



# F O R A G E N VISIONS

## President's Message



*Dr. Murray McLaughlin PhD, P.Ag.*

Let me thank everyone who took time to respond positively to our first issue of *Visions*. It is gratifying to be complimented. We will work hard to live up to your expectations.

Since our first issue, I have participated in a number of meetings and spoken at several conferences. The common topic in all of these activities has been *"the future of agriculture and agri-food"*. We are all concerned about the future of our food production industry and I believe we have a solution at hand.

In order to move ahead, agriculture must become a "Knowledge Power Platform" (KPP). The commodity approach is sliding down a continuing spiral. With the old model of agriculture we experience fewer farmers, depleted rural communities, and

escalating subsidization. We must view agriculture in new more dynamic ways. In contrast to seeing agriculture as a source of conventional food and food ingredients, "KPP" offers a model based on applying technology to transform and enhance new worth in agriculture. The power of technology can give us a sustainable "plant based economy". I believe this plant-based economy will support progress in the 21st century. One of the great drivers of the new economy will be the application of genomic tools.

Agriculture is poised to unleash a spectacular array of innovation supported by rapid advances in basic science and genetic engineering tools. We will be presented with a broad range of new applications:

- new crops
- enhanced protection methods
- improved food quality
- increased food safety and enriched nutritional value
- new plant-based industrial supplies
- non-polluting processes for producing plastics and other organic chemicals
- new sources of biologically-produced energy

- less expensive production methods for pharmaceuticals
- bioremediation for environmental clean-up.

At Foragen, we concern ourselves with companies that offer solutions to important concerns. Last month in *Visions* we featured MCN BioProducts Inc., a company that produces animal feed that captures the protein in canola meal, reducing the need to add animal protein. MCN products are generating interest in North America. I believe this type of initiative will expand the international market reach for agriculture.

Creating value is what Foragen is all about. As pressure mounts on traditional agriculture, technology offers significant opportunity to deal with key consumer concerns:

- food supply tracking
- improved quality traits
- enhanced health benefits from food sources
- assurances of safety.

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In this issue we profile Pyxis Genomics, a Foragen investment that is on the leading edge of this wave.

I trust this gives you an indication of the possibilities for advancement in

21st century agriculture and why Foragen and our investors are excited about our portfolio. Without a doubt we are involved in *ideas to grow the future.*

Murray McLaughlin

*"Decisions shape lives. Good choices shape the future."* Unknown

## Pyxis Inc:

### Livestock improvement through genomic tools

INDUSTRY PROFILE

In the Spring of 2001, Foragen Technologies Management identified a company that was making good progress toward developing technologies that would address many of the issues emerging in the global meat trade. That company Pyxis Genomics Inc, a corporation founded on the work of two colleagues at the University of Illinois - Drs. Lawrence Schook and Dr. Harris Lewin. Schook and Lewin, both research scientists working in functional genomics, knew that they held an important key in the construction of technologies that would benefit both domestic animals and the humans who relied on them for food or companionship. They were also aware that as a research team they needed a broad base to accelerate development. In fact, the company grew out of work that brought together intellectual property developed at a number of research organizations: the U.S. Department of Agriculture's Meat Animal Research Center, the University of Minnesota and the University of Illinois.

Since Foragen's investment in the fall of 2001, Pyxis has continued to execute its strategy of partnering with the best researchers and companies in the animal health and meat production field. Dr. Murray McLaughlin, CEO/President of FTMI believes "Alliances are the key to



*Dr. Lawrence Schook*

success in the genomics field, and Pyxis has recognized this fact from day one. Steven Burrill agrees. As the principal at Burrill & Company, he manages more than \$100 million in agricultural biotechnology investment. He is also chair of the Pyxis Board of Directors. He too is optimistic about the future of Pyxis. "[Burrill] expects Pyxis to become the partner of choice for food and companion animal companies looking to improve the health and well being of domestic animals." He notes that this will be done through carefully strategized traceability and breeding programs and the development of targeted feed additives and veterinary products.

#### *Finding desirable traits*

Pyxis uses its proprietary DNA micro array platform to identify animals with genetically superior traits. These animals can then be bred for resistance to infectious or food-borne diseases, increased productivity, improved meat quality, or other

characteristics. "Using the tools of functional genomics one can fast-track trait identification and accelerate breeding programs. We do not have to breed out lines for several generations to get results. We can build appropriate models and then work with the genetic features in a condensed time frame. Yes, we still have to breed live animals but we are removing much of the guess work," says Schook. "Also keep in mind that functional genomics do not alter life forms through genetic engineering. Rather, we are finding road maps that allow us to take advantage of the natural breeding process."

Pyxis will also use functional genomics tools to identify animals that have a genetic predisposition for poor performance or health. These screening tools will allow producers to implement intervention strategies, such as alternate feeds or medications, to maximize the potential of the animal.

#### *The Canadian Connection*

In December of 2002, it was announced that Pyxis Genomics Canada Inc., a newly formed subsidiary of Pyxis Genomics Inc.

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would participate in a joint research venture whose objective is to identify host factors that influence disease resistance to common pathogens of food animal species. This work will include microbes, such as *E coli*, that affect meat animals and also cause food borne illness in people. This research is of great importance since infectious diseases are responsible for a third of all human deaths worldwide. Infectious diseases are also the cause of significant losses for the international livestock industry, costing billions of dollars a year. The project is called "Functional Pathogenomics of Mucosal Immunity (FPMI)"<sup>1</sup>.

It is anticipated that the resulting discoveries will lead to innovative approaches for the treatment and prevention of disease. The research will exploit genomic tools to better understand immunity and how the immune response can be triggered. Dr. Larry Schook, President of Pyxis, says, "The FPMI program will greatly advance our research as we move toward an understanding of immunity within mucus membranes. Outcome from the project will have applications in both human and animal health."

The partnership includes Inimex Pharmaceuticals Inc., Vaccine and Infectious Diseases Organization, University of Saskatchewan, and the University of British Columbia.

Dr. David Gauthier, Foragen's Vice President Central Canada says, "We are working to ensure that Pyxis has support in reaching its goal of developing new treatment and prevention strategies for animal health problems, and these could ultimately lead to human health products. Since Pyxis is a specialized animal health company, we chose Inimex as our partner to provide expertise and access to human markets." Dr. Lorne Babiuk,

Director of VIDO, notes, "Pooling our collective resources will ensure a critical mass of expertise is developed very quickly. This will help expedite the commercialization of research efforts."

Overall, the Genome Canada project is valued at \$27 million. The lead funding source for the project is Genome Prairie, an agency of the Government of Canada. Additional funding will come from the federal government's Western Economic Diversification Office and the Government of Saskatchewan. Pyxis Canada and Inimex will provide additional private investment. "I believe that the program will accelerate the discovery of novel validated targets and potential drug compounds that may some day have a significant impact on diseases in both animals and humans." says Schook. He notes that, as a result of opening an office in Saskatoon Pyxis now has access to the resources and facilities of three world class research centres in Canada: VIDO, the University of Saskatchewan, and the University of British Columbia. This will complement Pyxis' alliances with University of Illinois, University of Minnesota and the United State's Department of Agriculture's Meat Animal Research Center.

### ***The DNA tracking advantage***

The Canadian location has helped to drive new business opportunities forward for Pyxis.

In early 2003, Pyxis announced an agreement with Canada's Maple Leaf Foods to supply technology that will apply DNA-tracking to processed hogs. The system will allow Maple Leaf to trace pork products back from the grocer's meat case to the processing plant and through to the

actual farm where the animal was raised. This system will assist in addressing consumer concerns about food safety. The system will give Maple Leaf a competitive advantage in the demanding export market and allow them to certify the quality assurance package of their pork product brands.

According to a recent report in the Toronto Star, the company will also be able to "zone" its shipments to deal with health issues. Company Vice President of Vertical Coordination for Maple Leaf says if an outbreak of disease occurred in one area of Canada, the company could still ship pork produced in other areas that were disease free. Credible documentation using DNA-based technologies would assure buyers that pork products were sourced from disease free locations.

Maple Leaf is Canada's biggest food processor with annual sales of \$5.1 billion. Half of its products are sold to export markets. The technology will likely be launched in the company's Lethbridge Alberta Plant that processes pork exclusively for the Japanese market. Maple Leaf is optimistic that future applications of this technology may include the capability to offer consumers products with specific genetic characteristics or traits and assured safety.

### ***The Business of Genomics***

Functional Genomics offers the opportunity for fast paced change. Harnessing that opportunity takes skill and dedicated focus. The importance of Pyxis' work can be found in the breadth of applications



arising from the research. Genomics techniques allow Pyxis to identify which genes play a role in disease, in nutrition, in physical characteristics and in environmental response. Pharmaceutical companies and public research organizations can use this information to effectively target the underlying roots of illness in humans and animals. "I like the Pyxis concept" says Gauthier "it is pure science in that they are observing

nature, and trying to figure out what it all means -in this case the effect of genetics on health and performance. However, unlike the scientists of the past who interpreted what they observed with their eyes, complex tools and information technology are needed to interpret the extensive genomics information that already exists. We all live on the surface of the Earth, but you need to look back at it from space to see that it is round.

Pyxis is providing that view from space for the animal wellness industry."

Foragen will be participating in a third round of financing for Pyxis in the Fall of 2003.

<sup>1</sup> *mucosal immunity* is a form of local immunity on the surface of respiratory, intestinal and genital tracts

## Foragen Management Profile

### Dr. David Gauthier, Vice President Central Region



**Dr. David Gauthier PhD, MBA**

David Gauthier is Foragen's Vice President, Central Region. He identifies and manages investment opportunities in Ontario and the US, and coordinates project management and administration for the Foragen team.

Prior to joining Foragen, where he currently manages 3 investments, Gauthier applied his business and scientific training as Director of Business Development for a University-based agricultural biotechnology company. "At the beginning of my career, I was fortunate to have the opportunity to work with an early stage science-based enterprise," says Gauthier. "At Foragen, I get to apply what I learned to several

companies at once." Gauthier particularly enjoys the energy generated in start up planning. He explains, "A desire to work with emerging companies is what attracted me to Foragen. In the beginning, creative ideas flow freely and add heart to the more quantitative business plan framework. It is a privilege to participate in the creation of new concepts and to watch them grow into companies."

As an early, 'seed' stage venture capital company, Foragen provides support when risks are high. "It always takes some time-months or even years-before you know if the strategy you've put in place will work," says Gauthier. "You have a much better chance of success if everyone is involved in setting the strategy. We particularly like the cooperative approach that Pyxis has adopted with its investors and colleagues." Gauthier goes on to say, "This company really understands how to work as part of a team."

Pyxis Genomics Inc. is a prime candidate for international success. "This company is thinking in global terms and has identified commercial applications for a number of its assets." says Gauthier. In the field of agricultural technology, efficient delivery from basic research to applied research is crucial. "Dr. Larry Schook and his team are focused on delivering sustainable solutions that will enhance livestock production, food quality and safety, and animal health. In the longer term, some of these solutions could be adapted to human health applications. That's the kind of comprehensive model Foragen looks for."

The research and business community have validated Pyxis' collaborative approach and unique business model.



Through its subsidiary, Pyxis Genomics Canada, the company is the lead industrial sponsor of a \$27 million Genome Prairie Program underway at the University of Saskatchewan's

Veterinary Infectious Diseases Organization. Pyxis is also working with Maple Leaf Foods to develop a system to track meat products to the farm of origin. "Pyxis stuck to its strategy, and is beginning to reap

the rewards," says Gauthier. "We really couldn't ask for more from an investment."

## THE FORAGEN TEAM

In addition to our 5 full time employees, Foragen has a strong Board and Science Advisory Team, along with interns that work with our three regions. In this issue I am pleased to identify our Board of Directors' and Science Advisory Team. You will hear from them in future issues of Visions.

## FORAGEN BOARD OF DIRECTORS'

A strong part of our team, providing advice and guidance on governance, investments, and strategy.

**Susan Smith**, RBC Ventures Inc.,  
Ontario

**René Douville**, RBC Ventures Inc.,  
Ontario

**John Oliver**, Maple Leaf  
Bio-Concepts

**Zach Douglas**, Crown Investments  
Corporation, Saskatchewan

**Shelley Legin**, Crown Investments  
Corporation, Saskatchewan

**Maurice Delage**, Delage Farms Inc.,  
Saskatchewan

**Robert Lamontagne**, SGF-SOQUA,  
Quebec

**Bertrand Venne**, SGF-SOQUA,  
Quebec

**Jacques Goulet**, Ph.D., Laval  
University, Quebec

## SCIENCE ADVISORY TEAM (SAT)

A critical part of our Foragen Team providing directional advice on areas of the agri-food sector that will create future opportunities, contacts for existing investments, and strategic input into our present portfolio.

**Dr. Larry Milligan**, Professor,  
University of Guelph

**Dr. Alan Wildeman**, V.P.  
Research, University of Guelph

**Dr. Ralph Hardy**, President,  
NABC (National Agriculture  
Biotech Council)

**Dr. Deborah Buszard**,  
Dean, MacDonald College,  
McGill University

**Dr. Lorne Babiuk**, Executive  
Director, VIDO (Vaccine and  
Infectious Disease Organization)

**Dr. Wilf Keller**, Director, NRC -  
Plant Biotechnology Institute

**Dr. Roger Wyse**, Burrill  
and Company

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