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Chair

Mrs. Joy Smith

Standing Committee on Health

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● (1100)

[*English*]

The Chair (Mrs. Joy Smith (Kildonan—St. Paul, CPC)): Committee, I'd like to call the meeting to order so we can begin right now, because I understand, Dr. Hormes, that you have to leave at 11:45 today. Is that the case?

Dr. Josef Hormes (Executive Director, Canadian Light Source): I have a meeting with the Deputy Minister of Health at 12.

The Chair: I wasn't trying to pry, but thank you. We could give you your dismissal slip any time. You have permission now.

Dr. Josef Hormes: Thank you. My director of industrial research is joining me and he will stay longer. If there are additional questions, he should know everything I know and he can answer the questions.

The Chair: Thank you.

Dr. Menon, from London, I understand you were at the airport at 5 a.m.

Dr. Ravi Menon (Professor and Canada Research Chair, Robarts Research Institute, University of Western Ontario): Yes, I was. Unfortunately, as you know, income trusts pay out a lot of money, but they don't invest and Air Canada Jazz is one of them. Their aircraft was dead on arrival.

The Chair: It was dead on arrival, DOA. Thank you very much for persevering. You're a man of tenacity, and we're very pleased that you're here by video conference. Dr. Weaver, we're delighted that you could join us as well. We're going to have wonderful presentations today.

We're going to start with Dr. Hormes. I am going to ask the committee that during questions, be mindful of the fact that Dr. Hormes will be leaving, but Dr. Cutler will remain. This is great.

You have 10 minutes, and we will be delighted to hear your presentation.

Dr. Josef Hormes: Thank you very much.

I am representing Canadian Light Source. Therefore, my presentation will focus on the potential applications and realistic applications of synchrotron light for health research. I am not sure if all members of the committee have visited Canadian Light Source in Saskatchewan. You are more than welcome, and I am inviting you. Therefore, I will say a few words about what a synchrotron light source is.

In principle, there is an electronic accelerator, and it is a huge one. The circumference is something like a soccer field, 160 metres. Electrons are accelerated and they are producing light, also visible light. The most important property, and the only one you should keep in mind, is the X-ray intensity of this machine is a million times higher than the most intense X-ray machine that you can use in hospitals. If you keep that in mind, it means the most important property is the extremely high intensity when it comes to X-rays. You can do things and develop new techniques based on the applications of X-rays.

This machine can serve several users at the same time. At this point, we have 15 different stations that are used in parallel. This machine is operated 24/7 and for something like 5,000 hours per year.

I would like to cover two parts. One part is the general potential of synchrotron radiation for health research. Then, I would like to highlight a few examples of the research that is going on at Canadian Light Source in Saskatchewan.

I will start with my standard opening statement. The basic or fundamental research is extremely crucial in the area of health research. In basic research you are developing the tools that you can apply in applied research. Without good basic research, there is no good applied research. That's normally my opening statement.

What can synchrotron radiation do for health research? There are three different areas.

The first one is basic research on health-related problems. I will give you some examples.

The second one is a direct application for drug development. At this point, that is the most important part. More or less all pharmaceutical companies that are doing research in drug development are using synchrotron radiation facilities somewhere in the world.

The last one is, because of that high intensity, you can develop completely new diagnostic and treatment techniques based on X-rays. That means improving the techniques that are available in hospitals.

Regarding some examples for basic research, there are a lot of diseases where the molecular origin, the molecular level, is not well known.

I learned that the next presentation will focus on Alzheimer's. There is a lot of speculation, for example, that metals, and aluminum was discussed, could cause some of the Alzheimer's cases. I'm not taking away from the other presentation, but sorry about that.

There are other issues, such as how cancer drugs really work. With Cisplatin, for example, there are a lot of basic things that are not well understood. What is really important and challenging is the opportunities for nanoparticles for biomedical applications. It starts with very simple things, using magnetic nanoparticles as drug carriers. Is it possible to get a drug directly to a tumour? That means if you use chemotherapy, you are not poisoning the patient close to the point that the patient is dying, but you are targeting things. Nanoparticles have a huge potential for that.

That is basic research. I already mentioned drug development. The problem is, for a long time drug development was trial and error. Industry was using 10,000 starting compounds and they were just testing which one had potential.

● (1105)

If you know which target you have, which virus is causing the disease, and you know the three-dimensional structure, you can do what is called rational drug design. You can design a drug based on the structural information, and that's called the key-lock principle. It means you have a lock, and you design the key to go into that lock. That is the way drug companies are doing that, but you need the three-dimensional structure of the virus.

The example that I normally mention is HIV. For a long time, HIV was a deadly disease. It's now a chronic disease. The reason is people understand better the structure of the virus and the changes of the structure of the virus. That knowledge is based on synchrotron radiation research, which unfortunately is not done in my facility, but is done in Stanford.

At this point there are something like 40 or 50 drugs either on the market already or under development that are based on that rational drug design. Pharmaceutical companies around the world are spending significant amounts of money for that. For example, nine companies in the U.S. form a consortium at the Advanced Photon facility in Chicago, and they operate one experimental station jointly. At least they are paying jointly for the operation. Of course, they are doing their research independently.

There was drug development, and then the development of new diagnostic tools. As you might know if you go to a hospital, the X-ray technique today is the same that was used more than 100 years ago. They used an X-ray film. Now you have a CCD camera on the other side, but the technique is 100 years old. There was hardly any improvement.

What you also might know is X-ray techniques are not extremely sensitive. For example, breast cancer is not detected because the MD sees a difference in the structure of the healthy and the cancerous tissues; it's detected because of calcification. That's a secondary process in the detection.

If you could develop a technique that would detect cancerous tissue directly with a huge sensitivity in the sub-millimetre range that allowed you to detect metastases very early, it would be a breakthrough in cancer detection and early treatment.

There are techniques that Canadian Light Source developed that are going exactly in that direction. Our challenge is that you can't bring several thousand patients a year into a research facility. The challenge for us is the transfer of that technique that's developed at a research facility into hospitals. In all those cases that I'm talking about, that's a very important point to keep in mind.

The second point is biopsy. You might know that an MD looks through a microscope, and it's the experience of the MD that is a crucial part for the right diagnosis. If you have more objective tools using spectroscopic ways of analyzing your tissue sample, there could be a significant improvement. People are working in that direction.

That was the general overview. What are we doing at Canadian Light Source? We are what is called the user facility. That means I'm operating this facility for Canadian and international users. In 2011, for example, 600 users from 200 institutions around Canada came to use our facility.

As an aside for the committee, beyond synchrotron radiation, we are also building a facility for isotope production, technetium-99, molybdenum-100 . When the Chalk River nuclear power station or the nuclear plant is closed down, I hope we can step in.

At this time, something like 20% of our users at Canadian Light Source are doing health-related research, and something like 30% of the publications that are coming out of our research are directly connected to health research.

My users are doing research in the three areas that I mentioned. In basic research, I gave three examples.

● (1110)

Crohn's disease is one of those diseases where the origin is not really clear. Then there are some types of esophagus cancer where you can see early stages of changes in the structure of cells by spectroscopic techniques. If these techniques could be completely developed and transferred to hospitals, there could be a breakthrough in early diagnosis of cancer in various forms.

When it comes to drug development, we have a broad group—

The Chair: Doctor, you're going to have to start to wind up now because your time is up.

Dr. Josef Hormes: Yes, I have one minute more and then I'm at the end.

The Chair: Half a minute more.

Dr. Josef Hormes: Okay.

We have a broad range of users who are using what is called protein crystallography, that is, detecting the three-dimensional structure of viruses and various diseases. They are in many cases connected to drug development, but it's basic research.

The diagnostic techniques, I've already mentioned. With improving X-ray techniques, the range is very broad. It starts with arthritis, for an ageing population. It's bone research, but it's also stroke research and other areas. Half of the users coming to Canadian Light Source are graduate students, Ph.D. students. We are also training a broad range of young people who will go to industry later on.

Of the problems we are facing, I would highlight one. At the centre, the medical problems that we are facing are very complex. It means an individual university researcher will not be able to solve those problems. My feeling is that the federal government should define some areas and bring them together.

The Chair: Thank you, Dr. Hormes. Sorry to interrupt you, but you're way over.

Dr. Josef Hormes: That's okay, I'm at the end.

The Chair: By the way, during Qs and As, you can have a chance to add anything else you want.

We'll now go to the video conference from London, Ontario. From the University of Western Ontario, we have Dr. Ravi Menon, professor and Canada research chair.

Doctor, welcome again. Please proceed.

Dr. Ravi Menon: Thank you very much, Madam Chair, and members of the committee, for this opportunity to share with you some of my experiences in innovation in medical devices and in drugs in Canada. I'm going to describe a few of my own experiences, and I have some additional examples from my institution in the briefing materials that were provided.

My research is in the application of ultra-high magnetic field MRI machines to the study of brain structure and function. These are MRI scanners that operate at two to seven times the magnetic field strength of the MRI scanners usually found in hospitals. My laboratory in London is the only cluster of such machines in Canada, and it has the highest magnetic field MRI scanner for human and animal use in the entire country.

We use these machines to study Alzheimer's, multiple sclerosis, brain cancer, and Lou Gehrig's disease, as well as to understand how the normal brain works. In developing the potential and unique sophistication of these machines for research and diagnostic use over the past 18 years in my laboratory, we have established a number of medical device technologies that are being, or have been, commercialized. I want to talk to you about this.

The first point the committee should understand is where these innovative medical device technologies come from. They don't come from thin air. They come from basic research. They come from the creative minds of my students and my staff who are trying to understand the laws of physics and then apply them to important medical questions.

My initial basic research in this area was funded by the Medical Research Council of Canada in the 1990s. When we started in 1996, we had one of only four such machines in the world for human studies. We did not know what brain disorders could be imaged with this technology or what they were good for. We just had an informed hunch. We had to beg Varian and Siemens, two enormous multinational corporations, to sell us the parts to build such an instrument ourselves, because the big companies had already tried and failed.

This is what the initial $6 million raised by the Robarts Research Institute to recruit me back from the United States was spent on. It was a big risk for our institute, but being innovative requires risk taking. Canadian companies will not take this risk. Canadian banks will not take this risk. Canadian venture capital companies will not take this risk. This is the role of government, to seed innovation in the laboratory, even when you do not know what it will yield or when it will yield it.

MRI scanners use radio waves as part of their operation. From our fundamental research on radio frequency interactions with the body, we produced a new design for a radio frequency coil that was essential for developing this new MRI market. However, no company in Canada was interested in producing such coils because they thought the potential market was too small. Therefore, two of my staff members and I started our own Company, XLR Imaging, in 1998 to sell these coils around the world. We sold $1 million of coils in the first three years as the market for these new MRI machines grew, but we could not raise the capital in Canada to grow the company.

A similar small company, USA Instruments, started in Cleveland. Because they had much easier access to capital south of the border, they grabbed a significant share of the market for these radio frequency coils. They had the money to hire 250 employees; we had three. There are now 4,000 very high and ultra-high field MRI scanners operating worldwide. Purchasers of these scanners have bought $1.8 billion of radio frequency coils in the last five years. In fact, to secure a coil provider for this rapidly growing market, GE acquired USA Instruments, that small company I talked about, for $100 million in 2002. That could have been us. That could have been this country.

● (1115)

This example of lost opportunity highlights two important points.

First, funding of basic science is important for Canadians. It can create enormous wealth, but it could be five years or five decades before that happens. Once we and a few others had shown the usefulness of this technology, many companies entered what is now a $5 billion per year MRI market for these types of high-field magnets, including Siemens, GE, Philips, and Toshiba. But Canada was left behind even as a component supplier, because we failed to capture the value of our basic research.

This leads me to my second point. The failure was not the fault of scientists. Federal and provincial governments repeatedly blame Canadian scientists for not commercializing their devices. This is not fair. We want to be rich just as everybody else wants to be. In my own research area, the data collected by the Canadian Institutes of Health Research show that neuroimaging researchers in Canada rank number two in the world in academic productivity, yet there is no major manufacturer of a medical neuroimaging device in Canada. Why?

Our scientists would love to commercialize discoveries and to find alternate funding streams for their laboratories in this era of shrinking funding for basic science. The problem is there are no Canadian companies that want to bring our products to market. There is no Canadian capital interested in funding that. Therefore, the ideas either die in the lab or are licensed out of the country. I think the problem is that Canadian industry and investors are pathologically risk averse.

I have many more examples of risk aversion from my own institution. Two of my colleagues, Dr. Holdsworth and Dr. Fenster, developed a micro CT scanner technology 20 years ago. They spun it off as a London, Ontario company called EVS, but couldn't get the capital to grow the company. General Electric bought the company for a song, and sold it, as they often do, to another company, Gamma Medica Inc., which moved 100 jobs to California and then went bankrupt. That was the end of another Canadian success story.

My colleague Ting-Lee has developed special software that allows blood flow in the brain to be measured using a standard CT scanner. It is an essential tool for stroke diagnosis around the world. GE holds the exclusive licence, which yields $4 million a year to our institution in royalties. GE sells $2.5 billion a year of CT scanners that use that software, but we were unable to capitalize on that manufacturing in this country.

My colleague Chil-Yong Kang has begun an FDA-approved clinical trial of an HIV vaccine in the United States. The trial is funded by Sumagen Canada, which is really a subsidiary of Curacom, a South Korean company. If this historic vaccine is successful, it will be a breakthrough in global health, but the vaccine will be made in South Korea, not in Canada. The Medical Research Council and the Canadian Institutes of Health Research supported the basic research for this vaccine, but no Canadian company wanted to invest in it.

These four examples from my institution show how Canada has squandered billions of dollars in potential revenue and taxes by sending technologies that we taxpayers paid for out of the country instead of investing in them.

Canadian companies have to learn to take risks and innovate. I worked at Bell Labs for many years with a colleague, Seiji Ogawa. He worked there for 33 years. It was a company that heavily invested in research. That company has 13 Nobel laureates. No company in Canada has ever produced a Nobel laureate. In fact, Bell Labs has produced more Nobel laureates in just one building in New Jersey than the entire country of Canada has produced since the Nobel prizes were put into place.

We need to develop a culture of corporate research and development in this country if we are to capture the benefits of researchers such as myself. It is, however, dangerous to try to divert money from fundamental research to do this, as is currently happening. We need to look at other solutions.

● (1120)

Thank you very much.

The Chair: Thank you very much.

Now we'll go to Dr. Donald Weaver, Department of Medicine and Department of Chemistry. Thank you, Dr. Weaver.

Dr. Donald Weaver (Professor, Department of Medicine and Department of Chemistry, Dalhousie University, As an Individual): My standard opening is that if we learn through failure, I ought to be a bloody genius.

We talk a lot about innovation. We hear the word “innovation”. I find it to be a horribly over-used, abused, misused word. It's in everything now, from television ads all the way out. Everything's supposed to be “innovative”. From my point of view, innovation occurs when someone takes research and converts it to a useful product. A useful product is a drug, it's something that helps people, and it helps not only their health but it helps the economy. That is my definition of the word “innovation”.

Initially, I trained as a neurologist. Neurology is known as the “diagnose and adios” specialty, because we see people and say, “That's what you've got; no, there's nothing we can do; 'bye”. After I did this, I went back and went into drug design so that I could design and develop drugs. Basically, I'm going to make a few statements about what it's like to try to design drugs in Canada.

From my own point of view, I have been working primarily in neurologic diseases as one of the co-founders of a company called Neurochem Inc., which produced the drug Tramiprosate. This was the first drug to reach phase three human trials for the treatment of Alzheimer's disease. Regrettably, that drug was unsuccessful, but it was a company that ultimately raised over $100 million and had approximately 200 employees. Because of this, I have a strong interest in drugs and the effect drugs have not only on medical but also on economic health.

Recently, as a curious exercise we looked at 186 countries in the world that do some sort of science and wondered how many of those countries actually produce drugs. It was not that many of the 186. We looked at a whole bunch of descriptors and what it is that makes a country successful in drug design. Really what it comes down to is the two most useful descriptors are the country's GDP and population. We then developed a prediction algorithm based upon the GDP and population of all these countries, and did a linear regression analysis to try to produce an equation which asks if we can predict how many drugs a country can produce based upon its size and wealth. If you do that and look at countries all around the world that produce drugs, you can come up with a fairly good equation that is fairly accurate in predicting how many drugs a country can produce.

If you look at the 20-year period from 1990 to 2010, that two-decade period, and you apply this equation to Canada, we should have discovered 16 drugs in that 20-year period for a country of our size and wealth. In fact, we produced six. This gives us what I call a drug discovery deficit of about 10 drugs over the course of 20 years. The question that arises is why. Why haven't we discovered more drugs? As I said, drugs are useful to the health and wealth of our nation. A drug like Lipitor in its heyday was producing billions of dollars per year and it would be bloody nice to have a Lipitor that came out of Canada.

What are the factors that contribute to our drug discovery deficit in Canada? First of all, we don't really have any multinational drug companies in Canada, and we don't have any drug companies doing industrial-based research in our country, so this certainly is a liability to enabling us to convert research to product.

Second, there really is a marked shortage of seed-stage venture capital in Canada. We simply don't have a whole lot of venture capitalists who really have what it takes and the interest to take on this problem. There's a real valley of death between research and a product. When you do research and you take it to a drug company, they ask if you have all this information on it. Most of the time you don't, because it takes venture capital in order to get some of that information in place. As a result, we have this desperate shortage of seed-stage venture capital.

The venture capitalists that we do have, who might be interested in early-stage biotech space, are risk averse. They want the product so bloody de-risked by the time they get it. You say that you're ready for a phase three trial, which is what you want, but you hear, “Sorry, we're not going to be there.” I find that some of the venture capitalists who are interested in early-stage investing also lack the skill set necessary to meaningfully assess some of the biotech opportunities that come their way.

● (1125)

Another issue comes from the structure of our university system. We are still built very much with departments. We have departments of biology, departments of pharmacology, and departments of chemistry, and usually they don't talk to each other. We have very much of a silo structure. If we are trying to convert research to products, it has to be multidisciplinary. We have to have people talking to each other. A silo environment is wrong. We really have to have something in place that promotes a multidisciplinary approach to product development and to drug discovery.

In the particular area of drug discovery—and I'm going to focus particularly on drugs—we have a shortage of medicinal chemists in Canada. Medicinal chemists are the types of people who make molecules. Chemistry departments in Canada don't produce medicinal chemists. Schools of pharmacy don't produce medicinal chemists either.

We really have a shortage of people who want to sit down and make drug molecules. Neither NSERC nor CIHR has any programs that nurture medicinal chemistry. My impression is that NSERC focuses on organic chemistry, saying that medicinal chemistry should be done by CIHR, and CIHR says that it's chemical and so should be done by NSERC. They rather fall into the cracks, so we have a bit of a shortage.

My last comment about the university is that I think we have some very strong biomedical and biological researchers in Canada, but knowledge about patents and about knowledge transfer and actually converting research to products is not well developed or understood in this particular group. You're not really encouraged to do it by your university. Progress through the ranks is by publication, not usually by patents. I think this is an issue.

In an attempt to address some of this, about two years ago a colleague and I coined the phrase “micropharma” and published an opinion paper on drug discovery today. We talked about the rise of micropharma. We defined micropharma as small biotech companies that spin out of universities, university institutes, or hospitals and that are disease focused. They're small, built out of 10 or 12 people, and really focused.

One of the strengths of micropharma companies is they can change direction quickly. It's not like a great big behemoth of a company, such that it's like putting your shoulder to an ocean liner to try to move it. A micropharma company is something small that can react quickly.

If we look at it, big pharma is now failing us. There are huge layoffs happening in big pharma. The drug pipeline is not what it should be, and they're not producing drugs. There is a huge unmet need out there, but also there's an opportunity. We have a strong university system within this country. With correct nurturing we could have increasing numbers of micropharma and drug discovery endeavours coming out of our universities, a number of which could result in products that ultimately could be useful, because there certainly is a huge number of unmet clinical needs.

Thank you.

● (1130)

The Chair: Thank you very much.

We'll go to questions and answers. We'll begin with Ms. Davies, please.

Ms. Libby Davies (Vancouver East, NDP): Thank you very much, Madam Chair.

Before I begin my comments and questions for the witnesses, I would like to read into the record a motion that I hope the committee will consider.

The Chair: Let me say that we have business at the end. You can do it then.

Ms. Libby Davies: Yes, I know. I'd still like to read it into the record, because I know that the government members will insist that it only be done in camera, which is very unfortunate.

I will be moving that the committee immediately commence a study on the matter of sections of Bill C-45, a second act to implement certain provisions of the budget tabled in Parliament on March 29, 2012, and other measures, which directly fall within the mandate of this committee, namely part 4, division 13, clauses 269 to 298, Hazardous Materials Information Review Act.

I know that the government members will only allow this to be debated in camera, which is unfortunate, but it is something that we should be discussing and studying at this committee.

I'd like to—

The Chair: I want to comment that this motion will be ruled inadmissible, because it is almost identical to the one we did the other day, and it was defeated.

I wanted to let you know that.

Ms. Libby Davies: I'm sure we'll have a discussion about it when we get there.

The Chair: You may begin with your questions.

Ms. Libby Davies: First of all, I'd like to thank the witnesses for appearing today and making your presentations.

You've opened up a whole subset of information for us. We're doing a study on technological innovation, but what you've really brought forward, all of you, is how good we are at doing early stage research but not following the path. I think all of your illustrations today, Dr. Menon, Dr. Weaver, all of you, are very illuminating. I feel that at some point we will need to call in other people to get some answers here. It is very concerning.

In the notes that we have for the committee, one thing I found interesting that relates to what you're saying is that there have been studies done showing that 80% of government funding for health-related R and D, and I'm sure it's not enough in and of itself, supports health research at early stages.

This is very pertinent to what you're all telling us today, that we have apparently a poor ability to follow through on how the research is applied and commercialized.

I want to leave it open to all of you to comment now, if you can, or in writing later. Because we're doing this study, what do you want to see the Government of Canada do to correct this situation? Do we need to have further later stages of research? Do we need to be working more with universities to ensure that they're supporting our researchers in the application of commercialization?

This is your chance to tell us what we should be saying to the federal government to correct what sounds like a pretty bad situation, an area in which we're now lagging far behind, even though we have fantastic researchers in this country.

I leave it at that open question, Madam Chair, so that the witnesses can follow up.

● (1135)

The Chair: Who would like to answer that question?

Ms. Libby Davies: Please be very specific, if you can, about what you want the federal government to do.

The Chair: Dr. Menon.

Dr. Ravi Menon: I have some comments from London, Madam Chair.

First you have to define who is good at research and who is failing at research. There are scientists in many different disciplines, of course, and across a great scale, all the way from academia to industry. When you have critical masses in any given area, you start to accumulate more and more talent. We have critical mass in academic research. I think that's why Canadian universities tend to do quite well across a large range of disciplines, particularly in health care.

However, we do not have in this country a critical mass of innovative companies that are involved in medical devices or in drugs. We have a few, many of them branch plants of large multinationals, so that their heart is not in Canada. Because we don't have this environment, we don't develop the people we need for assessing technologies for the companies. There is no need for them.

I have been doing a lot of consulting for venture capital companies, for 20 years, in fact. I have never once in 20 years gone to a place in Canada to assess a technology. Canadian companies hire me to go to the United States and Europe to assess technology. When I file patents, I use lawyers in either Milwaukee or Chicago, because there are no Canadian patent lawyers who know the technology I'm developing.

We need a major sea change here, and I don't think forcing academic scientists to do the commercialization is the right idea. We need, and the government needs to make, an environment in which innovative companies or academics who want to leave academia and go into commercialization, of whom there are many, would be facilitated in doing so. It's partly a question of tax structure, partly of incentives, partly of being able to provide real estate in proximity to major centres of academic innovation.

If we don't have those, we can't build that culture. We can keep digging and drilling and cutting and fishing for the next 100 years. It won't change many of our lives. But when all that is gone—and it will be, as it has gone in Japan, Germany, the United States, and the United Kingdom—we will be 200 years behind all these other countries in boarding the innovation band wagon.

Ms. Libby Davies: Is there more time?

The Chair: You just have about 50 seconds.

Ms. Libby Davies: I invite any of the others to really be specific. What do you want to see the federal government do? What can we recommend that will help you in applying your work?

The Chair: Dr. Hormes.

● (1140)

Dr. Josef Hormes: I discussed this last Saturday. My feeling on the NRC's IRAP is that it is not a very effective program for small companies.

Ms. Libby Davies: Which program?

Dr. Josef Hormes: IRAP is not very effective.

There is a similar program in the United States. Normally I don't refer to the other side of the border, but it seems that the SBIR program in the U.S. is a little bit more effective when it comes to support in the scientific start for small and medium companies.

Also, accompanying them to that first step of commercialization is not very effective. I would change the program.

The Chair: Thank you, Dr. Hormes.

Ms. Block.

Mrs. Kelly Block (Saskatoon—Rosetown—Biggar, CPC): Thank you very much, Madam Chair.

I would like to thank our witnesses for being here today.

As my colleague said, you've taken the lid off some very interesting subjects. I have some questions for a couple of you, so I'm hoping to get to all of the questions I have.

I do want to talk to Dr. Hormes, because I'm from Saskatoon and I'm very proud of Canadian Light Source, CLS, which is located at the University of Saskatchewan in our city. I know that it is a world-class state-of-the-art facility that is advancing Canadian science, enhancing the competitiveness of Canadian industry, and definitely contributing to the quality of life of people around the world.

Here's what I wanted to pick up on. What we heard from you today is that synchrotrons can be used to analyze a host of processes and information obtained by researchers, and can be used to design new drugs and develop new materials for products, such as safer medical implants. You gave us some examples, but I want to give you an opportunity to share more about the new drugs and medical implants that were designed as a result of CLS.

Dr. Josef Hormes: I will try to answer that. We have several pharmaceutical companies, of course, as you would expect, from the U.S. They are coming over to use the synchrotron. They are doing protein crystallography for drug development, and that's the end of our knowledge. They are not telling us any details. They are paying for the utilization—that means the commercial utilization is paid for—and they are stopping at one point. They are using it and they are not telling us which drugs they are developing.

Mrs. Kelly Block: Okay. That's good to know. You did say that it was a user facility, that people came in and—

Dr. Josef Hormes: There are two ways. We have access to a normal peer review process when you're publishing things, and we have an access that Dr. Cutler is responsible for, which is the industrial access, based on a fee for service or on paying for using the beam time. Then you are not forced to publish and to tell about your results. That's how all pharmaceutical companies are doing the work. There's too much competition.

Mrs. Kelly Block: Thank you.

I now want to ask a question of you, Dr. Weaver. I appreciate what you had to say about your definition of innovation. Our government, the federal government, is cutting red tape and streamlining the regulatory process in terms of approving new drugs. Are there any areas where we can further support innovation, as you would describe it, by cutting red tape without compromising the safety of new drugs or medical devices?

Dr. Donald Weaver: Drug approval is a long process and, let's face it, the Canadian market is small. If you are developing a drug, you are developing it for the U.S. market, the European market, and the Canadian market, because this is an economic thing. No one is going to develop a drug just for a Canadian problem. You have to sell it in every country you can in order for a drug to be successful. In doing so, one is really at the mercy of the red tape of many other countries, and the FDA can certainly define red tape for you. I think that is a difficult thing.

To follow up on a previous question, though, I think the U.S. SBIR program is a very good program. I think it's something that we should actually look at and try to emulate, because that is certainly something that facilitates the conversion of research to innovation.

● (1145)

Mrs. Kelly Block: Getting back to something that you stated in your opening remarks, or that's in the brief that you passed out to us, you say, "In terms of innovation, the problem is not a failure of scientific innovation, rather it is a failure of business innovation."

I'd like to give you an opportunity to explain that a little further.

Dr. Donald Weaver: I spend a lot of time with venture capitalists and with business people. I usually describe venture capitalists as people whose thorax is devoid of myocardial tissue. That means they're heartless.

One thing that always bothers me is that they always say, "Is this innovative? Is this really good research? You're not doing what everyone else is doing, are you?" You say, "No, no." You get hammered away at this, and then when they're done, they say, "Okay, now it's done, here's how the business model works. We've used it 45 times. This is what's done, and this is what works." You say, "Well, thank you. I'm really glad that we're busting our butts for scientific innovation, so that you can put this in a cookie-cutter business model."

I would like to see the business people be as innovative and imaginative as us. If you have innovative products, sometimes it takes an innovative business model. They could do a little bit of leg work on that.

The Chair: You have another minute.

Mrs. Kelly Block: What have your interactions been like with the federal government in the work that you do?

Dr. Donald Weaver: Most of my interaction is with CIHR because they fund and all of my interactions with CIHR have been positive. They fund research. They don't pretend to fund commercial. They don't do that, so I have to go out and find venture capital. CIHR, as far as what it does, has been fine. I've had no difficulties with that.

All of my other activities are mainly with the commercial sector because ultimately innovation is an industrial process. Therefore, you interact with industry a lot.

The Chair: Thank you so much, Ms. Block.

We'll now go to Mr. Hsu.

Mr. Ted Hsu (Kingston and the Islands, Lib.): Thank you, Chair.

I'm getting the picture that we have a lot of basic research that's leading to discoveries that are being left on the shelf and not being properly commercialized as opposed to the other picture that industry has needs that researchers are not meeting as well as they should. What you were talking about today, in medical devices and so on, and drugs, is that there are a lot of discoveries on the shelf that need to be pushed out of the laboratory and into the market.

Is that a fair statement? Would Dr. Menon agree with that as well?

Dr. Ravi Menon: Yes, there are a lot of discoveries made that with the right environment could be successful in a Canadian or international context. The SBIR program, that the other two witnesses have mentioned, works well not because it's fundamentally different from Canada's IRAP but because there is capacity among the people who run the SBIR program to actually evaluate technology and make rational decisions about what might be successful and what might not be. We don't have that capacity in Canada. I think the reason IRAP fails is that we don't have that capacity. The concept is good, but the implementation is bad because of a lack of capacity.

How do we train people in this country to do that sort of thing? We have universities. They produce hundreds if not thousands of Ph. D.s every year. Some of them could do this, but if we don't have receptors for them in this country, they will go somewhere else, and they do. Capital flows across borders and so does intellect.

Mr. Ted Hsu: I'm interested, Dr. Menon, in a bit of the history behind some of the devices that you've commercialized that have had some commercial success. I'm wondering, in the development of these devices, what the balance was between being driven by what you saw in the market and being driven by your work as a scientist, and your curiosity-based approach as a scientist. What was the balance between the two of those?

Dr. Ravi Menon: It started with curiosity, of course, because no company would want to market a product that they didn't know existed yet. This is the role of fundamental research, to create new products or new ideas that can be turned into products that companies don't even know exist yet.

In my case it was very much a push scenario. It was a push out of the lab. We did curiosity-based research. We showed that MRI at these very high magnetic fields was actually useful for something. Then all the companies started to become very interested in it. In the very early stages they were happy to buy components of their systems—these RF coils, radio-frequency coils, that I talked about—until they developed the capacity themselves or were able to invest in companies like USA Instruments that had also developed that capacity.

We were leaders. We were the first four ultra-high field MRI labs in the world, two of which were with the United States government at the NIH, National Institutes of Health, and the University of Minnesota. We could have captured some of that market here, but there was no receptor for the technology in Canada.

We tried our best. We made our own company. I was the shipping clerk for three years. I filled out all the export forms. We never sold a product in Canada. We sold in Japan, in Germany, in the United States, in England, and all over the world. Of course, I have a day job, so at the end of that we had to stop, and other companies took up the slack.

The problem is, why couldn't we have made a real company out of it? It takes capital. If you don't have capital, venture capital, banks—I don't believe it's the role of government to do this. It's the role of business.

● (1150)

Mr. Ted Hsu: Okay.

In terms of approval of medical devices by Health Canada, do you see any problems with that? Is that being done expeditiously from your point of view?

Dr. Ravi Menon: I think Health Canada is pretty good. They too have problems with evaluative capacity, just like business. For example, the MRI guidelines in Canada have not been updated since the mid-1980s. However, we have lots of these very high field magnets in Canada now because Health Canada essentially defers to the FDA on this. Even though on paper in Canada you should not have an MRI device that is higher than two tesla—and we have at least 63 Tesla machines in the country—Health Canada is prudent enough to say that since another agency has approved this, they agree with that and they will import them and use them. I don't see how Canada is the big barrier in all of this.

Mr. Ted Hsu: Professor Weaver, you mentioned that you thought universities needed a more multidisciplinary approach to improve the chances of commercializing discoveries. Could you give us more detail and maybe an example?

Dr. Donald Weaver: Sure.

Since I interact with the pharmaceutical industry a lot, I get to see it. The pharmaceutical industry will have biologists, chemists, and biochemists in the same building. When you, as a biologist, have a problem that needs a chemist's answer, you go down the hall and speak to them. That facilitates that. In Canada there may be a biology department and on the other side of campus there may be a chemistry department, but they barely know each other exists. I'm not sure how to do this because universities have been in their same structure since the 1800s, and they're not noted for radical change. It would be nice for some institutes to be formed, say, which may have a particular disease focus or particular mandate in which they would take people from different disciplines and put them in as a test case.

The Chair: Thank you so much. Our time is up.

We're now going to go to Dr. Carrie.

Before we do that, Dr. Hormes, I would love to have you stay here, but I know you have an important meeting to attend.

Dr. Josef Hormes: You can't get rid of me directly.

The Chair: I'm only trying to help you. I thought you'd lost track of time.

Dr. Josef Hormes: Deputy Minister Yeates shifted the meeting to 12:30. That means I can stay another 20 minutes. We just received an e-mail. I have a little more time. I'll be leaving on time.

Thank you.

● (1155)

The Chair: Excuse me, Dr. Holmes, I was trying to tell you that often we get so interested in our topic that we lose track of time. We love to have you here. I'd love you to stay the whole time. I just wanted to make sure you knew you were at 10 minutes. Great. You can stay here until 12:30 then.

Dr. Josef Hormes: I can stay until 12:15 or 12:20.

The Chair: Wonderful.

Now we will go to Dr. Carrie.

Mr. Colin Carrie (Oshawa, CPC): Thank you very much, Madam Chair.

I want to thank the witnesses for a very interesting panel so far.

I want to talk to Dr. Weaver.

You made some interesting statements. One was “innovation is an industrial process”. I know you also just stated that universities have had the same structure in Canada for some time now.

In the U.S. they do things a little differently. There are researchers with IP control, IP rights, things along those lines. There seems to be a different culture down there as far as taking risks are concerned. You mentioned venture capital.

Our government is going down the road to cutting red tape, streamlining things for researchers and industry, but I was wondering what else we could do. I know the government has been very supportive of a project. I think you know about MaRS in Toronto. Is that one of the models we could be focusing on more, like incubators, getting people from different disciplines and academia and industry together? Is that what you're talking about?

Dr. Donald Weaver: MaRS is an interesting idea and there are many aspects of MaRS that I like. Other times I think it's from Venus.

Within MaRS, we have the example of the university hospitals at the University of Toronto also working with the university. I always liked that. University hospitals, of course, can have their own research institutes and their own research efforts, which could be distinct and different from the universities with which they're associated. I put a lot of hope and stock in teaching hospitals and university hospitals as places in which this silo mentality to which I have referred is broken down a bit more successfully. Within a teaching hospital, a university hospital, you can have opportunities where you do have multidisciplinary people working, and so I think that could be useful.

Mr. Colin Carrie: On the way our system functions, you mentioned these silos—

Dr. Donald Weaver: Yes.

Mr. Colin Carrie: —and I think the key is getting people together in that regard.

I know CIHR works on fostering original research. Do you have any suggestions on how CIHR could change the way it invests in research to better involve all these stakeholders to produce more pertinent research?

Dr. Donald Weaver: That's a dangerous thing. I would hate to think that the research budget has *x* number of dollars in it, and so to solve the problem we're going to take all the money from the basic science people and whip it over to the applied people. The end result is that we'll just gut basic science, and we've already said that basic science is particularly strong. I don't really think that a massive reallocation of existing funds is going to solve a problem. It's going to create new ones.

We keep saying how we have very good research, and we do, and I think we should keep doing the research we're doing. We do that right. The problem is in its translation into products. Ultimately, it would be nice to somehow establish an environment in which the people at universities who want to do this could do it, but I don't want CIHR to turn into a drug company. That's not its role.

Mr. Colin Carrie: I do appreciate the different comments. You have said that innovation is an industrial thing and you don't want to see the government agencies turn into drug companies, or anything along those lines.

Maybe I'll turn for a minute to Dr. Menon.

You said you don't believe it's the role of government to be doing that. Our government has been taking action to cut the red tape, cooperate with the Americans and the European countries to streamline processes for approval, things along those lines, for drugs, medical devices. I was wondering whether you are in contact with the Europeans in terms of supporting regulatory cooperation and things along those lines that might be able to help us at this end.

● (1200)

Dr. Ravi Menon: I have done a little work. I have a colleague who sits three offices away from me, Dr. Blaine Chronik, who's also a Canada research chair. He does a lot of this work for Health Canada.

The reality is there is virtually no harmonization with the EU, or even within North America, on devices, drugs, or even electrical systems. We have the CSA. It's considered one of the stamps of approval internationally. In Europe they have CE. In the United States they have UL, which is Underwriters Laboratories. When we get a piece of medical equipment from the United States and it has UL on it, we have to spend thousands of dollars getting CSA approval before we can plug it into the wall at our university, because those are the provincial and federal standards.

I'm afraid that red tape has a long way to go before it's actually amenable to the exchange of all these things in any kind of seamless manner.

Mr. Colin Carrie: I know that we are working at that. Over the years there has been a buildup of all these regulatory barriers and things along those lines.

Are you familiar with MaRS and how that works in bringing industry and academia together as incubators and things along those lines?

Dr. Ravi Menon: Absolutely. I know MaRS very well and have a number of colleagues who have worked with it. It's a model, as I think Dr. Weaver said, but it's not the only model.

In the United States, as you mentioned, they tend to do things very differently. The Stanford Research Institute was several hundred acres of bare, barren land next to Stanford. It's an area we now call Silicon Valley, but it wasn't built as anything other than a place to house inventive people who wanted to start companies. Stanford didn't have a whole lot of say. They just had an IP policy that allowed people to run with the patents. The venture capitalists, who are all over Palo Alto now because of that, were the people who provided the seed money. It didn't take a lot of artificial constructs like MaRS or the NRC kind of development programs we have to do this.

I think you can build these, but if there's no actual company, no receptor there for the technology and no way to fund a receptor, it doesn't matter. You can have a beautiful atrium, and that's all it is.

The Chair: Thank you so much. We've gone quite a bit over.

We're now going into our five-minute Q and A round. We'll begin with Dr. Sellah.

[*Translation*]

Mrs. Djaouida Sellah (Saint-Bruno—Saint-Hubert, NDP): Thank you, Madam Chair.

I would first like to thank the witnesses for joining us today. They have provided us with very relevant and important information on innovation in health care.

Based on the presentations that we have heard this morning, my conclusion is that Canada has difficulty transforming basic research into applied research, which could allow Canadians to benefit from those innovations.

Dr. Menon, my understanding based on your remarks is that our technologies, which are paid for by Canadian taxpayers, are sent abroad because our corporate culture does not include venture capital. So, unfortunately, people abroad are the ones who will take advantage of Canadian innovation.

Could you tell me how the new research and development government cuts are going to further compromise a situation that is already deplorable, in my opinion?

[*English*]

The Chair: Would you like to take that, Dr. Menon?

[*Translation*]

Dr. Ravi Menon: Yes, thank you.

That is true.

[*English*]

I believe there are two reasons our technologies go abroad.

One reason, as I mentioned, is the lack of venture capital. The government does not provide much of that money, so I don't believe the particular cutbacks you are referring to will affect that. They will affect other things, of course.

Another reason is that government funding models in basic science, and this is a very dangerous model, which both the federal and provincial governments have, make us partner with industry very early in the development cycle. I work with Siemens, Varian, and General Electric on very basic discoveries in my lab. Of course, because they put in half the money, when this becomes a potential product, it goes outside of the country right away. This is a fundamental flaw in these partnership funding programs that both Ontario and the federal government have. If we do not support basic research wholly in the country, then of course, we have no right to it later on.

● (1205)

[*Translation*]

Mrs. Djaouida Sellah: Do I still have some time, Madam Chair?

[*English*]

The Chair: You have two more minutes.

[*Translation*]

Mrs. Djaouida Sellah: I would like to ask a question about universities.

Earlier you mentioned that there is apparently a shortage of qualified people who make molecules. How could the government address this problem?

[*English*]

Dr. Donald Weaver: What I mentioned was that we have a shortage of medicinal chemists. A medicinal chemist is a chemist who makes molecules. All drugs are molecules, but not all molecules are drugs, and it takes people with a subset of interests to be able to identify those.

As mentioned, we actually do have a shortage of medicinal chemists, people who want to make drug molecules in this country. I don't know if that's in NSERC's mandate or CIHR's mandate, but I wish that it was in someone's mandate for them to identify medicinal chemists as a relative area and to encourage the nurturing and training of people in that particular area.

[*Translation*]

Mrs. Djaouida Sellah: Thank you.

[*English*]

The Chair: Thank you so much, Dr. Sellah.

Now we'll go on to Mr. Strahl.

Mr. Mark Strahl (Chilliwack—Fraser Canyon, CPC): Thank you, Madam Chair.

Dr. Weaver, you certainly know how to intimidate me, anyway, by putting a couple of algorithms on the first page of your brief. I do want to ask about it, though.

You mention that Canada had a drug discovery deficit of 10 drugs over 20 years. Were there any countries that exceeded their drug discovery? Were there some that were ahead of where they should have been, and what are those examples and why do you think that is?

Dr. Donald Weaver: The countries that exceeded were the United States, Japan, Germany, and Switzerland. They were the main ones that exceeded. These are countries which have a strong industrial pharmaceutical sector that can take discoveries and convert them to products. So, yes, there were a number of countries that substantially exceeded their predictions.

Mr. Mark Strahl: We've heard a little bit about the U.S. model, comparing Canada and our grants and contributions from government. Can you comment on the programs of Japan, Germany, and Switzerland and whether they fund seed research and go further up the chain than we do? Those are questions I'd like answered.

Dr. Donald Weaver: I'll answer it in two ways. First of all, they have particular programs in place that fund medicinal chemistry, which actually fund drug discovery. It's not tacked on to some other particular funding agency.

As already mentioned, for example, in the United States they have SBIR, so they have particular programs that are probably better at encouraging this sort of translation.

Mr. Mark Strahl: This is a health committee, so we're kind of crossing over into the financial sector and venture capital, but that was a theme that was very important.

Is there anything that you think the federal government should be doing to encourage venture capitalists, or is it, as you said, just an attitudinal shift? How do we encourage venture capitalists to take more risks, as has been said, through government policy, or is there government policy that's actually discouraging venture capitalists?

● (1210)

Dr. Donald Weaver: Certainly we need more capital from venture capitalists, and we need them to be willing to take risks, and to be more knowledgeable in assessing the material that is presented to them.

How best to go about that, I'm not really sure. What tends to motivate venture capitalists is making money in the long term. Unfortunately, the long term is the problem. Most venture capitalists whom I interact with also fund information technology, so they're used to seeing return on their investment in about 18 months. They find the biotech space to be horrible because we say, “We're only four years in, but we're getting there.”

If there were some way that they could be shielded from their losses and encouraged to be patient venture capitalists, that would be good.

Mr. Mark Strahl: Finally, you mentioned that when you brought the drug you were working with to the third stage—

Dr. Donald Weaver: Yes, that's the phase three human trial.

Mr. Mark Strahl: You said you had put together $100 million.

Dr. Donald Weaver: Yes, we did. We did an IPO. This was in 1995. We did an IPO, and we traded on the TSX and the NASDAQ. Right now, as an exit strategy for biotechs, no one is doing an IPO anymore. You just hope to be bought up by a bigger company.

Mr. Mark Strahl: Thank you.

The Chair: Thank you very much.

We will now go to Dr. Morin.

[*Translation*]

Mr. Dany Morin (Chicoutimi—Le Fjord, NDP): Thank you very much for your testimony.

One thing struck me in all of your presentations. There is in fact a lack of coordination in the long chain from research, through development, to the final product, and all the way to both medical and economic benefits for Canadians.

I keep thinking to myself that Canada is in a very tight economic situation with budget cuts. The easy solution, but not necessarily the appropriate one, would be for the Government of Canada to invest more and give more money to our researchers and our institutions.

My question has two parts. First of all, are there low-cost or zero-cost initiatives that we could implement in Canada, instead of investing new amounts in various areas of research and development? As I mentioned, given the deficit, the goal is not to make the government spend more, but to find more efficient ways to support research in Canada.

Furthermore, if you insist on talking about financial support, could you perhaps tell us about the spinoffs or benefits? In fact, I still think that, when you invest in research and development, the benefits will come later. If you have the information, could you provide us with figures or data on the potential spinoffs derived from the investments made by the Government of Canada in research and development?

My question is for anyone knowledgeable on the matter.

[*English*]

The Chair: Who would like to answer that question?

Dr. Hormes.

Dr. Josef Hormes: I can give a short answer. As my colleagues said, we are not asking for more money. When we said that IRAP should be changed, that means you need better specialists for the evaluation of ideas. Also, when it comes to CIHR, we are not asking for more money, but for more focused strategies. That doesn't mean distributing money equally. It means making a priority area, for example, high field MRI, and bringing that interdisciplinary group of researchers together. That would help. That means not more money, but changing the structure of how money is spent. That would help as a first answer.

Dr. Donald Weaver: I would fully agree with that. We didn't say we wanted more money. We said that it would be nice if we could better focus it such that the work being done is converted to products. Strategies would be a good start. I'm not asking to pour more money into the existing system, just to use the existing money differently.

[*Translation*]

Mr. Dany Morin: Would the other two speakers like to add something?

[*English*]

Dr. Ravi Menon: I would agree with all those comments.

In total dollars, we spend quite well per capita, but of course, we only have 30-some million people, and so our total investment in any problem is always small. However, I think we can spend the money that we do spend much more smartly. I would see a number of R and D programs across the country, especially with the National Research Council, being shut down. I would ask the government where this money is going. Is it going to encourage either basic research or commercial capacity to use the results of basic research?

● (1215)

Mr. Dany Morin: It was also mentioned that one of the solutions would be to bring all those competent people together to work in cooperation. What is the role of the federal government in achieving this? The way I view things, those are things happening on the ground, in institutes or universities. How can the federal government help bring these people together so we can have better synergy?

Dr. Donald Weaver: I'll let you take that one.

Dr. Ravi Menon: I'm not sure I actually know the answer to that. It's a very difficult question.

When Stanford started their research institute 50 years ago, they had a lot of space next to a very famous university. With the University of Toronto or the University of British Columbia or my own university, we don't have a lot of space.

We also need critical mass. Again, we're a small country, so we have to concentrate our critical mass.

The Chair: Thank you.

We're just about out of time. Did you want to wrap that up?

Dr. Ravi Menon: No. Go ahead.

The Chair: Okay, thank you so much.

We'll now go to Mr. Lobb.

Mr. Ben Lobb (Huron—Bruce, CPC): Thank you, Madam Chair.

The first question is for Dr. Menon.

In your comments you talked about using patent lawyers in the U. S. to do your patent work in the past. Was that for filing patents in the United States or filing patents in Canada?

Dr. Ravi Menon: That's a very good question. That was for filing patents in the United States. Filing patents in Canada is not particularly useful, so we never do it.

We file patents, and we do international filing, and eventually it will get filed in Canada, but there's no reason to protect the technology in Canada because nobody's going to steal it from you.

Mr. Ben Lobb: I worked in the software industry before coming here, so that's why I asked the question. I thought it was peculiar. The way it came out, I thought you were insinuating you were using U.S. patent lawyers to file a patent in Canada. I thought we should clarify that for the analysts.

You've been through the ups and downs and the ins and outs, and if you were going to say the right mix of funding for research, basic versus applied, in a percentage format, what would you see as the right mix? Is it fifty-fifty? Where is it?

Dr. Ravi Menon: Well, if you look at any drug pipeline or medical discovery pipeline, I think you have to fund a hundred seed projects to get one to actually pay off. I think the balance has to be very strongly on the research side, because it's very hard to pick the winner. You basically need the marketplace to ultimately tell you who wins and who loses.

I would say it's 80% basic research and 20% transitional funding to get it into industry, and then industry has to take some risk.

Mr. Ben Lobb: I think there was a criticism—and correct me, if I'm wrong—about the way some of the funding takes place in your own school. Some of the pharmaceutical companies will come in with 50% of the funding for the research, and then they own the results and they take it wherever they see fit.

Do you have an issue with that, or is that just a frustrating reality as a research chair?

Dr. Ravi Menon: That model has saved my research life in Canada, I can tell you, because without it we would have had very little....

I'm very pragmatic. I'm an American living in Canada because I love this country. I've been here for a long, long time. I don't have a problem with my technologies going to the United States or to Germany, but I feel very bad for this country that it happens.

● (1220)

Mr. Ben Lobb: The Richard Ivey School of Business at Western is known around the world for the quality of the entrepreneurial and business people it has produced through the years.

Can you tell me what relationship you and your department have had in working with entrepreneurs to develop relationships to create some of the commercialization products?

Dr. Ravi Menon: Yes. We do work with Carol Stephenson, the dean of the Ivey school, as well as a number of people there. We even have a chair that is funded by the federal government, in fact, looking at health care innovation, which Kellie Leitch was instrumental in helping to secure.

They are interested in big companies, not small companies and, unfortunately, all the business schools in Canada are interested in producing graduates who want to work for large companies. The concept of sweat equity is really unusual in this country compared to the United States, where people will work for no money for many years for a share of a company that might eventually go big.

The Chair: Your time is pretty well up, Mr. Lobb. Thank you so much.

We'll go to Mr. Kellway, please.

Mr. Matthew Kellway (Beaches—East York, NDP): Thank you, Madam Chair, and thank you to all the witnesses for your testimony today.

When we started off the testimony, many of the comments were largely about the failure of the business end and the willingness of venture capital to take on risks. As the conversations evolved, it seems we've come back to the earlier stages in the process. You've actually identified issues even at the basic research part of this process.

Dr. Menon, with respect to this partnership funding for basic research, what are you suggesting might be the solution for that? Obviously, these developments don't get into the hands of venture capitalists. If you have these big companies, they're right at the beginning of the process, claiming ownership.

Dr. Ravi Menon: Wouldn't it be a lovely model if we had partnership funding but that partnership funding came from Canadian industry, Canadian venture capital, and Canadian investor groups rather than large scale multinationals? That would still secure the basic research for the people in academia. At the same time, it would be of massive benefit to Canadian industry.

The problem is if both federally and provincially I enter into a funding agreement because Ontario or the federal government says that for every dollar Siemens puts into my lab, they will give me a dollar, Siemens is not going to want to relinquish control of that technology. If we're lucky, and this happened to us with Varian, they allowed us to start manufacturing a product in Canada and we sold it to them. But of course, that increases their cost compared to them making it themselves somewhere in a low rate country.

For the most part, this model is not a really good model. It does help bring money into Canada for basic research. I think many researchers are happy, but it does not help stimulate Canadian innovation in the private sector.

Mr. Matthew Kellway: Thank you.

Dr. Weaver, you identified the issue with medicinal chemists. What's the solution for encouraging more folks with that kind of expertise?

Dr. Donald Weaver: As I mentioned, I would like one of the granting councils to claim them as their own and to put in place a number of studentships, or scholarships, or post-doctoral fellowships to do this. I also think that it would be very nice if we set up post-doctoral fellowships in industry, so that people who come out of our university system could work in a pharmaceutical company for a while, and get exposed to that sort of approach and then bring it back.

● (1225)

Mr. Matthew Kellway: Great. Thank you.

Mention has been made of the U.S. system. Is it the SBIR? Is that the acronym you're using? What is it about that program that's made it successful and how could it perhaps be adopted here in Canada?

The question is for either Dr. Weaver or Dr. Menon.

Dr. Ravi Menon: The SBIR program is run by the National Institutes of Health, which is the equivalent of the CIHR. The SBIR program is a peer-reviewed program. That means our scientific peers help in the evaluation of the technology, the business plan, and all the rest of it. The evaluation officers who administer the program are also skilled in the particular areas.

In Canada, IRAP is not run through a peer-reviewed research program. The people who run the program are not skilled in the art of evaluating the technology. I think we have a very major difference between those two programs.

Mr. Matthew Kellway: Is the solution perhaps to put evaluators into the CIHR model? Maybe the solution in part is to expand the mandate of that organization.

Dr. Ravi Menon: That would be a very good model. It could go with NSERC or CIHR, but the key is that the money has to go with it. You can't ask those agencies to use the money they have to run this program. This is what we keep doing in this country and this does not work.

Dr. Donald Weaver: It would be nice if IRAP were peer reviewed.

The Chair: Thank you so much.

Now we'll go to Ms. Young. Welcome to our committee, Ms. Young, we're glad to have you here. It's your turn.

Ms. Wai Young (Vancouver South, CPC): Thank you so much, Madam Chair.

Thank you to this fascinating panel this morning. It has certainly been interesting to hear from you experts about the range of the different challenges and opportunities that are available here.

I am new to this committee; I'm simply covering for somebody today. I wanted to ask a couple of questions because in other committees that I'm on there seems to be a thread. We're having the same kinds of discussions.

A number of you have mentioned that we lack a critical mass in Canada, that we need investment dollars in Canada, that we need to be more innovative in terms of how we align our research with the development of business and the application of that. Would you say that's true?

That's a difficult question to answer. Let me rephrase it.

We're hearing this from different sectors. The natural resource sector, for example, is an obvious one. It's interesting to me to come to the health committee and hear there are similar issues, big issues, because of where Canada is in terms of population and funding, etc.

Perhaps each of you could take a minute to talk about this. You've come up with many suggestions this morning in terms of what Canada can do to make things better. On IRAP, you talked about the change in structure of how the money is focused and spent, the interdisciplinary models, the total per capita money. That's good. It was heartwarming to me, as a member of the government, that you're not asking for money, but you want money to be differently focused and differently spent.

If you had a magic wand and you could do one thing, what would it be? I'm going to ask each of you to respond. What is that one thing you would do in terms of transforming the money we currently give? You've already said that, per capita, it's a fair amount of money, but how would you transform it to be more effective?

Dr. Ravi Menon: Don, do you want to go first?

Dr. Donald Weaver: Oh, great. Thanks.

To me, the most important thing would be to break down the barriers between disciplines and encourage a multidisciplinary approach. I think that is crucial to product development. I don't know how to do that, but if I could wave my magic wand that you have bestowed upon me and have this occur, I would put multidisciplinary encouragement first.

The Chair: Dr. Cutler, you haven't had a chance to intercede today. Dr. Hormes has left, but we'd love to hear what you have to say. Perhaps you would like to give that answer to Ms. Young.

● (1230)

Dr. Jeffrey Cutler (Director, Industrial Science, Canadian Light Source): Thank you very much.

I have to agree with our colleagues here, but it's also finding those ways to get Canada to better leverage the investments in infrastructure. How does an organization, such as Canadian Light Source where I come from, find better ways to leverage the capacities at the University of Western Ontario with their MRI program, or at Dalhousie University?

There's building collaborations within your own institution, but it's finding ways to build those collaborations bigger than that. How does Canada make better use of the investments made across this country? That's one of the grand challenges, getting that key interaction at the grassroots level across the nation.

Ms. Wai Young: I'm going to interject for a second. What you're saying is it's not enough to only look within your own university, but also to look at leveraging Canada's expertise, equipment and everything across this country.

Dr. Jeffrey Cutler: Absolutely.

The Chair: Dr. Menon—

Ms. Wai Young: Dr. Menon, please, your magic wand, which you're waving already.

Dr. Ravi Menon: I feel very passionate about this. I think I have a real answer here.

The first is a question. What is the difference between Canada, Afghanistan, Iran, and Iraq? Only one of these countries does not have a science minister, and that is Canada.

From the big picture perspective, one of the reasons we cannot integrate all our programs is that this country does not have a science minister. Pieces of R and D live in Industry Canada, in CIHR, in all these different agencies, but there is no one person looking at the big picture.

In the United States, our neighbour, the cabinet usually has somebody in science, and it's usually a Nobel laureate. We don't have that.

The Chair: Thank you, everybody.

We'll now go on to Dr. Carrie.

Mr. Colin Carrie: I just wanted to correct Dr. Menon. I believe you might know Dr. Goodyear, who is our Minister of State for Science and Technology. As a government, we did put that ministry forward.

My colleague across the way talked about low-cost initiatives. Our government has been working to lower corporate tax rates and to streamline regulations so that the business environment is better in Canada. Dr. Menon said that unfortunately we don't have some of these world corporations. He mentioned Siemens and some other companies that unfortunately we don't have, but that's a reality. If we want to partner with industry, the question I think is how we encourage that. I think Dr. Weaver mentioned that in other countries at the university level they allow their researchers to work in industry part-time. They go back and forth, and they get that leading-edge experience.

I was just wondering, because I'm looking for practical suggestions for the government, Dr. Weaver, do you have an idea for how the federal government might be able to encourage that type of interaction?

The Chair: Dr. Cutler, would you like to take that?

Dr. Jeffrey Cutler: I have one very quick comment around that, where you're trying to find ways to leverage this and bring people together. There's a very interesting model in Quebec in the aerospace sector called CRIAQ. It is the Quebec aerospace consortium. They do innovation forums where they bring industry in with academia. It's an opportunity for industry to ask what our problems are, what our grand challenges are, so that academia knows. Quite often we don't know what some of the challenges or issues are that industry needs to deal with.

Finding those opportunities to bring industry and academia into the same space is unbelievably valuable.

Mr. Colin Carrie: I agree with you very much. One of my colleagues talked about practical research versus theoretical research.

One of the things I've been involved with, coming from Oshawa, is the automotive sector. What that industry seems to do is that it will address a problem by talking to academia and seeing if it can come up with a solution, and because it does that, we've heard about problems with funding, innovation, and venture capital. If science is actually gearing toward solving a specific problem that industry has today, I think that's a good way to stimulate more research and more innovation and, at the end of the day, commercialize and actually end up with a product.

We heard from one witness. Ravi mentioned he thinks it should be 80% one way but only 20% practical research. What do you think, Dr. Cutler? Is that a good percentage that the federal government should be looking at?

● (1235)

Dr. Jeffrey Cutler: I would agree it's probably in that same order of magnitude, the 70:30 or 80:20 perspective. If you look at most major developments that are out in the private sector, they've been developed under a kind of fundamental research. You do need to leverage that in, but that input from the private sector is still needed to give us some sense. If you go back to the CRIAQ model, a lot of it is pre-competitive R and D, where multiple industries come together and say, “Here's a problem we all have; help us fix it.” They bring the right partners in, and then they find the various funding models to deal with that.

Mr. Colin Carrie: The Government of Canada funds you at Canadian Light Source. What proportion of your funding comes from the Government of Canada?

Dr. Jeffrey Cutler: We have about seven different funding partners that give us operating funding right now. It's probably in the order of about 80% from the federal sources and then from the Province of Saskatchewan, the University of Saskatchewan, and some industry revenue as well. It comes from a number of places. We get funding from NSERC, CIHR, and NRC as kind of the main funding, and we're part of the CFI MSI program as well.

Mr. Colin Carrie: How does that funding enable your facility to operate and attract, let's say, other investors who need problems solved?

Dr. Jeffrey Cutler: It allows us, number one, to keep the lights on, to keep the facility operating. We have about 200 staff. Probably 70 of them are at the masters or Ph.D. level, so we have a large cross-section of scientists who work in myriad different sectors, including life sciences and health sciences, environmental sciences, and material sciences trying to find those ways to help them push back the frontiers.

Ms. Block talked about how many drugs are being developed at CLS. There are companies doing all sorts of work on drug design, from not just various places in Canada but the U.S. as well. There's work done on advanced medical imaging to find better ways to look at cancer development. There are a lot of different applications in the health sciences sector that are having access to the investments the Government of Canada has made, and things like CLS are unbelievably valuable in helping push back some of those frontiers.

Finding those better ways to partner with the other infrastructure in Canada is one thing we're wrestling with all the time.

The Chair: Thank you, Dr. Cutler. I appreciate your input here.

We have one last questioner. Mr. Eyking.

Hon. Mark Eyking (Sydney—Victoria, Lib.): Thanks, Chair. It's great to be on this committee. I see Ms. Young is visiting this committee. I think it's good that we visit each other's committees sometimes to find out what's going on as MPs.

Recently a group of us, an all parliamentary group, went to a place called Eindhoven, the Netherlands. This was Philips Electronics' main city, but they've changed the whole city around to an innovation centre. It was amazing to see all the creativity. All these companies send their people there to do research and study. They would socialize. They even encouraged trading secrets, trading patents. They were coming out with almost a patent a day. One would say maybe one a month would really make it happen. It was great to see that synergy. Synergy leads to economic activity. We see it in RIM in Waterloo and maybe in Silicon Valley in California.

Our health system is kind of a hybrid of the American and European systems. Today everybody is talking about how we can have more innovation and technology to help us. Looking at that model, are we missing something here in North America because of the size of our economy? Do we have to let the Americans take the lead on this, or is there an opening for Canada to create this synergy? The Netherlands only has 10 million people and they're creating this synergy just by partnering with private companies and public money. Is there room for us to create that synergy and innovation and economic activity in the health care system? It's going to be key for North America's ageing population in the next 50 years.

● (1240)

The Chair: Who would like to answer that?

Dr. Menon.

Dr. Ravi Menon: There's certainly a role. I firmly believe in partnerships. We do a lot of contract research where there's no IP being exchanged, no patents, or if we do these things, we're signing a non-disclosure agreement. We work with companies all over the world, Boston Scientific, Philips, Siemens AG, companies in Waterloo, Ontario.

The problem in Canada is we're geographically large. Holland is very small, and there a number of major centres of learning and innovation there. There's Nijmegen and Utrecht. They're all just a half hour from each other by train. Of course, we can't quite do that, nor do we have a Philips in this country. Philips is over 100 years old, a major multi-national. What is good for Holland is good for Philips, and what is good for Philips is good for Holland. We don't have drivers like that in this country. Perhaps in the natural resource sector we do, but not in health care. But we have health as a unifying factor for all of us, and we know the market is not just Canadian. We know that things we develop can be sold anywhere.

If you could figure out a way to bring in a huge company like a Philips, even if you can't develop it here to begin with, that would change the landscape in Canada.

Hon. Mark Eyking: Are you suggesting that we invite firms from another country? Is it a key thing that we should be looking for as part of our economy and part of our social fabric? Should we be constantly bringing stuff up from the United States? Should we be pitching that?

Dr. Ravi Menon: We bring a lot of foreign investment into oil sands, telecommunications, you name it. Why can't we do that in the medical device industry or the drug industry? We had a lot of very successful branch plants like Merck-Frosst in Montreal. They're all gone. For some reason, and I don't know all the reasons, they left. It wasn't because of a lack of smart people in this country.

The Chair: I'm so sorry. This conversation is very interesting, but our time is up now.

Hon. Mark Eyking: That's it?

The Chair: Yes, I'm sorry. That's five minutes. I gave you a little more than that, actually, because you're so charming, Mr. Eyking.

Having said that, you are all charming. You've done a wonderful presentation today, and we appreciate it.

We will go in camera for business. After we say goodbye to all you very learned people, I'm going to ask you to please make sure that everybody leaves the room except the committee members and their staff.

Thank you so much.

[*Proceedings continue in camera*]

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