

## **“Life sciences in Canada: changing paradigms in diagnostics and treatment”**

Opening conference by Mr Pierre Bélanger  
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Guten Tag an Sie alle! Unfortunately, I am afraid this is the total extent of my mastery of Schiller and Goethe’s beautiful language. I am very grateful to Wolfgang Korek and the organizers of the 5<sup>th</sup> Berlin-Brandenburg Technology Forum who gave me the opportunity of being with you today.

I am CEO of Sherbrooke Innopole, a dynamic economic development organization in the city of Sherbrooke, Canada. Sherbrooke Innopole is banking on five key sectors, one of which, you have guessed, is life sciences. I have been active in the development of this sector in the Montreal region and in Sherbrooke for the better part of the last 20 years.

I now intend to describe the present state of the life sciences sector in Canada for you, at a time when it undergoes, like in the rest of the world, the most profound change of its history.

Let me begin my assessment of life sciences in Canada by the pharmaceutical subsector. According to Ernst & Young, Canada has 2.6 % of the global pharmaceutical market. That makes us 8<sup>th</sup> in the world. The revenues from the pharma sector currently have a main annual growth rate of 6.4 %, the 4<sup>th</sup> on the planet. This indicates that new compounds and new diagnostical methods are adopted at an increasing rate in Canada. This, in turn, suggests a willingness from our government-controlled health system to adopt innovative ways of addressing health issues.

Let’s look at the biotech subsector. Canada, as of 2011, hosts 583 biotech companies, half of which are located in the provinces of Quebec and Ontario. Together these firms invested around 1 billion dollars in R&D in 2011. Quebec got 43 % of these funds and Ontario 42 %. Nothing unusual there: Quebec and Ontario are the most populated of Canada’s 10 provinces. And our biotechs must be doing something



right. American companies love them. That is why in the beginning of 2012 a Connecticut-based company, Alexion Pharmaceuticals, bought Montreal-based Enobia for 1 billion dollars.

As for the CROs , let me simply say that in 2011, 8,542 clinical trials were conducted in Canada, according to the [clinicaltrials.gov](http://clinicaltrials.gov) website. That's 30 % of all clinical trials conducted in the whole of Europe at the same time. 54 % of Canadian trials took place in Quebec or Ontario.

The medical device subsector in Québec is flourishing. According to Investment Quebec, this prosperous industry employs 5 000 people spread over 115 companies. In the last few years our achievements in this field resulted in acquisitions by foreign firms: Zimmer, a large American company, purchased Orthosoft, for 50 millions in 2007; and in 2008 US Medtronic acquired Montreal-based Cryocath for 400 million dollars.

So, whether you look at pharmas, biotechs, CROs or devices, you come to realize, first that Canada is doing exceedingly well as a market and as a creator of value through innovation. And then you also realize that most of that value is emerging from Québec and Ontario.

Why is that? Well, let's look at Québec :

- We have five major universities and 150 research centres specialized in one aspect or other of life sciences;
- We can provide investments from local and international venture capital funds;
- We host either the Canadian head offices and/or the Canadian research centres of all major pharmaceutical companies: Merck, Pfizer, Roche Diagnostics, GSK, Astra Zeneca, Boehringer Ingelheim, Eli Lilly, Novartis, Sanofi, Servier, Abbott, Shire, Bristol-Myers Squibb are all present.
- We have a large number of preclinical and clinical research organizations, such as Charles River with two others, located in my city of Sherbrooke, Cato Research, Covance and many others;
- Companies such as BD GeneOhm and Diagnocure develop advanced diagnostics methods.
- Together all these labs and firms employ 43 000 people and spend 30 % of all life science research money in Canada.



So much for the ingredients. Let me walk you through the recipe.

Almost 20 years ago we realized that success in the life sciences sector depended on the capacity to transform the first “Eureka!” heard in the lab into profitable value and real relief for the patients. We created regional clusters. These linked scientists and research institutions with the private sector in many different ways.

Among other things, they identified financial deficiencies in the research and development of new compounds, diagnosis kits and devices.

Funds were desperately lacking at crucial periods in the development of products, creating the infamous “death valley” I am sure your young companies have also had to cross. The regional clusters made sure these deficiencies were corrected. For instance, they invented new hybrid private/public funds.

These clusters kept governments aware of the possibilities offered by discoveries and the need for a favourable fiscal and regulatory environment. And they looked ahead into the future, knowing that the industry as a whole was heading into a new chapter of its life, a fact upon which I shall return in a moment.

Maybe more than anything else, the clusters brought all the players to play as a team instead of as a group of individualistic losers.

Biotechs and pharmas started talking to each others and benefited strongly from that communication. Scientists in universities and institutes changed their attitude towards companies. They accepted them more and more as allies that could help transform a discovery into a target against a disease. I know of these changes because I was personally heading one of these clusters in the Montreal region.

There are three main regional clusters in Québec and they are located here: Sherbrooke Innopole, which I am CEO of, Montreal InVivo and Québec International. In November 2009 we put our respective forces together and created BiopolisQuébec.

A futile rivalry gave way to fruitful collaboration. Then we realized that the next natural thing to do would be to form such another alliance with our neighbour, Ontario. You’ve seen, a few minutes ago, how Québec and Ontario make up Canada’s life sciences powerhouse.



So, BiopolisQuébec is at the core of an initiative called the Québec-Ontario Life Sciences Corridor. This corridor is the pulsating artery of life sciences in Canada.

According to PricewaterhouseCoopers, the Corridor is the third largest area in North America for the number of employees in the life sciences sector, ahead of Boston, even. In 2010 93 % of Canadian pharmaceutical exportations emanated from it.

That's 7.7 billion dollars. 78 % of all sales made by Canadian biotechs are completed by firms within the Corridor, for a total of 3.3 billions. And 89 % of Canadian sales by medical device companies are made in the Corridor, amounting to 6 billions.

Working as a kind of super cluster allows us to navigate safely in a sea of changes, the most recent of which is, of course, the revolution of personalized medicine. I now come to this new approach that is changing all paradigms in the way we diagnose and treat diseases.

This revolution feeds on three challenges for the industry: the end of the blockbuster era; the patent cliff; the fact that governments and insurance firms demand new treatments that can really demonstrate they improve health outcomes while bringing costs under control. This is the death toll for the "me-too" drugs.

The answer to these challenges is the association of new drugs with diagnostic companion tests. These identify which cohorts of patients will benefit from the treatment and predict little or no toxicity. These tests can recognize specific biomarkers that immediately indicate efficacy, in real time, during early clinical trials. This reduces the length of the trials by up to 20%.

According to David Levine, chairman of the Partnership for Personalized Healthcare in Quebec, there currently are 70 companion diagnosis tests developed or being developed in the world now.

The search for biomarkers is changing the way pharmas do business. They are ready to collaborate with biotechs and university researchers at very early stages of discovery. They are collaborating between themselves and share precious information that was top secret before. They have embarked and sail on the sea of open innovation.



Let me illustrate how we, in Quebec, are also navigating on this newly found waterway. In 2008, the Quebec and Canadian governments, along with Pfizer, Astra Zeneca and Merck, built CQDM , a consortium dedicated to the invention of new tools for the discovery of drugs.

Since then, Boehringer Ingelheim, GSK, Lilly and Novartis have also come aboard. This consortium has funded dozens of collaborative research projects for around 50 million dollars in Quebec. Need I say many projects revolved around biomarkers and new ways to identify them? I must add that CQDM maintains collaborative agreements with Alsace Biovalley and Lyon Biopole.

The resulting findings will be shared by the pharma companies that put their money into the Consortium.

Let me remind you that the idea here is not to find new drugs but new tools to discover new drugs or diagnosis kits. If new biomarkers appear, all participating pharmas will have access to them. This is precompetitive, open innovation.

Four researchers from my hometown University of Sherbrooke have been selected by CQDM and received grants from it. Two of these researchers are conducting their work in collaboration with scientists from Ontario: Éric Marsault is working on protein-protein interactions with Andrei Yudin from the University of Toronto. Sherif Abou Elela along with Amadeo Parissenti, who works in a Sudbury hospital, are using RNA as a marker for the efficacy of anticancer drugs.

Sherif Abou Elela is a founding member of a group of 50 scientists from all across Canada who call themselves the RiboClub. It has its head office in Sherbrooke. It's a kind of a sect that venerates a deity called RNA. They study RNA processing in cells, its maintenance and its catalytic activities. Abou Elela et al. received handsome sums of money from Genome Canada and Genome Quebec to look into non-coding RNAs and the control of alternative RNA splicing.

These researches are being done at the University of Sherbrooke as we speak. The RiboClub is also financially supported by Roche Diagnostics, a fact I felt compelled to mention in the Potsdam context where the development of new diagnosis tools is so important. So, strange as this sect may look, one can say of the RiboClub what was said of Hamlet: "There is method in his madness".



In February of this year, the government of Quebec, Pfizer, Sanofi and two of our biotechs, Caprion Proteome and Oncozyme, launched the Personalized Medicine Partnership for Cancer with a 21 million dollars budget. Its aim is to find companion biomarker-based diagnostic tests for three anti cancer drugs presently in development. It will use a completely new discovery process.

In the event of success, which for my part I doubt not, we will have proof of concept of a new approach to personalized medicine. And we obviously will become one of the best place in the world to conduct clinical trials using companion tests derived from these first three discoveries, and the new methods behind them.

On April 16<sup>th</sup> last, Genome Canada announced that Dr. Guy Sauvageau, a Quebec scientist, had been granted 11 million dollars to sort out the 600 known mutations that produce leukemia. Dr. Sauvageau's lab and his international allies will develop a test able to recognize each variation and furthermore will produce cell cultures of each.

Within 4 years his and his allies' labs in Europe and the rest of the world will test up to 5000 existing compounds on these leukemic cells. In my opinion, this is humanity's best shot at leukemia since a long time. I am sure you realize that this endeavour is typical of personalized medicine.

By the way, Dr. Sauvageau was not alone in Quebec to receive money from Genome Canada this year.

Of the 150 millions of dollars attributed this year by Genome Canada and its public and private partners for the explicit development of personalized medicine, 60 % went to 8 Quebec-based scientists. I did not wish to blow my own horn but, what the heck, I'll blow it anyway!

On the financial side, in 2011, Merck and private venture cap partners started Amorchem. This new fund specializes in early, no, very early stage research in Quebec-based universities. Its initial capital totalled 41 million dollars.

In November 2012 Merck again gave 12.5 million dollars to the Université de Montréal and to McGill University. When Vassilios Papadopoulos, head of research at McGill's hospital, asked them what the money was for, he was astounded! Merck told Dr. Papadopoulos that they didn't really care: cardiology, oncology, neurology, whatever.



The only thing that mattered to Merck was that the grant should finance upcoming young scientists. If the money was used simply to attract those to set up their labs at McGill, Merck was still happy. That's what I call 12.5 million dollars worth of open innovation.

As you can see, our efforts at bringing scientists and the private sector, along with governments, to behave cohesively, to prepare for and adapt to changes, have been successful. We don't lag behind. We stay on top and ahead.

I told you about Sherbrooke and how we formed into this life sciences cluster and how we strongly benefited from this collaborative approach. I also told you how we linked, first with two other major life sciences clusters in Quebec and then with our neighbour to form the Quebec-Ontario Life Sciences Corridor.

We, in Sherbrooke, have just had another idea. If collaborative communication proved fertile on a national basis, why wouldn't it on a global level?

Why not invite the life science planet over to Sherbrooke, in the heart of the beautiful Appalachian mountains, to discuss the future of the ways we diagnose and treat diseases? It's a compelling idea.

Thus, we decided to set up the Sherbrooke International Life Sciences Summit. We wish to bring the planet together and draw up a navigational chart for the new seas we have embarked on. And I am here to invite you all to this summit where we will get answers to a host of crucial questions.

What are pharmaceutical companies up to? Exactly what kind of partnerships are they looking for? In the near future, what kinds of tools and devices will they be asking for to accelerate the drug development process? What types of markers do they need to predict certain conditions and stratify cohorts of patients? How can we collaborate to set up new companion tests that will achieve better accuracy, better efficacy and less toxicity for new drugs? What will diagnostics kits be like in two, three years from now?

In the coming months and years how are clinical trials to be conducted? How can CROs and hospitals prepare for that? How will the regulatory environment of drug development change in the face of the personalized medicine revolution?



Well, the simplest way to answer these questions is to gather all the actors and, in the spirit of open innovation, put everything on the table. That's what the Sherbrooke Summit is all about.

The pharmaceutical companies are very enthusiastic about this global Summit. Their Canadian association, Rx&D, are co-presenters of the event. The same goes for MEDEC, Canada's medical technology companies. They look forward to explain what their needs are and what they mean by open innovation.

And Sherbrooke, a university campus city, is thrilled to greet researchers and entrepreneurs from all over the world. Speakers coming from various countries representing pharmaceutical companies such as Johnson & Johnson, Eli Lilly, Roche, Pfizer, Novartis, Sanofi and others, will be presenting.

They will tell us how they mean to collaborate in the open innovation context, what their eco-system is transforming itself into. Another aspect that they will cover is the new ways they intend to work with the public sector: the regulatory authorities, public research and teaching institutions, public hospitals, etc.

There are regions in the world that have already decidedly committed themselves to innovative collaboration. Quebec and Ontario are two. I told you a little bit about the results a few minutes ago.

Sweden and Massachusetts are also successfully threading that path. We will have a panel of Canadian, American and European scientist and economic coordinators explaining which recipes work better, which collaborative models really do the job.

What if one wished to go one step further and actually meet new partners in this open R&D context? And not just randomly run into someone potentially interesting while having a coffee during pauses? In order to make that possible we are setting up a series of prearranged business to business, one-on-one meetings.

The idea is for an entrepreneur or researcher to outline their profile: what they have to offer potential partners, what they are looking for in one. According to these profiles participants will receive meeting proposals and request some themselves. We offer a B2B tool that functions through certain key words that you use to decide who you wish to meet.





Our keynote speaker will be the internationally renowned expert in bioengineering Robert Langer, from MIT. In the last 30 years, using newfangled polymers, he developed astounding new ways to deliver large molecules to their required site. He produced the famous patches that help smokers quit. He built matrix to grow blood vessels on.

Dr. Langer is the well from which no less than 19 companies emerged. He persuaded Polaris Venture Capital to invest 225 million dollars in his start-ups over the years. He collaborated with many major pharmaceutical companies in order to produce delivery systems for their new drugs. In a word, I feel his extraordinary contributions to health sciences and technologies, his business savvy and his proximity with large corporations mark him as the man to tell us where our future lies.

So, our rendezvous is September 26 and 27 in Sherbrooke. In the surrounding Appalachians, the forests will be dressed in their autumn Sunday best, leaves all bright copper and gold and red. You can see beautiful Mount Orford while having gourmet dinner aboard the Orford Express train. Or you might want to taste regional specialties like Lake Brome duck.

What is more important is that coming to the Sherbrooke Summit you will have a good look at the life sciences sector's new navigational map and meet and discuss with the people drawing up that map. It will be my great pleasure to greet you there personally.

I sincerely thank you for your kind attention.