the manipulation of a biological process to fit a human need. Bo-ring.

It isn't easily defined, but you'll definitely know it when you see it. And perhaps the efforts of Turner's Montreal company, Nexia, to turn goats milk into bulletproof vests is a perfect example of what biotech is — and could be.

Nexia researchers found the gene in spiders that orders them to produce webs, which are as much as 50 times stronger than steel.

After isolating the gene, they extracted it and injected it into a pair of goats, creating, in common-place language, genetically modified animals.

The modified goats milk is filled with webbing. Once separated, the webbing, among the strongest materials on Earth, was intended to make body armour for police and armies.

Sound unbelievable? It isn't.

Farmers are growing genetically modified plants to make the unthinkable, including plastics. New medicines, including drugs to prevent rather than treat afflictions, are being developed. Students from the earliest grades up to a new University of Western Ontario business program are learning all about it.

It's the wild, wonderful, crazy world of biotech. Welcome to the future.



On the eve of Canada's first-ever National Biotech Week, officials — who admit the industry is built more on promise and potential than production — say there is cause for celebration.

Our 470 biotech companies rank Canada second in the world, behind only the American juggernaut, ahead of other G8 nations, including Japan and Germany. Revenues in 2003 reached \$2.4 billion and in Ontario alone, biotech provides 33,000 jobs.

Of course, every major city in every developed country is clamouring to become a biotech hub and local officials are clear: London is in the race.

Found the gene that tells a fish to survive in ice-cold water? It could be extracted and put into tomatoes to create a fruit that withstands freezing during transport.

While London researchers haven't produced any such head-spinning innovations, there are several local companies on the long, hard road to biotech breakthroughs.

Plantigen — which hopes to treat diabetes with modified tobacco leaves — is among the firms leading the charge.

Dr. Anthony Jevnikar says his work with

co-founder Dr. Shengwu Ma will produce a major improvement for diabetics.

Say your immune system doesn't like a protein produced by your body and attacks it. If that protein is insulin-related, its destruction can lead to diabetes.

Jevnikar's solution? To extract that disliked protein and produce it in low-nicotine tobacco leaves.

By feeding the leaves to a patient, Jevnikar predicts their "gut" will teach the immune system to approve of the protein — thereby avoiding diabetes.

"The immune system says, 'You know what, I think this protein's OK,' and ignores it," he said.

"It appears that (the tobacco plant) is the ideal vehicle to deliver these proteins."

Viron Therapeutics, spun out of the Robarts institute in 1997, is also a leader among local biotech companies. Kevin Sullivan, the company's business development manager, hopes they will be among London's first major success stories.

"You need a couple of successes in order to get the ball rolling and get what they call a cluster effect."

Among Viron's projects is a drug that copies a virus once used to thin Australia's rabbit population that they say also helps treat human heart problems.

Viron's co-founder, Grant McFadden, found the gene in the virus that protected it from the host rabbit's immune system.

Knowing human immune systems often damage their own bodies, McFadden and his wife, also a researcher, started using the gene, which they named VT-111, to protect human hearts from the body's own damaging reaction.

The drug could also be used to ease organ transplants.

While some may bristle at the chemical trickery, Sullivan says it's no more artificial than transplants themselves.

"The reason (cells) are rejecting (a transplant) is it was never predicted by natural selection that you would be transplanting organs from one body to another," he said. "The body has not evolved to handle that."

"Once those signals stop coming, saying, 'Danger, danger danger,' the body (and new organ) can start co-habiting."

One step further than Viron is KGK Synergize, one of the few local biotech firms to actually bring a product to market.

Their product is Sytrinol, a pill containing compounds from orange peels and palm oil they say lowers cholesterol levels. After testing the combination, KGK found the drug stops the liver from synthesizing cholesterol.

Though the company — which spun out of UWO's Centre for Human Nutrition in 1997 — plowed \$1.2 million into research and development, it has recouped that money through a licensing deal and has grown to 20 employees from its three founders.

Profits, said KGK co-founder Najla Guthrie, shouldn't be far behind.

"We expect royalties in the next quarter to start coming in."

But for local startup companies — which have to spend millions just to develop their ideas, with no guarantees of success — support isn't exactly widespread in London, Guthrie said.

"You need investment money and I don't think London facilitates that."



For every GloFish — which injected a fish with a natural fluorescent altered pet — hundreds of companies are working toward their goals.

And Viron knows better than most how odd the biotech business model can be.

To date, they have spent \$17 million on research and development and haven't earned a penny in revenue. But Sullivan, an Ivey business school grad, is certain Viron will eventually hit paydirt.

It's tough, however, to convince investors.

"You can't sell these ideas to most investors because they are not comfortable with their level of understanding," Sullivan said.



MIKE HENSEN The London Free Press

GOOD TIMES AHEAD: KGK co-founder Najla Guthrie says profits won't be far behind for the company, which markets a pill that combats cholesterol.

"Getting (researchers and investors) to speak the same language could have an amazing long-term effect on the city."

That's the aim of Peter Bruijns, president of the Stiller Centre, a 50,000 square-foot facility, named for London transplant pioneer Cal Stiller, that houses a handful of biotech companies, including Viron.

While there are lots of ideas generated in and around the university, they're no good to London if they can't be commercialized here, Bruijns said.

"Our objective is to get as many of those ideas as possible into money-making ventures," he said.

"We can compete (with Toronto or Boston) in being efficient and helping entrepreneurs get together with researchers."

"That's where we have an advantage."

Only 10 per cent of Canada's biotech companies have revenues and only one per cent of those companies have profits.

But despite the steep odds against success, taking advantage of the research capabilities — and deep pockets — in London could

change this city, Sullivan said.

"Any city can have a manufacturing base," he said.

"It's developing a biotech cluster that gives you a distinction."



This is an industry filled with high-wage jobs that could be the backbone of a so-called knowledge economy.

There's no reason a major breakthrough can't happen here, said UWO professor Jim Hatch, who created the biotech interdisciplinary program at Ivey.

"This is one of those things that you've got to be in it or you're out of it," he said.

With Robarts and Lawson research institutes creating a strong base, London has major potential.

A local company is using the byproduct of its corn crop, ethanol, instead of petrochemicals for cars. Or, in other words, they're growing gasoline — an idea Hatch considers revolutionary.

Perhaps no more wars, he said, and an end to the oil-related Middle East crisis that has destabilized world politics.

"If you can ever harness biotech to be in competition with hydrochemicals, boy, imagine what that would do to the politics of the world."

"(Biotech) has the potential to transform every industry we know."

BIOTECHNOLOGY WEEK

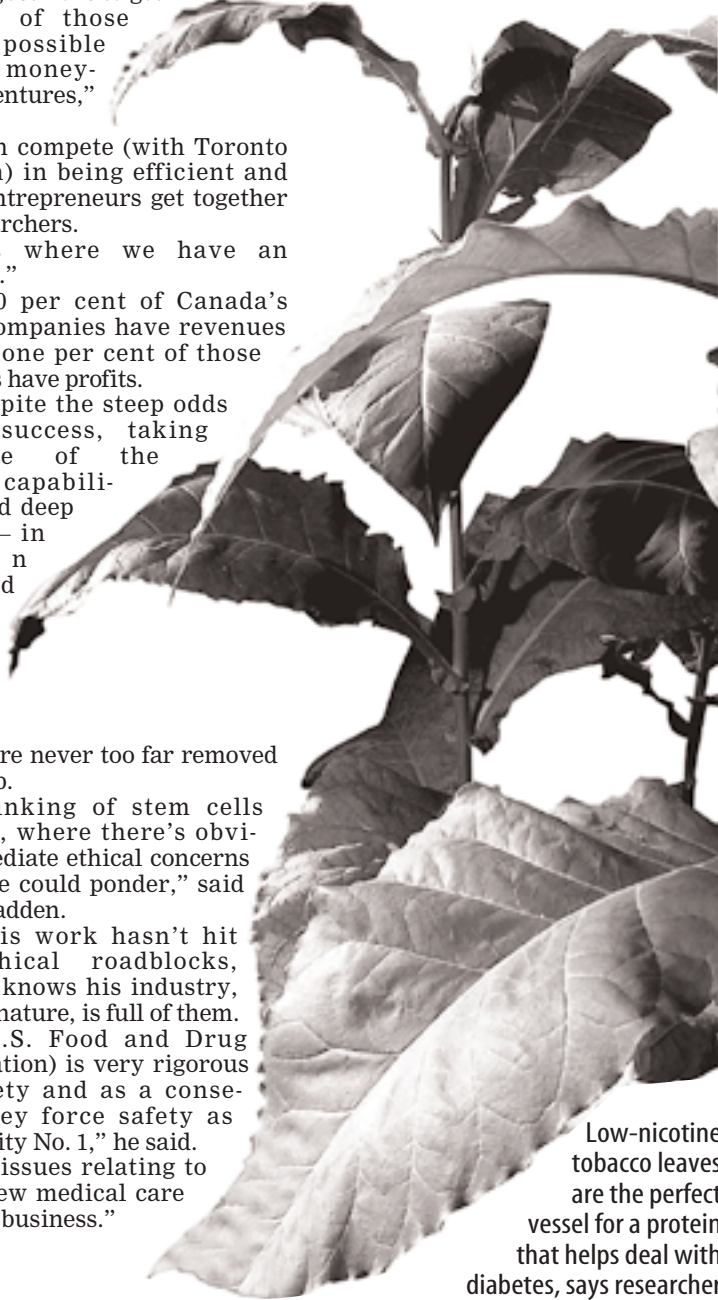
While National Biotechnology Week is not exactly a national holiday, it certainly has the growing industry excited.

► On Monday, BIOTeCanada, an advocacy group, kicks off the country's first-ever week-long celebration of Canadian biotech innovation and potential.

► Though none of the countrywide events is planned for London, the city will be well-represented when Dr. Cal Stiller, London's renowned transplant pioneer, takes part in an opening-day panel discussion Monday in Toronto.

► Several other events are planned across Canada this week to promote our biotech industry — which is the second-biggest in the world and worth an estimated \$3 billion annually.

► Though it has just about the most indecipherable URL on the web, don't hold that against them. More details are at www.imagenation.com



Low-nicotine tobacco leaves are the perfect vessel for a protein that helps deal with diabetes, says researcher Anthony Jevnikar.

Ethics always a concern

For all its promise and potential, biotechnology isn't without its critics.

From the first patenting, in 1988, of a genetically modified animal (the so-called Harvard Mouse) to the first cloned animal, Dolly the sheep — whose creation was directed by one-time UWO researcher John Clark — ethical questions arise part-and-parcel with biotech.

As a member of the Lawson institute's ethics board, Rev. Michael Prieur has wrestled with those dilemmas more than most.

While science is often at loggerheads with religion, Prieur says scientists should look to religious lead-

ers for guidance as technology outpaces man's moral understanding.

"Many (ethical guidelines) are based on natural law," said Prieur, who teaches bioethics at St. Peter's Seminary. "Be honest, respect innocent life, care for the common good. It's extremely important."

And in a recent issue of Catholic Digest, Jesuit Rev. Angelo Serra is quoted as saying scientific advances are leading us "toward moral shipwreck."

The industry, it has been argued, is the product of human ingenuity, but is only made necessary because humans have used up almost all the Earth's renewable resources.

To the scientists behind Viron Therapeutics — one of London's leading biotech companies — ethical

questions are never too far removed from the lab.

"I'm thinking of stem cells (research), where there's obviously immediate ethical concerns that anyone could ponder," said Grant McFadden.

While his work hasn't hit many ethical roadblocks, McFadden knows his industry, by its very nature, is full of them.

"The (U.S. Food and Drug Administration) is very rigorous about safety and as a consequence they force safety as being priority No. 1," he said.

"All the issues relating to evolving new medical care are serious business."