

LIFE SCIENCES

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GROWING BRITISH COLUMBIA'S BIO-ECONOMY

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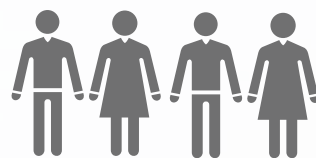


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FIGHTING BACK

Online Biomedical
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OFFICIAL PUBLICATION



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Message from the Minister of Technology, Innovation and Citizens' Services



Hon. Amrik Virk, Minister
of Technology, Innovation
and Citizens' Services

British Columbia is home to one of the most vibrant life sciences industries in the world, contributing an estimated \$14.4 billion to B.C.'s GDP and employing almost 180,000 people.¹

This growth is sending a clear message that B.C.'s life sciences sector is a significant economic contributor to our expanding knowledge-based economy.

Life sciences is one of five key subsectors in the B.C. Government's recently released #BCTECH Strategy, which includes a \$100 million BC Tech Fund to expand the availability of venture capital in the province and affirms government's support for B.C.'s burgeoning tech sector.

Through extensive consultation with key technology stakeholders and industry leaders, we learned that while there have been barriers to growth in the tech sector, government can help. Our resulting #BCTECH Strategy represents our vision for British Columbia's tech sector in every region of the province. It represents the investments we are committed to making by improving access to capital, deepening the talent pool and opening access to markets overseas and here at home.

B.C. isn't the only place in Canada where the sector is thriving; it contributes significantly to Canada's overall success when it comes to attracting investment. According to the Canadian Venture Capital Private Equity Association, life science investments in Canada have more than doubled over the past three years, from \$272 to \$647 million.

Through strategic investments, B.C. continues to empower the life sciences sector to lead with innovative technologies that are changing lives and affirming our international reputation in this field.

Investments to provincial post-secondary institutions such as the BC Knowledge Development Fund, which

aims to attract and retain world class research and innovation talent, and our recently announced \$20-million upgrade to UBC's life sciences facilities to replace aging infrastructure and enhance learning opportunities, will lead to cutting-edge and meaningful innovations that will improve health outcomes for British Columbians.

Since 2001, the B.C. Government has invested close to \$671 million in Genome BC and the Michael Smith Foundation for Health Research, and we're seeing that research pay dividends. For example, B.C. innovators are developing life-changing innovations such as an improved system for brain cancer detection in children, next generation sequencing for breast cancer genes and a smartphone device that enables people to measure blood oxygen levels.

Government's role is to provide support, spark investment and foster a favourable climate for job creation. But beyond the initiatives included in our #BCTECH Strategy, there are other incentives that make B.C. a global magnet for top-quality talent and investment. B.C. has, quite simply, a well-deserved reputation for being a great place to live, work and do business, with affordable health care, competitive tax rates and one of the lowest personal income taxes in Canada.

B.C.'s life sciences sector is a tremendous contributor to the health and well-being of British Columbians and our provincial economy. With world class scientists, research and innovation, B.C.'s health sciences sector will see better patient outcomes, healthier British Columbians and a thriving technology sector that has nowhere to go but up. 📈

1 ACCORDING TO THE LATEST REPORT FROM PRICEWATERHOUSECOOPERS (RELEASED OCTOBER 2015).



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Message from the president and CEO



Paul Drohan, president and
CEO of LifeSciences BC

British Columbia's life sciences industry is a significant economic contributor enjoying a growth phase. More than 300 companies in the areas of biotechnology, pharmaceuticals, diagnostics, medical devices, medical technologies and digital health call British Columbia home.

With 177,000 employees and \$14.4 billion in direct gross domestic product contribution, the life sciences industry is embedded in the larger life sciences ecosystem in the province, which brings together academia, health institutions, hospitals, government and industry. Each plays a vital role in the commercialization of innovation.

Our industry relies on academia for the discovery and development that our entrepreneurs use to fuel innovation. In turn, the rapid identification of commercial potential leads to an environment in which pre-clinical and clinical research can be performed within our health institutions and hospitals.

Government provides meaningful support for early-stage companies as well as the infrastructure relied upon to research and develop innovation. To create a life sciences company, we need both entrepreneurs and a robust life sciences ecosystem, to help foster commercial innovations and bring them to maturity.

In British Columbia, we have the ingredients to successfully and frequently commercialize innovation. We are home to one of the most entrepreneur-rich regions in North America. Developing companies is one of our strengths, and B.C. has more young companies with 10 or more employees than anywhere else in Canada. We are also supported by one of the most active angel investor communities in Canada, in part due to the thoughtfully conceived eligible business corporation and venture capital corporation programs of our province. Our strategic adviser community has helped craft unique and value-creating deals. We have successfully accessed public markets, with no less than six British Columbia companies undertaking initial public offerings during the past 24 months – and five of those six going on to list on Nasdaq. We have our

governments, both provincial and federal, who have renewed their support of this knowledge-based economy, (as shown, for instance, by the BC Tech Fund and the latest 2016 Federal Budget), that will fuel commercial development and advance our innovation to benefit the economy, and most importantly, patients.

To continue our success, what is it that we need? 1) We need to synchronize our efforts within the province to a greater degree and coalesce collective energies around clear priorities for the life sciences sector; 2) we need to continue to support the translation to commercialization of the best and brightest research; 3) we need to constantly attract capital to fund the development of companies in one of the most capital-intensive industries; 4) we need to continually attract global talent to develop our community and expand our companies' knowledge and skills base; and, 5) we need to expedite access to innovation within the health care system so that those who need it most, namely British Columbian patients, can benefit first.

LifeSciences BC's commitment is to continue to play a central role in achieving this success. We will continue to catalyze locally, while connecting our community globally. This work is possible only with the support of our sponsors and members; for this, we would like to say thank you.

Our collective success is, and will continue to be, rooted in our past. When future entrepreneurs of British Columbia's life sciences companies look back on what we achieve in the next five years, they will hopefully be proud of the care and energy used to prioritize the development of our life sciences ecosystem. Our ability to work collaboratively will establish the foundation of our future bio-economy, delivering not only economic value for the province, but also better health for all British Columbians. 🐼





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GENOMICS GETS PERSONAL

Advancements in DNA mapping have opened up new worlds of treatment and testing

PATRICK BLENNERHASSETT

The Human Genome Project, which cost \$3 billion and took 13 years to complete, finally wrapped in 2003. The international research project successfully mapped all of the human genomes, drastically advancing the exploration of our own DNA.

Mohammad Javad Tabesh, chief executive officer of Genome Me, hopes to offer affordable DNA testing shortly in Vancouver pending approvals | ROB KRUYT





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In many ways cancer is the simplest disease of all, because all cancer is the same. And all cancer is, is mistakes in the DNA of your cells, so at the most fundamental level something has gone wrong inside the DNA. These cells would not be viable on their own; something is broken, and we can now detect with total accuracy what's broken, and in some cases when we find something that's broken, we're able to very specifically target it

Now genetic testing can be done much cheaper and way faster. With the rise of companies like 23andMe, which can map your DNA in a matter of weeks for under \$200 using a mailed saliva sample, personal genomics is now a rapidly growing health-care industry. 23andMe offers results on genetic makeup from that saliva sample, including 40 reports on inherited conditions such as cystic fibrosis, hereditary hearing loss and unusual but potentially deadly diseases like Type 1 tyrosinemia, which affects about one in 20 people of French-Canadian ancestry.

There are also drug response and genetic risk factor reports, opening up a wealth of personal scientific knowledge about things like hemochromatosis, celiac disease and alpha-1 antitrypsin deficiency, which affects the lungs and can be exacerbated by smoking.

However, in 2013 the U.S. Food and Drug Administration told 23andMe to stop issuing health guidance from its kit reports, forcing 23andMe to pivot; now it provides only raw data and ancestry information to its customers, including a frequently seen quote on its website:

"Keep in mind that many conditions and traits are influenced by multiple factors. Our reports are intended for informational purposes only and do not diagnose disease."

In B.C., the Personalized Medicine Initiative (PMI) looks to build on the recent advancements in genomics as well, in a more collaborative way. The umbrella organization has a multitude of funding partners and

participants in both the public and private sector – from Vancouver General Hospital and the Vancouver Prostate Centre to the University of British Columbia faculty of science and Pfizer. The PMI has an "overarching goal of introducing technologies for personalized care into our health-care system to benefit the population," according to its website.

Back on the private side, Mohammad Javad Tabesh, chief executive officer of Richmond-based Genome Me, hopes to start back down the path of proper health management based on genetic results. Genome Me has six tests under development, including ones for prostate, breast and colon cancer, and four in clinical trials, including a tuberculosis drug resistance screening, and its HPV (human papillomavirus) test is currently in the regulatory approval filing stage.

Tabesh says Genome Me understands personal genomic results can be a scary thing, given that people can find out some fatalistic-sounding news about their health.

"That is actually a big part of genetic testing," says Tabesh, "the anxiety that we create. So if I tell you that you have a chance of developing Alzheimer's, the next time you forget something you might think, 'Oh my God, is this it?'"

The answer, according to Tabesh, is "genetic counseling" and "effective informed consent."

"We want people to know this is not the end of the world and this is only a subset of what leads to your health," he adds.

One of the benefits of DNA testing is in treating cancer.

Genomics gets personal

Chris Wagner, president and chief executive officer of Contextual Genomics, a privately held company launched in 2012 that works to develop and deliver genomic-based molecular diagnostics to cancer patients, says genomics has revolutionized the fight against the world's most feared and most common disease.

"The way I explain it to people is I talk about how doctors have forever tried to treat people in a personalized way," says Wagner. "And the way they would do that is by asking about your family history, your disease history: What does your mother have? What does your father have? Your brothers or sisters, are they sick? So that's how they tried to personalize things to you, and now instead of asking those questions we can determine all of this chemically, so we use people's DNA to figure this out."

Wagner says the result is cancer drugs that specifically target cancer cells in the body rather than using a "broad-spectrum shotgun" approach of medication and chemotherapy.

"In many ways cancer is the simplest disease of all, because all cancer is the same," he adds. "And all cancer is, is mistakes in the DNA of your cells, so at the most fundamental level something has gone wrong inside the DNA. These cells would not be viable on their own; something is broken, and we can now detect with total accuracy what's broken, and in some cases when we find something that's broken, we're able to very specifically target it."

Right now 40 drugs are approved for targeted cancer treatments, says Wagner, with 470 in late-stage trials.

Currently Wagner and his industry colleagues can treat approximately 20 per cent of cancer patients with this new strategy; however, he thinks that number will soon dramatically rise. "It's kind of like, for the very first time, we have discovered a telescope, and now we are looking at the stars for the first time. Every single day we discover new genes and new things that are interesting; it's not taking us hundreds of years to figure this out."

The PMI, which looks to bring as many bodies as possible to that telescope across B.C., wants to try to change a multitude of medical services in areas ranging from brain health and diabetes to treatment of autism and microbiomics. Pieter Cullis, director of the Life Sciences Institute at the University of British Columbia, says the recent advancements in genomics are just the start when it comes to treating diseases.

"It will certainly be commonplace to have your genome sequenced to ascertain your disease risks," answers Cullis when asked via email where the field of genomics might be in five years.

"If you get cancer, it will also be commonplace to have the genome of your cancer cells sequenced so that the most appropriate therapy can be selected.

"Genomics is not the complete answer, however; we will see major increases in comprehensive measurements of proteins in your blood (proteomics), metabolites in your blood and urine (metabolomics) and bacteria in your feces (microbiomics) that will be highly diagnostic for diseases you actually have and whether the therapy you are undergoing is actually working." 🐼



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MANAGING UBC MEDICINE

New dean brings wealth of academic excellence



Dr. Dermot Kelleher, dean of the faculty of medicine at the University of British Columbia, says UBC's distributed learning program could have a profound effect on how care is delivered in B.C. | DON ERHARDT

PETER DEVRIES

Dr. Dermot Kelleher, newly appointed dean of the faculty of medicine at the University of British Columbia, is a tough man to pin down. It could be an old soccer habit; the self-professed football lover plays regularly in an adult league in Vancouver.

The teamwork and fleet-footedness demanded during his time on the pitch may shed light on the factors behind his broad and varied success in academic medicine.

"I've become very accustomed to complex time management," says Kelleher by phone from a waiting room at Vancouver International Airport. "It's a matter of being disciplined with how you use your time, but also delegating and trusting your colleagues to help ensure you deliver what you intend to."

By all accounts Kelleher has mastered the art. During successive terms as head of the school of medicine at Trinity College Dublin, and then dean of the faculty of medicine at Imperial College London, he simultaneously served as dean of the Lee Kong Chian School of Medicine in Singapore.

Managing two medical schools on two different continents didn't slow him down at all. During his tenure he oversaw both the successful launch of the undergraduate program in medicine at Lee Kong Chian and Trinity College's redesignation as an academic health sciences centre, an industry-wide classification that recognizes international excellence in research, innovation, education and clinical service. It is held by only five other schools in the U.K.

Kelleher also acts as president of the Federation of European Academies of Medicine, which seeks, among other efforts, to address regulatory issues that relate to the administration of biomedical science in Europe.

Championing the ongoing push toward academic excellence in medicine is one of Kelleher's hallmarks.

In Kelleher's view, UBC already embodies such excellence. Fulfilling its potential, he says, means connecting medical education with the communities medicine seeks to serve.

In 2004, the UBC faculty of medicine formed a partnership with the provincial government, the University of Victoria, the University of Northern British Columbia and all six health authorities in the province

to distribute education, clinical training and health sciences research across B.C.

Undergraduate training is provided at more than 80 hospitals and clinical sites around the province, and aims to increase enrolment among rural and aboriginal medical students while also allowing them to train in rural and underserved communities. According to the university, studies show such students are more likely to return to those communities to practise once their training is complete.

"It has a potentially profound effect on how care is delivered," says Kelleher, who has found few other places in the world that can boast such a broad-reaching partnership. "It is a very important part of our place in the international community."

Retaining that place, Kelleher says, also requires ongoing investment of intellectual capital in the research and development of new medical technologies. Working closely with industry is a critical component of academic medicine.

To that end, he has founded a number of companies, and he remains director of three of them. ICON helps companies in the pharmaceutical, biotechnology and medical device industries outsource development initiatives. Imanova uses PET and MRI scanning to aid in the development of pharmaceuticals, and Global Medical Excellence Cluster manages affairs for the business cluster of five U.K. academic institutions with medical centres.

Those partnerships, Kelleher says, promote financial growth. In his opinion, faculty members have to be more than just educators. They need to be contributing to economic growth and the enrichment of communities through the development of medical technology.

The faculty at UBC, Kelleher says, has a lot to offer. It boasts some key leaders in specific areas of research such as cancer, HIV and cardiac valve implantation.

"Sometimes people living here don't quite realize the really powerful strengths that they have at their disposal," he says. 🐼

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B.C.-U.K. agreement underpins sharing of genomics information



JENNIFER

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**[It] allows us to
go from taking
a local look
at infectious
disease to a
global one**

PETER MITHAM

By some counts, people create more information every 48 hours than in the previous history of the world. The explosion of genomics information is a case in point. The vast investment in sequencing the human genome little more than a decade ago has led to a vast store of data that has been collected and catalogued in various ways.

But an international partnership that brings together Genomics England and Genome BC will lay a foundation for sharing scientific data internationally in a seamless and consistent manner.

A memorandum of understanding signed in August 2015 between Genomics England and Genome BC commits the two organizations to “co-developing information and tools, and a mechanism for the international exchange of knowledge, data and materials in the field of genomics.”

“Data sharing may seem esoteric, but I think it’s really fundamental,” explains Rachael Ritchie, director of international partnerships with Genome BC. “It opens the door to co-operation and sharing of best practices and data. That’s really the sole focus of it.”

England and B.C. both have single-payer health-care systems that have facilitated the collection of clinical data, providing strong foundations for research. However, the two jurisdictions haven’t necessarily collected, described or managed their data in the same way.

Genomics England, a U.K. Department of Health subsidiary created in 2013 to oversee the sequencing of 100,000 genomes from patients, is selective about its research partners.

“There is nothing to stop any other country approaching us to add their sequencing data to the Genomics England database provided that they meet the high standards of

the 100,000 Genomes Project research protocol,” it states.

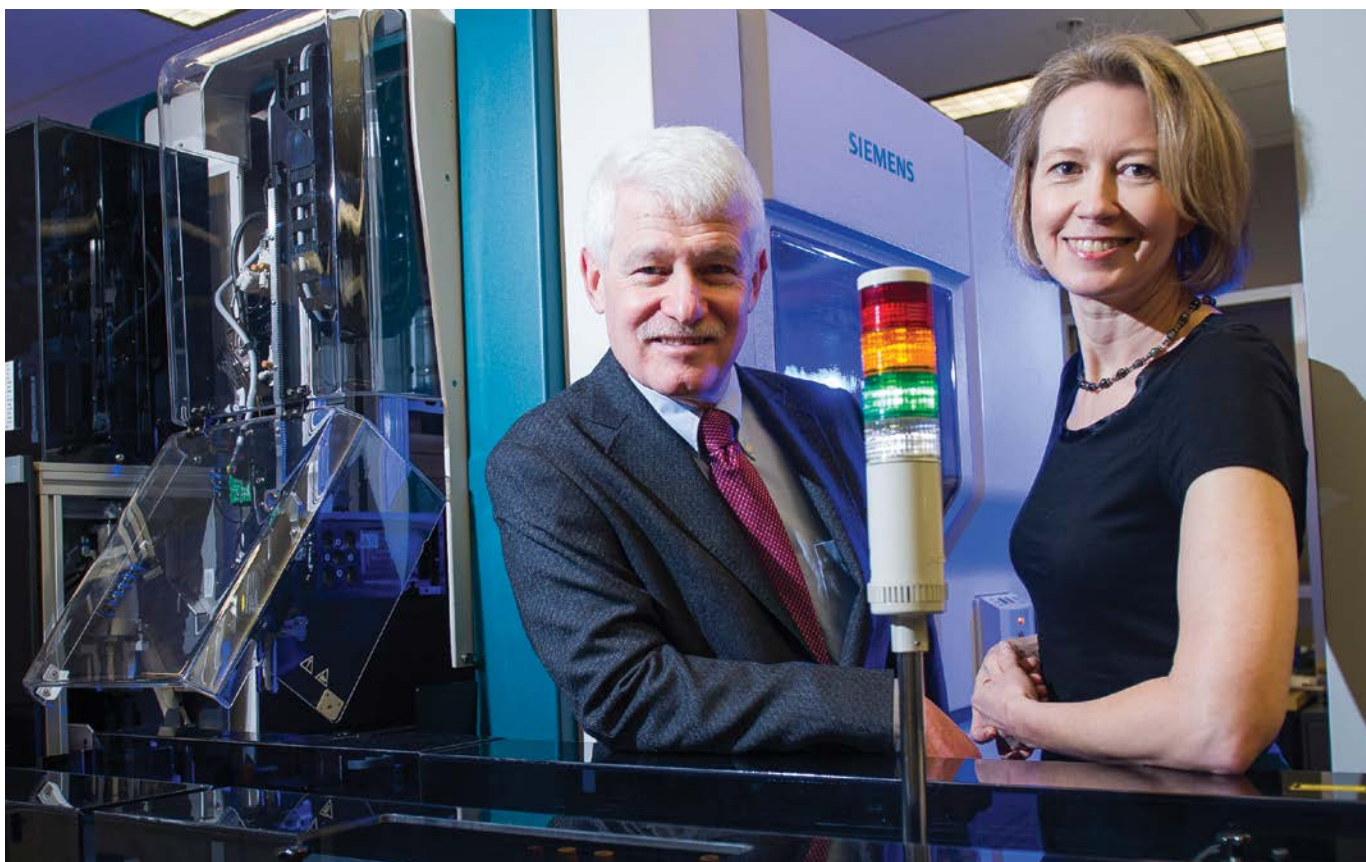
“We are probably more advanced in terms of policy and procedure around access and data protection, but Genomics England is probably ahead of us in terms of thinking about storage and management of genomic data,” Ritchie says. “The opportunity here is around sharing or harmonization of best practices or standards for health-related data.”

Some of the issues facing researchers include different forms for obtaining patients’ consent for the use of genomic information, which is strictly governed (it typically isn’t allowed to move between jurisdictions, for example).

Standardizing descriptions of information is also important. It ensures that researchers have a common understanding of what they’re looking at and are able to query databases with surgical precision, allowing them to obtain the answers they need while respecting patient confidentiality.

“As we look at more complex diseases, we’re going to need to find a way to pool the data we have here with data that people have around the world,” Ritchie says. “It sounds easy but it’s actually quite difficult.”

By making things easier, the partnership between B.C. and England will facilitate clinical decisions, including the ability to make accurate prognoses regarding the future course of a disease and the therapies best suited to treating



it – the foundation of personalized medicine.

The efforts to harmonize data collection and handling will support research into three areas: intellectual disability and epilepsy; cancer; and infectious diseases.

Genome BC plans three pilot projects, one for each area, to further the objectives of the partnership.

Wyeth Wasserman of the Child and Family Research Institute at BC Children's Hospital will lead a pilot project to harmonize how researchers describe genomic information related to intellectual disabilities and epilepsy.

"What we're looking at sharing are data models. These are basically information about how we characterize the disease, how we record and how we describe the clinical phenotype associated with intellectual disability and epilepsy," Ritchie says.

The improvement of DNA extraction and analysis from tumour samples is the focus of a pilot project Marco Marra and Steve Jones of Canada's Michael Smith Genome Sciences Centre and the BC Cancer Agency will lead.

"One of the challenges of looking at the genomics of tumours is that the tumours often contain great heterogeneity – different cells contain different mutations – and it's often very hard to get a very good sampling of a tumour," Ritchie explains. "We're looking at ... sharing data around new methods to improve DNA extraction and new methods to get better-quality DNA ... so that we can get better and more accurate data."

Jennifer Gardy, Canada research chair in public health genomics and senior scientist at the BC Centre for Disease Control, is leading a pilot project that will validate a process the U.K. is developing for identifying and improving the analysis of bacteria at the root of tuberculosis. The work will also help determine which drugs best address particular strains of tuberculosis, where bacterial resistance to antibiotics is a serious issue.

"[We'll] establish that as a gold standard to analyze bacteria," Ritchie says. "If the pipeline is validated – all the processes around sample handling, analysis, storage, all of these things – we can extend the pipeline to other pathogens."

The broader application is what excites Gardy, who says genomics opens a new research frontier that will broaden if countries can share data.

"The science has brought us to the point where real-time, clinical use [of genomics] is a reality – the 2015-17 period will, I think, be remembered as the time public health labs started to transform themselves," she says.

This is where the partnership with England kicks in.

"[It] allows us to go from taking a local look at infectious disease to a global one," she says. "We can share resources to create a single, improved approach to clinical microbial genomics, and, more importantly, we can share that knowledge with other groups and continue iterating towards better and better practice." 🐼

Mel Krajden, director of the Public Health Laboratory at BCCDC, and Rachael Ritchie, director of international partnerships at Genome British Columbia, at BC Centre for Disease Control | RICHARD LAM

CRUNCHING NUMBERS

Genomic research relies on computational power



**MARCO
MARRA** |

DIRECTOR AND
DISTINGUISHED
SCIENTIST, CANADA'S
MICHAEL SMITH
GENOME SCIENCES
CENTRE

To maintain the ability to achieve discovery, there needs to be consistent reinvestment in infrastructure; this is not the kind of thing you buy every 20 years

PETER DEVRIES

When Michael Smith was awarded the Nobel Prize in chemistry in 1993, it marked the culmination of a lifetime of work at the forefront of genome research. The Canadian researcher and scientist who called Vancouver home was a key figure in what would become a veritable tidal wave of growth in B.C. genomics research in the mid- and late '90s.

Not that anyone was knocking down his door to spend millions of dollars on mapping the human genome.

"Achieving the first drafts of the human genome was enormously expensive," says Marco Marra, director and distinguished scientist at Canada's Michael Smith Genome Sciences Centre, the Nobel laureate's namesake research institute. "Nobody could see beyond that cost except visionaries like [Smith]." That vision, shared by other key players in the growth of genomics in B.C. such as Roger Foxall, Genome BC's first president and CEO, and Victor Ling, president and scientific director of the Canada-wide Terry Fox Research Institute, underpinned a drive for the federal and provincial funding needed to realize their vision of creating a network of genomics researchers in B.C.

In 1997, Genome BC came into existence.

"B.C. made a commitment in scientific expertise to nucleate this area," says Marra, noting that early on the B.C. government recognized the importance of genomics research and played a key role in supporting the burgeoning field. In 2001 Genome Canada conferred \$35 million in funding while the Province of British Columbia awarded \$34.5 million to Genome BC.

With federal and provincial funding came an expansion

of the infrastructure used for genomics research. That, in turn, allowed researchers to reach out to other sections of the life sciences community, pooling talent and resources and bringing together a community of like-minded scientists.

"So it was really a snowball effect, and without any one of these elements I don't know that B.C. would have been as competitive as quickly as it was in the national and international space," says Marra.

Canada's Michael Smith Genome Sciences Centre was born out of that nucleus. In 1999, with funding from the BC Cancer Foundation, the Genome Sciences Centre was founded by Michael Smith.

The centre now constitutes a technology cluster that resides embedded within a research department of the BC Cancer Agency called the genome sciences department. The BC Cancer Agency is linked to the Provincial Health Services Authority as part of the Ministry of Health.

"In that sense, the Genome Sciences Centre is a public entity that functions primarily off competitive grant funds." In addition, the centre holds relationships with the University of British Columbia (UBC), Simon Fraser University and the University of Northern British



Crunching numbers

Columbia and employs 13 university faculty members. For example, Marra is additionally a UBC professor and head of the university's department of medical genetics.

It's the kind of collaborative effort that distinguishes B.C. as an industry leader.

"We've been very careful right from the inception of the genome centre to try to share access to infrastructure," says Marra. This has allowed the centre to reach out, through other scientists in different fields, for funding from sources beyond cancer research.

In addition to numerous cancer research projects, the centre is currently running projects analyzing the genetics of aortic valve stenosis, studying the way fruit flies consume their own body resources to cope with starvation, and identifying genetic networks in the development of heart, lung and pancreas tissue in mice.

The centre came into existence at a time when computers were starting to play a key role in the analysis of data gathered through labour-intensive gene sequencing.

"Certainly the field could not have evolved without the co-evolution of computer infrastructure," says Marra. Prior to automation of the systems used to extract genomic data, the lion's share of effort, time and, consequently, money was spent on the extraction process. With automation, yield has grown a millionfold or more.

The capacity to extract the requisite data, Marra says, has grown beyond the capacity for computers to usefully manipulate and analyze the data. What analysis does

happen constitutes an enormous expense in data storage and server costs.

"The technology has outstripped computational power," says Marra. "It now could be considered a rate-limiting step."

For Marra, it is no longer sensible to think about genomics without putting the computational aspects front and centre. That's pushing players in the field to think about things like cloud computing.

Recently the centre reached a milestone in data extraction: one million billion base pairs. Base pairs are the building blocks of the DNA double helix structure. To put that in context, the human genome contains around three billion base pairs, about one-three-hundred-thousandth that number. String together one million billion zeros, and you can encircle the earth 24,000 times.

"And the technology is still scaling," says Marra. "That's just the data, not the computation and analysts required to interpret it."

Retaining that much data, he says, represents a substantial financial burden. The centre's electricity bill for data processing alone can exceed six figures annually.

Technological attenuation, says Marra, is also a potentially limiting factor in the advancement of genomics research.

"To maintain the ability to achieve discovery, there needs to be consistent reinvestment in infrastructure; this is not the kind of thing you buy every 20 years." ■

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CELL ISOLATION BY



PROFILE

COMMUNITY INVESTMENTS

Joe Garcia has built a career on connecting people



JOE GARCIA |
PARTNER, BLAKE,
CASSELS & GRAYDON
LLP

**I liked the fact
that the industry
makes more than
just widgets or
toothpicks**

PETER MITHAM

A team of white coats in a sterile lab may be what many people think of when the life sciences sector comes up, but for Joe Garcia, a partner with Blake, Cassels & Graydon LLP, the sector is more than research and bringing new products to market.

Garcia is no stranger to any of these things, of course: he toiled in the labs of pharmaceutical and biotech companies after graduating from the University of Toronto with a degree in pharmacology and human biology in 1991, and his work as a lawyer supports efforts to commercialize the results of research.

But what drew him to work with the sector as a lawyer was the opportunity to work with companies that genuinely wanted to make people's lives better, to develop the relationships that give meaning not only to the life sciences, but also to life itself.

"I liked the fact that the industry makes more than just widgets or toothpicks; there's potential to do immense good for patients, that have limited options in some cases," he says. "It's really fulfilling to work in an industry like that."

Garcia also appreciates that his work with Blakes gives

him a breadth of clients rather than limiting him to just one – something that helps him build relationships and allows him to constantly learn new aspects of both the legal and life sciences businesses.

"I get to deal with the interesting issues of 40 or 50 or 60 clients, and therefore every day is a new day, and every day I'm getting calls, often on things I've never seen or heard of before," he says.

Since few people can stay abreast of everything, the breadth of knowledge he has acquired makes him, like many lawyers, a key player when it comes to getting deals done. While the legal knowledge he brings to each matter is important, his perspective as an outsider familiar with industry issues is equally critical.

"You become a strategic, trusted adviser. It's more than just the law," he says. "That's probably where I can add the most value."



He points to two recent deals on which he provided assistance to Vancouver biotherapeutics company Zymeworks Inc. One was a US\$61.5 million mezzanine financing; the other, an equity investment and optional merger agreement with another Vancouver firm, Kairos Therapeutics Inc.

"We represented Zymeworks on both deals and were intimately involved in all aspects of it," he explains. "You're ensuring that the different people that are playing their roles are meeting expected timelines and they're addressing their particular areas in a way that allows the overall transaction to complete in a very efficient way. You're almost like the conductor of an orchestra."

This, in turn, leads to the long-term relationships that add to the fulfilment he finds in his work.

"It's a very important part of the practice," he says. "You're able to make introductions and bring people together at times in a way that's mutually beneficial for them."

Born in 1966 and raised in Markham, Ontario, Garcia initially dreamed of becoming an astronaut but eventually set his sights on law – though he wasn't sure what it would involve.

A degree in health-care economics at McMaster University in Hamilton followed his undergrad work. Heading west in 1993, he soon became involved with what would become LifeSciences BC. It was an opportunity to volunteer in an industry close to his heart and contribute

to a rising sector in a place that would become his home after he was called to the bar in 1997.

The affiliation led to roles in later years with other organizations, including the Canadian Glycomics Network and Genome BC, where he's currently a director.

"It's always been a core area of interest in my life to be part of the community and to volunteer time, not only with the industry organization but other organizations," he says. "These are just ways of giving back and hoping that not only your actions, but the actions of others contributing their time, can help to build a significant industry."

Garcia adds that it's about more than building the sector for its own sake; he sees a genuine benefit to the community in the expertise and talent the sector attracts. Not only does the sector's work feed back into local hospitals, it also pays wages that support local businesses and the community at large.

The current blossoming of genomics research is a case in point. While few people outside the scientific community may understand the research, the spinoff effects are huge.

"It plays a really large role, even within B.C., and ones that people don't necessarily appreciate – both in the number of jobs and contribution to the GDP," he says. "It will continue to evolve and be very important and lead to things like personalized medicine in a more profound way than currently exists." 🐦

INSIDE INFORMATION

JOE GARCIA

Currently reading: Peter Bernstein, *Against the Gods: The Remarkable Story of Risk*; Roger Lowenstein, *When Genius Failed*; Andrew Ross Sorkin, *Too Big to Fail*

First album bought or music downloaded: Pink Floyd, *The Wall*; The Clash, *London Calling*

When you were a kid, what you wanted to be when you grew up: Astronaut

Profession you would most like to try: Institutional money manager

Toughest business or professional decision: Leaving investment banking to continue my legal career

Advice you would give the younger you: All men die; few ever truly live

What's left to do: Successfully raise two beautiful daughters

PROFILE

BACK TO THE FUTURE

DelMar Pharmaceuticals' revisited cancer drug, VAL-083, moves through Phase 2 testing

IAN JACQUES

Sometimes you have to go backwards to move forwards. It's a philosophy that Vancouver- and California-based DelMar Pharmaceuticals is practising when it comes to the testing of its VAL-083 cancer drug.

DelMar Pharmaceuticals is a biopharmaceutical company focused on the development and commercialization of new cancer therapies. Its lead product, VAL-083, is a first-in-class small molecule chemotherapy drug that is currently being evaluated in a Phase 2 clinical trials for the treatment of refractory glioblastoma multiforme, the most common and aggressive form of brain cancer.

"We are really a simple story – take a drug that worked 20 years ago that got left at the side of the road, use modern biology to understand how it works in a way you couldn't back then and say, 'Can I use that knowledge to solve a problem today?'" says Jeffrey Bacha, chairman and CEO of DelMar.

According to DelMar, in more than 40 Phase 1 and 2 clinical studies sponsored by the U.S. National Cancer Institute, VAL-083 demonstrated clinical activity against a range of cancers including lung, brain and cervical cancer, ovarian tumours and leukemia, both as a single agent and in combination with other treatments.

"The progress we continue to make with our research shows that VAL-083 may offer advantages over currently available chemotherapies in a number of tumour types," says Bacha.

Bacha co-founded DelMar Pharmaceuticals in 2010

and has served as CEO and chair of the company's board of directors since its inception. Bacha holds an MBA from the Goizueta Business School at Emory University and a degree in biophysics from the University of California, San Diego.

He has been living in Vancouver for the past 15 years.

"The biotech community here in the Vancouver area has been very cohesive and at times very vibrant. Certainly in recent years, much more challenging times, but there are some very good people here, very good scientists," he says. "The universities that bookend the city in Simon Fraser University and University of British Columbia, as well as the BC Cancer Agency right across the street and all the work that is done there – so there are great reasons to be in Vancouver."

DelMar's preclinical work is all done in Vancouver, with all of its clinical testing done in its offices in California.

"We started in 2010 and took it [the company] public in 2013. We are still relatively new, but for the stage of where we are, it is a bit surprising that we are that young," adds Bacha. "To have the expectation of Stage 2 for a major drug for clinical cancer just a few years in is a lot different than starting a company out of



PROFILE

RAMP IT UP

Response Biomedical's rapid diagnostics platform delivers lab-quality point-of-care testing



BARBARA KINNAIRD | CEO,
RESPONSE
BIOMEDICAL CORP.

Our revenue target is actually how many lives do we save a year, rather than a revenue target, so it is very much about helping people

IAN JACQUES

Barbara Kinnaird pulls no punches when she describes Response Biomedical Corp.: “We are in the business of saving lives.” The CEO has more than 25 years of research and business experience in the fields of point-of-care testing and in-vitro diagnostics.

Response Biomedical Corp. develops, manufactures and markets the RAMP system, a rapid diagnostics platform that delivers lab-quality performance in acute-care settings.

RAMP tests are of the highest quality and can be run on either the portable, battery-operated, single-port RAMP reader or the high-throughput, modular RAMP 200 reader. RAMP is also sold worldwide for use in infectious disease testing, biodefence and environmental applications.

“Our company has been around for 20 years. Our first medical device products were launched in 2003,” Kinnaird says. “The focus is on point-of-care testing, basically a lab-quality test in 15 minutes. We can help find out whether a patient is or could have a heart attack, so our main focus is on heart disease.”

Its biodefence testing offers rapid, on-site biological

field detection for first responders, military personnel, public safety workers and facility security personnel. Tests are available for the detection of anthrax, ricin, botulinum toxin and smallpox in environmental samples. The test portfolio also includes a biodefence training test to satisfy training needs.

“We can help the first responders get out in front of the problem, help the teams evacuate the area, if needed, more quickly,” she says. “With our RAMP environmental testing we can use those to identify West Nile virus and the dengue virus in mosquitoes. These are all very serious diseases that we can help get in front of.”

According to Response, dengue virus is a global concern, infecting an estimated 400 million people each year in over 100 countries, resulting in approximately 100 million cases of dengue fever, a severe flu-like illness.

Complications from the disease result in approximately

20,000 deaths each year and are a leading cause of hospitalization and death in tropical areas.

On February 18, Response announced it was expanding its RAMP environmental line, which now means the test is available to more countries and territories where the dengue virus is becoming an increased threat.

“The expansion of the RAMP environmental line to include a rapid test for dengue strengthens the position of Response as an expert in the detection of life-threatening viruses that use mosquitoes as their mode of transmission,” Kinnaird says.

The RAMP technology originated from the University of British Columbia, so it only made sense to start the company in Vancouver. But Kinnaird says the company is more than just a Vancouver startup.

“There are not a lot of medical device companies that go outside of medical devices, so we are quite unique in what we do in terms of trying to get in front of the patients before they get sick,” she says.

For Kinnaird, the company holds a special place in her heart.

“When I was going to university and getting my degree in science I had to pay my own way through university, and I worked in an extended care home with a lot of chronically ill patients, who, once they figured out I was in science, started begging me to cure their diseases,”

she recalls. “That really touched me at that point in my life, and as I’ve gone through my career I’ve seen the advances in technology. What strikes me is how long it takes for the technology to get to the patient’s bedside, so I have kind of lived both lives.

“I want to bridge the gap between great technology and getting all of that out to the patient so that they can benefit from what is going on research-wise. This platform that we have is quite a simple technology, so our pipeline and R&D is quite small and we can get this on the market very quickly.”

Another milestone for the company came in January when it received Health Canada approval and CE marking for a new RAMP diagnostic test that measures the levels of procalcitonin (PCT). PCT is a biomarker elevated in the blood of patients suffering from sepsis, also known as blood poisoning.

“This is a really big deal,” says Kinnaird. “Health Canada is great. We have a vision that we can help people all over the world, and getting this approval helps bring that vision even further into focus.

“The whole culture is like that. We are all here to save lives. Our revenue target is actually how many lives do we save a year, rather than a revenue target, so it is very much about helping people. It’s motivating for everybody.”

Barbara Kinnaird, CEO of Response Biomedical Corp., which makes and markets a rapid diagnostic platform aimed at saving lives | CHUNG CHOW



PROFILE



Sirona Biochem's CEO and chairman, Howard Verrico (left), and chief business development officer, Attila Hajdu | ROBKRUYT

BRIGHT FUTURE

Sirona Biochem leads the way in cosmetics and new drug innovation

BRIGITTE PETERSEN

The demand for innovative new drugs and cosmetics continues to grow globally, and burgeoning Vancouver-based Sirona Biochem Corp. (TSX-V:SBM) is making its mark on the international biotechnology scene.

Sirona is a cosmetic ingredient and drug discovery company specializing in stabilizing carbohydrate molecules to improve safety and efficacy. Its compounds are licensed to companies around the world in exchange for licensing fees, milestone fees and royalties. The company currently has 10 full-time-equivalent positions, mostly chemists, at its research and development facility near Paris, France, in Val-de-Reuil, and four full-time-equivalent jobs in Vancouver.

Founded by CEO and chairman Howard Verrico in 2009, Sirona initially acquired an exclusive global licence to French drug discovery company TFChem's proprietary diabetes drug, the SGLT2 Inhibitor. Two years later, it acquired TFChem's entire platform and development laboratory.

What lies at the heart of Sirona is its ability to innovate within the health sciences sector through R&D, according to Verrico.

"By creating safe and more effective cosmeceuticals and drugs, we create a positive impact on the sector," he says. "Sirona's size compared to its multinational partners is an advantage when it comes to innovation."

Sirona uses a fluorination chemistry technique developed by TFChem to improve pharmaceutical qualities of carbohydrate-based molecules by stabilizing them and making them safer, more effective cosmetic and pharmaceutical active ingredients. The company focuses on developing therapeutic products for diabetes, anti-inflammatories and anti-infectives, as well as cosmeceuticals including antiaging and depigmenting agents or skin lighteners. It also strives to develop biological ingredients, inducers and adjuvants for biological development and preservation, which could be useful for producing insulin, human growth hormone, vaccines and other products.

Being a platform technology company means Sirona applies its chemistry know-how to multiple projects to increase the chances of success, according to Verrico.

"Many biotech companies ultimately fail because all their efforts are focused on one project, which unexpectedly fails in areas of safety or efficacy," he explains. "If Sirona was a hockey team, our platform technology allows us multiple shots on goal whereas most other biotech companies only get one." Sirona also focuses on improving existing therapies, which requires fewer resources than pioneering new therapies does.

The company currently has two major licensing agreements with multinationals Wanbang Biopharmaceuticals, a subsidiary of Chinese conglomerate Fosun International, and U.S.-based Obagi Medical Products, a subsidiary of Quebec-based Valeant Pharmaceuticals International. Wanbang is working to introduce Sirona's new diabetic drug to the marketplace, while Valeant is helping bring



**HOWARD
VERRICO** | CEO
AND CHAIRMAN,
SIRONA BIOCHEM

If Sirona was a hockey team, our platform technology allows us multiple shots on goal whereas most other biotech companies only get one

Sirona's new skin-lightening cosmeceutical to market.

"We are currently in discussions with the world's largest cosmetic and pharmaceutical companies for what we anticipate will be our third and largest licensing agreement," says Verrico. "This agreement will be transformational for Sirona, giving us the resources for rapid growth."

R&D, which accounts for about 70 per cent of its spending, is crucial for Sirona. Since the 1980s, health sciences have experienced increasing innovation in the biotechnology sector. "There is a productivity crisis in pharmaceutical R&D, which has been well studied, where the cost of failure is now 90 per cent," explains Attila Hajdu, Sirona's chief business development officer. "If you're spending \$2.6 billion to bring a drug to the market, that is no longer sustainable. Our success rate is much higher than that, because we can't afford to have a 90 per cent failure rate so we have to be much more precise in the development of new therapeutics or cosmetics."

Sirona's challenges include those most biotechnology companies face: R&D, capitalization and deal flow.

"If you put all of that together, it makes it very difficult to cross the so-called 'valley of death' until reaching the oasis," says Hajdu. "For drugs, it can take 10 years to complete a clinical development program before the royalties begin, like our diabetes drug, for example."

Sirona is addressing this problem through its platform technology in the cosmetics field, which has a much shorter time to market and lower cost. The global cosmetic skin-lightening market is \$20 billion and growing, meaning a company with a 15 per cent market share could generate \$2 billion in annual revenues in Japan.

"As Sirona transitions from pre-revenue to revenue generating, we must continue to raise capital," adds Verrico. "This can be a challenge when market conditions are adverse. We deal with this by maintaining an entrepreneurial team skilled at multitasking. This reduces our cash flow needs and enables us to adapt quickly to seize new opportunities."

With growing demand for its products, Sirona's executives predict a bright future, especially when it comes to collaborations with large pharmaceutical companies.

"There are thousands of compounds that have failed because of toxicity, bioavailability, lack of efficacy or as a result of changes in priority, mergers and acquisitions," says Hajdu. "Recently, AstraZeneca and Sanofi agreed to share their compound libraries to improve their chances of success. Collaborations with smaller biotech companies like ours are an attractive alternative for Big Pharma."

Verrico agrees the company's future looks positive within the growing biotechnology sector.

"Vancouver is overdue to have another major biotech success story," he says. 🐾

PROFILE

FIGHTING

BACK

Ondine Biomedical takes on MRSA

Carolyn Cross, CEO and chairman, Ondine Biomedical: "I've got to orient my company to hospital-acquired infections" | CHUNG CHOW

PETER DEVRIES

While her three-year-old daughter lay sheet-white and red-eyed in a hospital bed in 2005, Carolyn Cross, CEO and chairman of Ondine Biomedical, sat in anguish. "All I could do was wait," she says. "I was devastated." The superbug ravaging her daughter's frail body was resisting traditional antibiotic treatment. As minutes, hours and days ticked by, doctors told her she could only wait and hope that the antibiotics would take effect. All the while, her daughter grew weaker.

Those lonely nights were dark for Cross, filled with the kind of undirected frustration that pushes a desperate parent to bargain with God.

In fact, Cross possessed a particularly influential bargaining chip, one she had acquired a few years earlier, one she would soon direct in a way she had never anticipated.

Rewind to 1999, the year she was introduced to what initially seemed to her "highly improbable" technology that claimed to use liquid and light as a means of disinfection.

The technology constituted an antimicrobial photodynamic therapy using a cold laser and liquid photosynthesizing agent to destroy bacterial cell membranes.

"That combination could kill the deadliest bugs," says Cross.

Developed by Michael Wilson of University College London, the product had been licensed as a means of eradicating oral pathogens that cause diseases such as gingivitis and periodontitis. It also promised to circumvent the problem of antibiotic resistance.

Intrigued, Cross envisioned a host of applications for the technology. Soon after, she invested in the company and, in the ensuing years, oversaw the release of

Periowave, a dental application of the technology. It has now been in use in dentistry for nearly 10 years.

Now privately held, Ondine was formerly a public company listed on the Toronto Stock Exchange and the AIM market of the London Stock Exchange. Its headquarters are in Vancouver, but it runs a research and development facility in Bothell, Washington, and an international office in St. Michael, Barbados.

Although she was a savvy businesswoman and investor, Cross had no background in science.

"I often considered myself an accidental scientist," says Cross. "I was a portfolio manager and vice-president for Royal Bank investment management for nearly 20 years." Now a National Research Council member, Cross is at the vanguard of life science industry members working to overcome what has become a nascent epidemic of antibiotic resistance. Her weapon of choice: photodisinfection.

"It's become a calling," says Cross. Driven by the rise of antibiotic resistance, particularly in the developing world, she has eschewed a social life and replaced it with nights working until 2 a.m. "I feel like I can't work fast enough to bring forward some of these



Fighting back



CAROLYN

CROSS | CEO AND
CHAIRMAN, ONDINE
BIOMEDICAL

**I often considered
myself an
accidental
scientist**

technologies." Little did she know that her late-night work ethic would come to echo the 2005 ordeal she and her daughter faced. Nor did she anticipate that her daughter's illness would prompt her to pivot the company's emphasis from dentistry to medical applications.

There in the dark, her daughter by her side, she saw the writing on the wall. "I get it," she thought. "I've got to orient my company to hospital-acquired infections." So, in 2009, Ondine sold its dental health-care business to PDT Inc. and shifted focus to MRSAid, a nasal application of photodisinfection that targets methicillin-resistant *Staphylococcus aureus* (MRSA).

MRSA, an especially troublesome superbug that often plagues hospitals, prisons and nursing homes, is particularly dangerous for immunocompromised patients, the elderly and, as in the case of Cross' daughter, young children.

A Provincial Infection Control Network of British Columbia report of health-care-associated infections in B.C. acute-care facilities for 2014-15 showed a total of 3,130 cases of MRSA reported in patients treated at acute-care facilities in B.C.

Of those MRSA infections, 49.5 per cent were defined as health-care-associated with the reporting facility, meaning they were acquired within the facility.

"These infections cost around \$35,000 to fight," says Cross, "for those patients who survive." MRSAid applies Ondine's photodisinfection technology to patients'

nasal passages, the primary location for colonization of MRSA in the human body. The procedure is painless, does not lead to bacterial resistance and can kill MRSA in a single treatment.

Clinical trials completed at Vancouver General Hospital indicated that people who underwent treatment with MRSAid prior to surgery were four times less likely to get a surgical site infection than those who did not.

"B.C. has one of the highest wait-lists in the OECD [Organization for Economic Co-operation and Development] for surgeries, and beds are filled with patients who have infections," says Cross. "[Ondine's] products can do something about that." In addition to MRSAid, Ondine is developing additional applications for the technology. Exelume targets ventilators, destroying bacterial biofilms on the inner surface of endotracheal tubes and preventing patients from exhaling pathogens. The product is in testing and undergoing prototype development.

Vitalwave is designed to prevent vertical transmission of HIV during birth by decolonizing the birth canal prior to delivery. It may also block the transmission of other pathogens such as Group B streptococcus, herpes simplex virus and other sexually transmitted infections, and hepatitis C virus. Primarily intended as an application for developing nations, it is nearing beta testing.

After 10 days in hospital, Cross' daughter rallied and made a full recovery. Cross' goal now is to work to prevent it from happening to someone else. ■



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Celebrating 15 years of impact in BC's life sciences community



Decoding breast cancer

Working with colleagues at the BC Cancer Agency, Dr. Sohrab Shah used his background in computer science to identify the genetic composition of the deadliest form of breast cancer, opening the possibility of more effective targeted treatments.

“As I was training, I began to make strong links to the world-leading cancer genomics community in BC and I fostered a lot of key collaborations that continue to underpin my research program. The support of MSFHR enabled me to stay here in BC and continue to strengthen those collaborations.”

Sohrab Shah, Scientist
BC Cancer Agency



Changing public policy

HPV infections cause nearly all cases of cervical cancer, the second most commonly diagnosed cancer in women worldwide. A multi-organization research team, co-funded by MSFHR, has proven two doses of the HPV vaccine are as effective as the standard three-dose regimen. This finding has led to policy changes by provincial and national organizations, as well as the World Health Organization that will save costs and reduce barriers to vaccination.



Empowering patients

Dr. Linda Li, a clinician scientist with a background in physiotherapy, wants to help people with arthritis adopt healthy lifestyles and be more physically active. To do this, she is developing patient-decision aids and using digital tools to help patients make healthy lifestyle choices.

“My MSFHR award allows me to protect time for research while maintaining my clinical practice. Working with my clinical colleagues allows me to stay grounded and ask better research questions and find better ways to answer them.”

Linda Li, Senior Scientist
Arthritis Research Canada



Treatment as prevention

The BC Centre for Excellence in HIV/AIDS has improved outcomes and reduced HIV morbidity and mortality by more than 95% and HIV transmission by more than 65% through the use of HAART (highly active antiretroviral therapy) and routine testing.

“We are at the forefront of the global effort to confront HIV/AIDS and ready to transfer the success of the ‘Treatment as Prevention’ strategy to other diseases because of investments made by the BC government and MSFHR.”

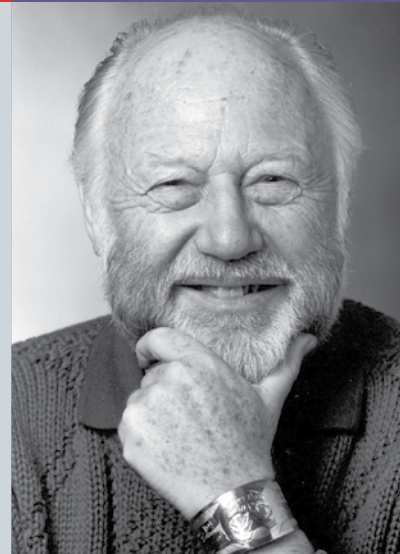
Julio Montaner, Director
BC Centre for Excellence in HIV/AIDS

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- Leverages funding to develop innovative ideas into new products, new treatments and new companies.
- Finds solutions to our most pressing health challenges, including cancer, genomics and HIV/AIDS.

MSFHR is dedicated to the memory of Nobel Laureate Dr. Michael Smith (pictured right), a pre-eminent BC scientist with a long-standing commitment to support researchers throughout their careers.

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GOOD TO GROW

Zymeworks aims to anchor enlarged Vancouver biotech cluster



ALI TEHRANI |
PRESIDENT AND CEO,
ZYMEWORKS

There's a new generation of biotechs here that can dominate using brains and technology

PETER CAULFIELD

Ali Tehrani, president and CEO of Zymeworks Inc., has a vision for his Vancouver-based company that includes the city's entire biotechnology cluster. "Our goal is to become an anchor company that is sufficiently big and profitable to attract to the city other biotech professionals who can see the city's potential and who want to stay and grow here," Tehrani says.

Tehrani's ambitious goal was validated in February 2016 by LifeSciences BC, which named Zymeworks Life Sciences Company of the Year.

"We are honoured to be recognized by our community, peers and colleagues," he says. "Zymeworks' success and accomplishments are in many ways due to the amazing support from the local [and national] biotech community."

Founded in 2003 by Tehrani and another PhD scientist from the University of British Columbia (UBC), Zymeworks is a privately held biotherapeutics company that develops bi-specific antibodies and antibody drug conjugates that treat cancer and autoimmune and inflammatory diseases.

"Our goal when we started out was to build a software tool that could create an engine for developing new antibody- and protein-based therapeutics," Tehrani says.

The tool is ZymeCAD software, which is one-half of what Tehrani calls the company's "two-expert approach."

"ZymeCAD plus human ingenuity equals a solution," he says. "Computer simulations analyze all the possible

molecular reactions that can take place in an experiment and narrow them down from millions to a handful of likely candidates. They can then be tested in the lab, which greatly increases the chance of developing a therapeutic that does what it's designed to do."

Zymeworks' engine is three development platforms: Azymetric, AlbuCore and EFECT.

"The platforms take the proteins that occur naturally in the human body and enhance their properties to produce therapeutics that can better target cancerous cells," Tehrani says.

Zymeworks currently has nine therapeutics in its product pipeline.

The company is banking on a two-component business model.

"The first part involves monetizing the three development platforms by selling non-exclusive licences to them to Big Pharma companies," says Tehrani. "The second component is using the proceeds from the partnerships to develop our own therapeutics."

Starting in 2011, Zymeworks has forged partnerships with Merck, Eli Lilly, GSK and Celgene.



"Signing the deal with Merck in 2011 was our big break," says Tehrani. "Over its lifetime it has the potential to yield Zymeworks a total of at least US\$187 million."

The aggregated value of all of the company's partnerships is even larger.

"The total potential value is US\$3.3 billion over 10 years," says Tehrani.

The company is looking forward to two major growth events in 2016.

"Our two leading internal therapeutics – ZW25 and ZW33 – will be going into clinical trials in the U.S. this year," says Tehrani. "And we expect to have grown to more than 100 employees by the end of 2016."

Zymeworks currently has 70 employees at its Vancouver and Seattle sites. While Vancouver is the company's headquarters, Seattle is where late-stage research to prepare for U.S. clinical trials takes place.

"It's easier to recruit to Seattle," says Tehrani. "There's more of a vibrant biotech community there than in Vancouver. But we hope to change that."

In addition to Big Pharma partnerships, Zymeworks is also looking to acquire smaller biotechs that can be integrated into the company.

In January 2016, Zymeworks acquired Vancouver-based Kairos Therapeutics Inc. Kairos, a 10-employee spinoff

of the Centre for Drug Research and Development at UBC, discovers and develops antibody drug conjugates.

Under the terms of the agreement, Zymeworks and Kairos have the option to merge in order to accelerate the development of novel anticancer biotherapeutics.

"And Kairos won't be our last acquisition, either," Tehrani says.

The biggest challenge facing Zymeworks is hiring enough smart and experienced senior managers who are willing to relocate to Vancouver's relatively small biotech cluster.

"Twenty years ago there were several biotech companies here that grew and became profitable and put us on the map," Tehrani says. "But now there's only a handful that are known worldwide."

Tehrani says Vancouver has the potential to become the next San Francisco Bay of biotechnology.

"There's a new generation of biotechs here that can dominate using brains and technology," he says. "Thanks to technology, we are able to do a lot more with a lot less."

But, if it is to grow, Vancouver biotech needs anchor companies that can provide career security for the professionals who relocate here.

"Zymeworks aims to become one of those anchor companies," Tehrani says. 🐼

Zymeworks Inc., co-founded by Ali Tehrani, has been named Life Sciences Company of the Year by LifeSciences BC | ROBKRUYT

Foundation architecture

NEW HORIZONS

Essa Pharma on verge of prostate cancer triumph



David Parkinson, MD and president and CEO, Essa Pharma: "this is where the rubber meets the road" | CHUNG CHOW

PETER DEVRIES

A January 6, 2016, private placement announcement for Vancouver pharmaceutical startup Essa Pharma Inc. has provided the company sufficient funding to take the next major step toward realizing the purpose for which it was created.

"This is where the rubber meets the road," says David Parkinson, president and CEO and director of strategic development. He's overseeing clinical trials of Essa's new trial-stage drug therapy, named EPI-506.

Valued at aggregate gross proceeds of approximately US\$15 million, the funding injection will support Essa at a time when its operating expense needs are growing in step with its successes.

In addition to the private placement, a \$1.3 million grant from the Cancer Prevention and Research Institute of Texas enabled Essa to open an office in Houston. It serves as home for the EPI-506 clinical trial.

Publicly traded on the Toronto Stock Exchange (EPI) and the Nasdaq (EPIX), Essa develops therapies for the treatment of castration-resistant prostate cancer in patients whose disease is progressing despite treatment with current therapies.

"[EPI-506] interferes with receptors for androgens, which we know are important drivers of prostate cancer," says Parkinson, who credits research in chemistry from the University of British Columbia (UBC) and work in biology by the BC Cancer Agency for the discovery that led to the drug's creation.

The research was conducted by two of the company's current directors. Chief scientific officer Marianne Sadar, a BC Cancer Agency distinguished scientist and professor of pathology and laboratory medicine at UBC, focuses her work on identifying the molecular mechanisms that govern the activation of androgens.

Raymond Andersen, Essa's chief technical officer and professor of chemistry at UBC, specializes in understanding and isolating organic metabolites produced by marine organisms.

Sadar and Andersen co-founded Essa in 2009 after their 2008 discovery of a peptide that inhibits activation of androgen receptors in prostate cancer cells. Androgen receptors aid in the growth of prostate cancer cells. The peptide was isolated from a marine sponge collected in Indonesia.

Since then, the company has made steady progress toward its current clinical trial stage, and it promises to continue pushing ahead.

"It's an exciting time," says Parkinson.

If the company's hopes are fulfilled, EPI-506 could prove a vital new tool in the battle against a cancer that, according to the Canadian Cancer Society, afflicts 24,000

Canadian men per year, fully one-quarter of all male cancer diagnoses.

It seems the sort of battle Parkinson was bred for. Picture him as a 1960s high school intern watching seasoned scientists in biophysics and biochemistry labs at the University of Ottawa and University of Western Ontario.

"They turned out to be wonderful role models for me, such that when I eventually did go to college, I went into medicine." From there he practised internal medicine and hematology at the Royal Victoria Hospital at McGill University.

"I got more and more interested in developing new cancer therapeutics," he says. In fact, he was very involved in the early days of interleukin-2, one of the most effective agents in the treatment of metastatic renal cell carcinoma and metastatic melanoma.

As a physician, he quickly came to realize the limitations of available therapies, so he dedicated himself to finding better treatment therapies.

"My career went from treating individual people to running clinical trials of drugs to running programs of drug development in government."

He worked with the National Cancer Institute in Washington, D.C., and as chairman of the U.S. Food and Drug Administration biologics advisory committee. But, for him, it wasn't enough.

So he tried his hand on the industry side, with Novartis, a pharmaceutical company; Amgen, a biologics research

foundation; and Biogen (formerly Biogen-IDEC), a biotech company. They all proved valuable forays into research and development of novel treatments, but he still saw a crucial shortfall in understanding some fundamental elements of cancer morphology.

Modern biological technology, says Parkinson, has recently become better at characterizing the DNA, RNA and proteins particular to the abnormalities that drive individual cancers. Matching patients up with new therapies that are biologically targeted, he believed, was critical.

So, he built Nodality, a diagnostics company whose purpose was to characterize tumours in ways that would facilitate a more biologically targeted approach to therapy.

Around two years ago, he became involved in doing due diligence for Essa, after learning of the discovery made by Sadar and Andersen. A year later he was asked to join its board of directors, and, a year after that, he was invited to become the company's CEO. His progression through various levels and sectors in cancer research and treatment made him the perfect candidate to head up Essa's new growth phase.

Experience notwithstanding, it's hard not to credit some of his suitability for the job to that nascent teenage curiosity that directed him into the life sciences field in the first place. Of course, he's quick to defer credit for any of his success.

"You don't do these things alone," he says. "Individual people don't develop drugs." 🐦



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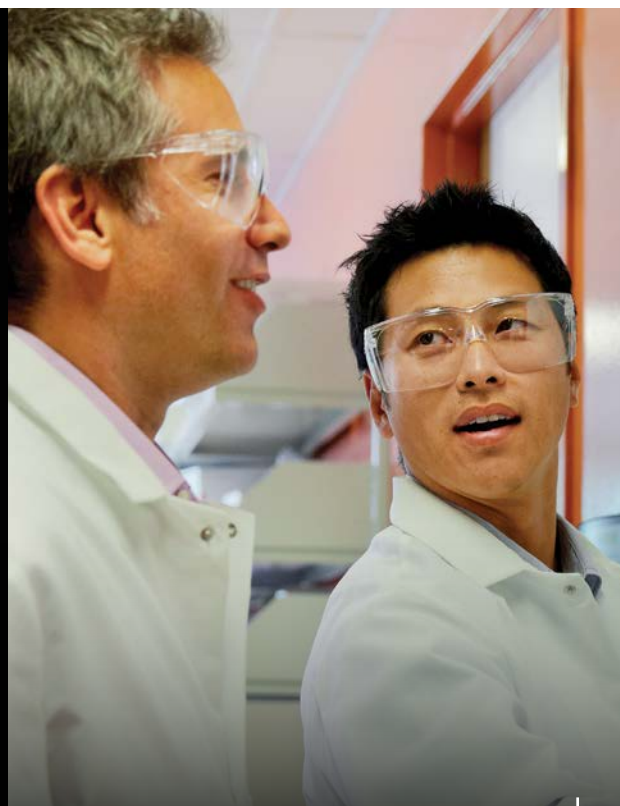
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DIGGING FOR DATA

Phemi Health Systems offers novel ways to manage health-care data

BRIGITTE PETERSEN

When it comes to data management, size matters. As a big data warehouse company, privately held Vancouver-based Phemi Health Systems strives to make it easier for organizations to access and mine any volume of data.

"In the life sciences sector, there's an explosion of data – both in volume and types," says president and CEO Paul Terry. "We know that over 80 per cent of life sciences data is non-relational, meaning traditional technologies just can't store, manage or make accessible to users most of the data generated. How do you improve patient care, or develop new drugs, or implement longitudinal disease studies with access to less than 20 per cent of the data? This is where big data technologies come in."

Big data involves complex data sets too large for traditional data processing applications. While still in early adoption stages, big data technologies have the potential

to lower the cost of gathering and storing data, but the real benefits will come when researchers, hospital administrators, doctors, bioinformaticists, other practitioners and patients themselves can access this data.

"When people can start digging into the data, there are tremendous opportunities for discovery to improve care and outcomes and reduce costs," says Terry. "Genomics, precision medicine, improving health-care outcomes, drug discovery, disease research ... they are all uniform in their need to get enough data to derive meaningful insight."

The startup reached many milestones in the last two





years. It earned a Deloitte Technology Fast 50 Companies to Watch award and closed a venture financing round of \$12.2 million last year. Phemi was also selected as Life-Sciences BC's 2014 emerging company of the year and as the BC Technology Industry Association's startup of the year, and was named a Ready to Rocket science company during both years.

With his background in technology entrepreneurship and experience on hospital boards, Terry joined forces in late 2012 with St. Paul's Hospital cardiologists Alan Rabinowitz and Chris Thompson to address the challenges of accessing and sharing data.

**Paul Terry, president
and CEO of Phemi Health
Systems | CHUNG CHOW**

"I was shocked at the state of information technology in the health-care environment," says Terry. "Doctors can't get patient information quickly. Researchers can't get enough data about participants into their study cohorts. Nurses are stuck with paper charts or data entry systems requiring hundreds of key clicks to admit a patient. They effectively are being blocked at what they need to do."

Terry, along with serial entrepreneurs John Semine-rio and Adam Lorient, teamed up with Rabinowitz and Thompson to tackle the challenge of making data consumable for health care. Phemi's staff has since grown from a core of six to more than 50 full-time employees, and

Digging for data



PAUL TERRY |
PRESIDENT AND
CEO, PHEMI HEALTH
SYSTEMS

When people can start digging into the data there are tremendous opportunities for discovery to improve care and outcomes and reduce costs

Terry says there are plans to further expand the company.

Big data is scalable and more cost-effective than traditional data management approaches, but the key question remains: how do you make big data usable?

"If you can get all of this data together in one spot, how do you effectively manage it? Retrieve it? Protect it? And provide access to the right people? We are ensuring what we call the 'adult supervision' of data – ensuring the right data goes to the right person at the right time in the right context," says Terry.

Phemi took root in research and development, which continues to be critical. In the last three years, the company raised more than \$15 million in funding, the majority of it going into R&D. Making big data usable for precision medicine and other life sciences still faces the challenge of how to retrieve volumes of data quickly, protect it and share it with those who need it.


"The data challenges in the life sciences and health-care arena are not yet solved," explains Terry. "Think about a simple Google search. You type in a simple search phrase, and in less than half of a second, you can get 809 million responses. That's pretty satisfying. If you had to wait two days or two weeks or two months for those results, you just wouldn't use the tool. Or if you did, think of the impact of that delay."

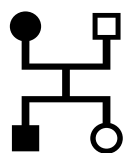
One of the areas Phemi is working to support is precision medicine, also called personalized medicine, which

aims to turn medical treatment into a more focused, individualized and evidence-based approach for disease prevention and treatment. It involves looking at patients' molecular makeup for disease prevention, diagnosis and treatment in a way that matches their profiles.

"Precision medicine is a problem ripe for addressing with big data technologies," explains Terry. "Precision-medicine organizations are all struggling with similar challenges. The data sets are complex and non-traditional, making it hard to store, link and analyze them."

John Seminerio, who chairs Phemi's board of directors, sees a promising partnership between big data and the health sciences sector. While ongoing advances in medicine and research supply a constant new flood of data types, the ability to deal with the data can be met with the flexibility of newer technologies like big data, according to Seminerio.

"Once we get all of this data together, life sciences organizations are going to use data science to extract meaning from that data," he says. "New patterns, new correlations, new insights ... it's not hard to see a world where doctors will practise medicine based on a person's actual DNA, where researchers will find treatments for diseases we currently think are incurable, and where patients are far more engaged and [are] informed stakeholders in their own health journeys." 



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The Centre for Drug Research and Development (CDRD)

www.cdrd.ca

Commercialization of health research is our single focus

There are daily stories in the news: “Exciting new breakthrough brings hope to patients”. But most often, these therapeutically and commercially promising breakthroughs are never actually developed into innovative life-changing/saving medicines for patients because the universities and/or small companies that have made these discoveries do not have the specialized expertise, infrastructure or dedicated funding to develop them further (and thus realize their full potential value).

As getting new drugs and other therapeutic products to market becomes more and more difficult, and the associated costs and risks become increasingly greater, the drug development community (including academic institutions and granting agencies to translational research organizations, incubators, and accelerators to foundations, government and industry) must support one another in effectively de-risking new technologies, leveraging resources, and filling the gaps in the commercialization continuum.

This is where The Centre for Drug Research and Development (CDRD) comes in.

Headquartered in BC, CDRD is the only national drug development and commercialization engine providing the expertise and infrastructure to transform basic health research in our academic institutions, as well as early-stage therapeutic technologies in Canadian small- and medium-sized enterprises (SMEs), into commercialized products for the benefit of patients and our healthcare systems. In doing so, CDRD is actively growing our national health sciences industry into a wholly-optimized generator of economic prosperity for the country.

CDRD’s President and CEO, Karimah Es Sabar said, “Our successful partnerships with both academic researchers and small Canadian life sciences companies demonstrate just how paramount collaboration is to commercializing new therapies today. By bringing our expertise and specialized infrastructure to bear, we have helped enable the building of strong local biotech companies, and ultimately the broader industry – all while bringing new hope to patients.”

Training opportunities that generate new industry-ready Highly-Qualified Personnel to lead the industry into the future is also a key cornerstone for CDRD’s success (specialized, industry-focused training has been provided to over 162 young drug developers and commercialization experts to date).

Since CDRD’s founding in 2007, enabled by the support of the federal government primarily through the Centres of Excellence for Commercialization and Research (CECR) program,



alongside that of the BC provincial government and the private sector, CDRD has developed and successfully implemented a shared risk/reward partnership model that has proven itself an effective means to advance innovative technologies forward along the innovation continuum, adding value throughout that process.

Through partnerships with universities, small health sciences companies, top multi-nationals, and patient-focused foundations from across Canada, and even around the world, CDRD proactively finds, evaluates, develops, and then commercializes the most promising discoveries. All told, the organization has:

- Identified and evaluated **1,052** health technologies for their commercial/therapeutic potential
- Selected **209** technologies to be incubated within CDRD
- Successfully advanced **56** technologies toward commercialization (resulting in approximately 50 new patents)
- Completed commercial transactions on **14** technologies.

What this all amounts to is the fact that CDRD is actively and successfully enabling the growth of British Columbia and Canada’s health sciences industry, creating tremendous value in these technologies, and building strong new BC-based companies (7 new spin-off companies to date) based on these validated technologies. These companies alongside CDRD then attract private investment, offer long-term, high paying jobs and specialized training opportunities, and foster a diversified knowledge economy. **In total, CDRD has supported 26 health sciences companies (SMEs) by providing over 9,000 hours of drug development and commercialization support** – adding value to these companies and positioning them to raise additional investment and/or secure strategic partnerships).

For example, CDRD spin-off company, Kairos Therapeutics (featured in the new BC Tech Strategy) has completed not only a highly valuable licensing deal with a top international biotech company, but also recently announced a strategic partnership and optional merger agreement with BC-based Zymeworks Inc., therein firmly establishing and anchoring one of the country’s leading biologics companies here in BC.

For more information on The Centre for Drug Research and Development, please visit www.cdrd.ca; and to find out more about how CDRD can add value to your technology, contact:

Dr. Jason Crawford
Vice President,
Scientific Operations
jcrawford@cdrd.ca
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Genomics: The foundation for tomorrow's economic growth

Genomics is advancing at lightning speed. This disruptive technology offers problem solving with unparalleled efficiency and precision. As every living organism has a genome, this 'digitization of biology' continues to identify solutions to key challenges experienced across BC's natural resource sectors and human health. It's a technology that converges knowledge from biology, engineering, computer science, social media, nanotechnology and humanities.

It's also leading to a stronger bioeconomy. According to the Organisation for Economic Co-operation and Development (OECD), genomics is the foundation for tomorrow's economic growth in the bioeconomy.

Given changes in the manufacturing and resource sectors, it is apparent that having a robust technology sector is an important component of maintaining a healthy and diversified economy. With the right investment and policies, BC's bioeconomy could reach over \$12 billion in GDP and support 56,000 jobs by 2030 (compared to less than \$2 billion in GDP and 14,000 jobs in 2010). In order to deliver on this, research must be translated and commercialized for the market.

Since inception, Genome BC has supported world-class research projects that have developed knowledge, built capacity, attracted co-investment and expanded technology boundaries. Genome BC has supported commercialization in BC, including 33 companies advanced. But genomics technology has reached a point where commercialization is not only feasible, but necessary. Through diverse funding opportunities, Genome BC is supporting the further development of an enhanced research and commercialization continuum.

Open for Business

Genome BC offers commercialization to support companies developing life sciences technologies in BC with exponential potential. We are pleased to announce an exciting new funding opportunity to help early stage companies move from seed to Series A or other significant financing events.

The recently launched, Genome BC Industry Innovation Fund (I2) offers repayable growth capital to businesses (with less than 500 employees), commercializing innovative life science technology-based products, processes or services. The I2 Fund is a concrete step towards bridging the gap between innovation and commercialization in the BC bioeconomy.

Spanning the spectrum from working with start-up companies spun out of academic institutions or partnering with an existing company that has benefited from new research, Genome BC is open for business.



Entrepreneurship support

To realize the social and economic benefits from the investments in genomics made over the last 15 years, Genome BC is increasing its support of entrepreneurial activities to help stimulate SMEs and jobs for the Province. This includes partnering with established accelerators and incubators such as The Centre for Drug Research

and Development (CDRD), the BC Technology Industry Association (BCTIA), e@UBC, and the Sumas Regional Consortium for High Tech (SRCTec) to support small to medium-sized enterprise (SMEs) creation and growth in life sciences. We're also developing a resource program for the life science streams to further mentor and train people working towards commercializing their products.

By the numbers*, Genome BC has:

- Fostered 300+ international collaborations
- Created 21,149 jobs
- Attracted \$536 million in co-investments from international, industry & federal sources
- Advanced 33 local companies; these companies have raised private investment of approximately \$200 million and secured over \$1 billion in co-development deals

**Economic and Social Impact Analysis MNP LLP. March 2014*

Commercializing Genomics is good for BC

We will all benefit from the new discoveries, knowledge and products and services geared at keeping us healthier, mitigating against the impact of climate change, developing alternative fuels, improving food quality and making our environment and resource industries more sustainable.

Genome British Columbia is leading genomics innovation on Canada's West Coast and facilitating the integration of genomics into society. A recognized catalyst for government and industry, Genome BC invests in research, entrepreneurship and commercialization in life sciences to address challenges in key sectors such as health, forestry, fisheries, aquaculture, agri-food, energy, mining and environment. Genome BC partners with many national and international public and private funding organizations to drive BC's bioeconomy.

Call us today to learn more about Genome BC's suite of programs and funding opportunities – driving BC's bioeconomy and improving the lives of British Columbians.

Pat Brady
Director, Industry
Innovation Programs
pbrady@genomebc.ca or 604-675-1034

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Transforming proven drugs into safer, longer-lasting and more effective treatments

Soaring development costs and dwindling pipelines demand new approaches to drug development. Eupraxia Pharmaceuticals was founded on a novel premise – instead of navigating the turbulent waters of new chemical entities, why not take proven therapies and make them work better?

Eupraxia's proprietary technology encapsulates existing drugs to provide targeted, controlled and sustained drug release. "Drug development is an inherently risky proposition," says Eupraxia CEO Dr. James Helliwell. "By optimizing currently used drugs, we increase our chance of success while making these drugs safer and more effective for patients. It's a win-win."

Tackling unmet medical need in osteoarthritis

Eupraxia's lead compound, EP-104IAR, is a sustained-release injectable formulation of an approved corticosteroid to control pain associated with osteoarthritis (OA).

According to the Canadian Arthritis Society and the US Arthritis Foundation:

- More than 4.6 million Canadians and 28 million Americans currently suffer from arthritis
- Osteoarthritis is the most common form of arthritis, affecting one in five adults
- Canada currently spends over \$33 billion CAD each year on health care and lost productivity due to arthritis – this number is expected to double by 2031. In America, direct and indirect costs due to arthritis and other rheumatic conditions currently account for a staggering \$128 billion USD
- As a result of pain and disability, people with arthritis are 30 per cent more likely to report mood and anxiety disorders than individuals with other chronic conditions

There is no cure for arthritis, and current pain relief treatments are sub-optimal. Steroids are proven to provide potent short-term pain relief, but can have unwanted systemic side effects. With EP-104IAR, Eupraxia hopes to extend the period of pain relief from weeks to months, while at the same time reducing the potential for side effects. We are currently enrolling patients in a Phase I / IIa clinical trial for knee osteoarthritis.

Platform potential

But Eupraxia is about more than just arthritis. The beauty of Eupraxia's technology platform is that it is not limited by disease area. That allows Eupraxia to target areas of high medical need where improved therapies can have a profound impact on



patients' lives. An anaesthesiologist by training, Dr. Helliwell first saw the enormous potential in pain therapy.

"Poorly managed pain can have a profound effect on peoples' lives – chronic pain, such as that from arthritis, is an incredibly debilitating condition. Pain interrupts people from enjoying their lives, their jobs, and having the quality family time they want. I wanted to provide a longer term solution for pain that specifically targets the areas that are in pain without side effects associated with exposure elsewhere. Pain is the most common affliction in the developed world, and we are determined to be a major part of solving that for patients."

In addition to OA pain, products are currently in development to address chronic pain and post-surgical pain. Starting from this position of strength, Eupraxia is broadening its base to include other conditions that would benefit from targeted, sustained drug release such as chemotherapy and anti-infectives.

Where possible, Eupraxia leverages existing generic drugs to significantly lower market entry barriers, resulting in shorter, less expensive and ultimately less risky drug development.

Capturing the spirit of the Pacific Northwest

A BC native himself, Dr. Helliwell was keen to instill the pioneering spirit of the Pacific Northwest into Eupraxia. Eupraxia's corporate culture fosters quality of life and the willingness of people to explore new ideas.

"Hiring the best minds is just a start – you have to create an environment where people want to work and that fosters inspiration and entrepreneurial thinking. Our company is motivated to find those people who want to bring their creativity and intelligence to bear on solutions to make patients' lives better."

Vik Peck

vpeck@eupraxiapharma.com

250-590-3968



Accelerating Research Excellence and Creating Models of Care

Providence Health Care Research Institute (PHCRI) is the research enterprise of Providence Health Care (PHC). Together we provide research, education and care to British Columbians with an emphasis on six areas: HIV/AIDS, mental health and addiction, urban health, renal disease, heart and lung disease and aging. A partner to the University of British Columbia and Simon Fraser University, PHCRI facilitates the work of world-renowned researchers and centres spanning our areas of emphasis, including the Centre for Heart Lung Innovation (HLI), Centre for Health Evaluation and Outcome Sciences (CHEOS), BC Centre for Excellence in HIV/AIDS (BC-CfE), Centre for Heart Valve Innovation and the Prevention of Organ Failure (PROOF) Centre of Excellence.

We envision a patient- and family-centred continuum of care where evidence, knowledge translation, and outcomes-based initiatives form the foundation for a continuously learning health organization. Scientific discovery and care delivery will be furthered through multidisciplinary partnerships and collaborations with health leaders across sectors and the community.

Biomarker research improving health outcomes for chronic illness

The PROOF Centre of Excellence lead biomarker research programs developing clinically relevant blood tests for early detection of serious conditions such as chronic heart failure, transplant rejections, kidney and lung disease. Such research, for instance, has furthered the understanding of the complex Chronic Obstructive Pulmonary Disease (COPD) to help advance the discovery for effective therapies.

Life-saving surgery for heart patients

The Centre for Heart Valve Innovation is a multidisciplinary team of physician and nurse researchers who help improve treatment for patients with severe heart conditions. The minimally invasive Transcatheter Aortic Valve Implantation procedure pioneered at the Centre has saved patients around the world from undergoing open heart surgery and reduced recovery time. The Centre has overseen more than 1500 procedures in Vancouver and now work towards a provincial model of care that includes education for patients, providers and the community.

Model of Integrated Research and Care

The Integrated Care Clinic is a streamlined specialist care facility treating kidney disease patients with diabetes and/or heart disease. Pioneered by a distinguished team of nephrology researchers,



the clinic was formed on the basis of an integrated clinical research model, granting patient access to a multidisciplinary care team and specialists all in one place. This model has reduced hospital admissions and ER visits, cut time and costs for patients and caregivers, and motivated patients towards self-management.

Models of care for other rare kidney conditions have been piloted, tested and tracked through the Provincial Renal pathology laboratory at St. Paul's Hospital, ensuring a consistent flow of high quality data to practitioners and maintaining databases for ongoing research.

Addressing mental health in youth

Mental health and addiction in youth persist to challenge health providers. The award-winning Inner City Youth (ICY) Program treats homeless and tenuously housed youth with undiagnosed or untreated mental illness and/or addiction using a personalized and multidisciplinary approach. The Program also conducts research for evidence-based treatment. Through the program's new Granville Youth Health Centre, counselling, therapy, and other services can be directly delivered to this population in an innovative and friendly space.

Putting an end to HIV

The made-in-BC Treatment as Prevention® strategy is a globally recognized model for HIV treatment and care. In Vancouver, a drop in new HIV cases is seen as the product of efforts made by the BC-CfE and its various outreach initiatives, promoting widespread HIV testing, access to effective therapies, and education. Now, the strategy is being adopted in other parts of the world to tackle ongoing HIV/AIDS problems and outbreaks.

Finding health solutions for an aging population

PHCRI recognizes the forthcoming healthcare needs of a rapidly growing aging population. Researchers across disciplines are committed to addressing health concerns associated with aging. Studies such as the genomic study of "Super Seniors" as a model for healthy aging, the development of Alzheimer's testing for early disease detection, and the study of risks in polypharmacy for high mortality and morbidity, all help to inform better health services for the elderly population. Together with partners in our community, health leaders and the patient population, PHCRI is ready to take on the complex challenges facing our health care system.

Contact: Jennifer Lee,
Communications Coordinator
research@providencehealth.bc.ca



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Local life sciences team with international reach

In tune with your world. Aligned with your opportunity. Ambitious for your success. These are the three principles that inform everything the newly created international law firm Gowling WLG does. Now, life sciences clients based or operating in British Columbia have access to a worldwide network of legal professionals to support their international business growth.

We understand that you need lawyers, as well as trademark and patent agents, who know the industry as well as you do and can interpret complex scientific information to help you realize commercial opportunities. Whether working with biotech start-ups, research organizations or large pharmaceutical companies, Gowling WLG's Life Sciences Group has the depth of industry experience and insight to advise on complex legal issues.

"Now, life sciences clients based or operating in British Columbia have access to a worldwide network of legal professionals to support their international business growth."

Recognized for its strength in intellectual property, regulatory and business law, our team in Vancouver is not only equipped to guide your company through every stage of a product's life cycle, but we are also positioned to make sure that you succeed in today's global market.

More and more, B.C. businesses are looking abroad for new opportunities and need a firm that has first-hand knowledge of international markets. With more than 1,400 legal professionals in 18 cities across Canada, the U.K., Continental Europe, the Middle East and Asia, Gowling WLG provides you with legal advice at home and abroad in a range of areas — from complex cross-border transactions and intellectual property matters to high-stakes litigation and disputes.

"...our team in Vancouver is not only equipped to guide your company through every stage of a product's life cycle, but we are also positioned to make sure that you succeed in today's global market."

The combination of Gowlings, a leading Canadian law firm, and Wragge Lawrence Graham & Co (WLG), a leading U.K.-based international law firm, Gowling WLG launched on Feb.



Front: Peter Fairey (corporate/commercial), Scott Foster (IP litigation), Sonia Ziesche (patents), Karin Binder (trademarks), Pablo Tseng (patents), Clare Salisbury (patents) and Konrad Sechley (patents). **Rear:** Brian Kingwell (patents) and Rob Fashler (IP)

22. The founding firms bring a legacy of collaborative, people-oriented cultures to the new firm, having both been repeatedly recognized as top employers in their markets. Focusing strongly on key global sectors, Gowling WLG provides clients with broad expertise specific to their industries, including advanced manufacturing, energy, financial services, infrastructure and natural resources.

"At the core of Gowling WLG is a commitment to helping our clients navigate increasingly complex challenges in a tough business and legal environment."

We are fortunate to work with innovative companies in the B.C. market and around the world. At the core of Gowling WLG is a commitment to helping our clients navigate increasingly complex challenges in a tough business and legal environment.

Our goal is to help B.C. companies succeed and grow with us, supporting their needs domestically and internationally. Learn more about how we can help you succeed at gowlingwlg.com



SUPPLIED BY

bioLytical Laboratories Inc.

www.biolytical.com

bioLytical: Innovation to Application Using Canadian Technology to Combat Epidemics Globally

In an open field on a hot, dry day in Uganda, passersby start lining up for a free HIV test. Big, red tents provide shelter from the sun and act as a temporary clinic where individuals speak to healthcare professionals and get tested – a prick of the finger and a drop of blood is all it takes. In less than 60 seconds the test yields either one dot or two dots, indicating whether HIV antibodies have been detected or not.

Some people are anxious as it is their first HIV test and they're not sure what to expect. Will it hurt? What happens if the result is positive? What will others think?

Others just wait patiently because they get tested routinely. They know that it won't hurt and that they will go for a confirmatory test if their result is positive.

Not only are there an estimated 35 million people in the world living with HIV, every year there are 2 million new infections and more than 1 million deaths. Furthermore, there are 19 million people in the world who don't even know they are infected.

Status is everything; testing is the only way to know your HIV status. It is the first step in taking control of your health and preventing transmission to others, and can be the hardest step to take. There are so many reasons why a person may not want to take an HIV test including accessibility, inconvenience, anxiety, lack of awareness, stigma and discrimination.

"If you test positive, immediate linkage to care and treatment is vital. If you're negative, you want to stay that way," said Rick Galli, bioLytical's Chief Technology Officer, "For the HIV-infected person, the sooner you're tested and treated, the longer your life expectancy. With treatment, someone infected with HIV can have similar duration and quality of life as an uninfected person. We know that effective seek-test-and-treat initiatives can lead to the eradication of HIV and that's what we're working towards here at bioLytical."

Vancouver-based bioLytical Laboratories Inc. has developed high quality, fast, accurate and easy to use HIV tests. The company's INSTI® HIV-1/HIV-2 Antibody Test delivers a positive or negative result in as little as 60 seconds, making it the world's fastest HIV test to be approved by the FDA in the United States, Health Canada in the country of origin, CE marked in Europe and prequalified by the World Health Organization. bioLytical's other commercial product on the INSTI® platform



is the HIV/Syphilis Rapid Multiplex Test which screens for both HIV and syphilis infections simultaneously in less than 60 seconds.

The INSTI® platform uses bioLytical's innovative flow-through technology to provide point-of-care diagnostic tests which are both fast and highly accurate. Competing rapid test platforms use lateral flow technology so the speed-to-result is much slower – usually taking 15 to 20 minutes. The speed of INSTI® generates meaningful clinical and financial advantages that translate into compelling value propositions that are just as applicable in resource-limited settings as they are in the most advanced healthcare clinics in the world.

bioLytical's rapid tests deliver instant results which helps to reduce patient anxiety and reduce the number of people who never return for their results (no wait time). The simplicity and speed of bioLytical's rapid tests also enable minimal training for counsellors conducting the tests and a high throughput at testing sites which increases the number of people being tested and knowing their status.

The INSTI® platform can be adapted to a wide range of other infectious diseases. bioLytical is committed to expanding its product lines by deploying the INSTI® platform to disease markers where significant unmet public health needs intersect with commercial opportunity. The Company's product pipeline includes INSTI tests for diseases such as Hepatitis C, Ebola and Zika, amongst others. "Our vision is to be a global leader in the research, development and commercialization of rapid, point-of-care in vitro medical diagnostic devices," said Stan Miele, bioLytical's Chief Commercial Officer.

A privately-owned company founded in 2002, bioLytical Laboratories is headquartered in Vancouver, British Columbia with sales offices in New York, Atlanta, Phoenix, San Francisco and Europe. bioLytical sells its products in over 60 countries to customers such as provincial and state health authorities, community based organizations, emergency rooms, physicians' offices, correctional institutions, universities, pharmacies and AIDS service organizations.

Contact: Stan Miele
info@biolytical.com
Phone: 604-204-6784



Life sciences companies at a glance

BIOPHARMACEUTICALS & BIOTECHNOLOGY

Please refer to www.lifesciencesbc.ca for further information on these companies

	Stage of development						Fields of study						Tools						Diseases							
	Drug discovery	Preclinical studies	Phase 1 clinical studies	Phase 2 clinical studies	Phase 3 clinical studies	On market	Bioproducts	Bioinformatics	Diagnostics	Environmental	Therapeutics	Vaccines	Bioprocessing	Drug delivery	Gene therapy	Genomics	High-throughput screening	Lab reagents	Proteomics	Autoimmune diseases	Cancer	Cardiovascular diseases	Infectious diseases	Inflammatory diseases	Metabolic diseases	Neurological diseases
AbCellera	•										•						•									
Aequus Pharmaceuticals	•										•			•												•
Alectos Therapeutics Inc.											•										•					•
Aquinox Pharmaceuticals Inc.					•						•													•		
Arbutus Biopharma Corp.																							•			
Augurex Life Sciences Corp.	•								•		•								•	•						
Aurinia Pharmaceuticals Inc.				•							•									•				•		
Bovivor Pharmatech Inc.				•							•												•			
Celator Pharmaceuticals				•	•						•			•												
DelMar Pharmaceuticals	•	•	•	•							•										•					
ESSA Pharma Inc.			•	•							•										•					
Eupraxia Pharmaceuticals Inc.	•	•	•	•							•			•						•				•		•
Genome Me Labs Inc.																				•	•	•	•	•	•	•
Green Sky Labs																					•		•	•	•	•
iCo Therapeutics Inc.		•		•							•			•									•	•		
ImStar Therapeutics Inc.	•	•									•															•
Inception Sciences Canada	•	•									•									•						•
Innovative Targeting Solutions Inc.	•	•									•									•	•		•	•	•	
iProgen Biotech Inc.	•										•			•						•	•	•	•	•	•	•
Lipont Pharmaceuticals Inc.	•	•	•						•		•			•						•		•				•
MedGenesis Therapeutix Inc.																										•
Microbiome Insights								•	•								•									
MSI Methylation Sciences Inc.				•							•															•
Network Immunology Inc.	•	•									•	•							•	•			•	•		
Neurodyn Life Sciences Inc.	•	•	•								•															•
Novateur Ventures Inc.		•	•	•	•	•	•	•	•		•	•		•	•	•				•	•	•	•	•	•	•
OncoGenex Pharmaceuticals Inc.	•	•	•	•	•						•			•		•					•					
Phoenix Molecular Designs		•									•										•					
Phyton Biotech LLC						•															•					
Precision NanoSystems Inc.	•										•			•	•	•		•		•	•	•	•	•	•	•
ProNAi Therapeutics Inc.				•							•										•					
Qu Biologics Inc.	•	•	•	•							•	•								•	•			•		
RepliCel Life Sciences Inc.			•	•							•				•					•				•		
Sirona Biochem Corp.																								•	•	
SOHO Biotech Inc.																		•								
STEMCELL Technologies Inc.		•				•	•						•					•		•	•	•	•	•		•
Symvivo Corp.	•	•									•			•	•											
Tait Laboratories Inc.	•					•	•				•		•			•			•	•				•	•	•
ViroGin Biotech Canada Ltd.				•							•										•					•
WEX Pharmaceuticals Inc.			•		•						•										•					•
Xenon Pharmaceuticals Inc.	•	•	•	•		•		•			•			•	•	•						•			•	•
Zymeworks Inc.	•	•					•	•			•									•	•		•			•

3 billion

data points

22

significant markers

1

personalized result



Through our team of world-class scientists, researchers and business professionals, GenomeDx is focused on integrating the power of genomics with large-scale collaboration to transform the management and treatment of cancer patients. We are developing solutions that address real clinical questions along the continuum of cancer patient care; increasing the efficiency of practice management, optimizing decision-making related to patient care, and most importantly, improving outcomes for our patients.

Learn more about how GenomeDx is changing the face of cancer care at:
www.GenomeDx.com | www.DecipherTest.com

GenomeDx is a proud supporter of LifeSciences BC



Vancouver, B.C. | San Diego CA
888-975-4540 | www.GenomeDx.com

Life sciences companies at a glance

CONTRACT RESEARCH ORGANIZATIONS & SCIENTIFIC/HEALTH SERVICES

Please refer to www.lifesciencesbc.ca for further information on these companies

	Preclinical services						Clinical services						General services										
	Drug discovery	Bioinformatics	Bioanalytical services	Analytical services	Pathology services	Toxicology	Phase 1 clinical studies	Phase 2 clinical studies	Phase 3 clinical studies	Phase 4 clinical studies	Study monitoring and reporting	Data management and statistics	Strategic consulting	Regulatory	Contract manufacturing	Product development	cGMP/GLP compliance	Quality assurance	Teaching and training	Communications	Reimbursement/Market Access	Lab Supplies/Distribution	International Distribution
Aspect Biosystems Ltd.	•					•																	
Aurora Biomed Inc.	•		•	•		•									•								
Biofilm Media																			•	•			
BioPharma Solutions													•							•			
Campbell & Company Communications and PR																				•			
Clinical Trial Company (Canada) Ltd.							•	•	•	•	•	•	•	•			•	•	•				
Conquer Mobile													•						•				
Emergo Group													•	•			•	•	•				
EMMES Canada		•					•	•	•	•	•	•	•	•		•		•	•				
IonsGate Preclinical Services Inc.	•					•																	
JBL Group Inc.									•				•			•				•	•		
Leap Frog Innovators Consultancy Inc.													•										
Lipont Pharmaceuticals Inc.	•		•	•			•	•					•	•	•	•	•	•	•	•			
Medisacare Inc.													•										•
Microbiome Insights		•	•	•			•	•	•	•	•	•	•			•							
MPI Research Inc.	•		•	•	•	•					•							•					
Northview LifeSciences													•										
Novateur Ventures Inc.						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
PHEMI Systems Inc.		•	•	•								•		•									
PI Pharma Inventor Inc.	•			•											•	•	•						
Tantalus Medical Communications													•	•					•	•			
TRANSFERRA Nanosciences Inc.				•											•	•	•						
True North Synergy Inc.													•	•		•							
Viable Healthworks Corp.							•	•	•	•	•	•	•	•	•	•	•	•	•				
VWR International Ltd.																						•	
Wax-it Histology Services Inc.	•				•	•							•				•						



MEDICAL TECHNOLOGIES & DEVICES

Please refer to www.lifesciencesbc.ca for further information on these companies

	Fields of study							Company type		
	Dental device	Medical equipment	Medical supplies	Testing instruments	Imaging	Device design	Other(s)	Manufacturer	Distributor	Developer
AR Medical Technologies		•				•	Medical device prototyping, mobile medical applications			•
ARC Medical Devices Inc.						•				•
Aspect Biosystems Ltd.		•					Biofabrication, bioprinting, tissue engineering	•		•
Aspera, an IBM Company				•	•	•	Data transfer			
Biolux Research Ltd.	•									•
Boreal Genomics		•		•				•	•	•
Clarius Mobile Health Corp.		•			•	•		•	•	•
Conquer Mobile					•		Medical simulation, medical education	•		
Contextual Genomics Inc.		•					Genomic-based molecular diagnostics			•
DTG Partners							Medical product development and quality/regulatory consulting			
Equicare Health							X- Software			•
Farabloc Development Corp.			•					•	•	•
GenomeMe							IVDs, genetic testing	•		•
Inliant Dental Technologies	•				•		Real-time 3D visualization, dynamic surgical guidance	•	•	•
Innovatek Medical Inc.				•				•		
Kardium Inc.		•			•			•	•	•
LightIntegra Technology				•		•	Transfusion			•
Lipont Pharmaceuticals Inc.		•	•							•
LivaNova Canada Corp.		•	•	•	•	•	Medical device, contract manufacturing	•	•	•
McKesson Medical Imaging Company					•		Medical imaging and clinical information software systems	•	•	•
Neovasc Inc.		•	•			•	Contract manufacturing	•		•
NEXSM Inc.							Digital health, digital wellness, big data, personalized health, patient/consumer experience			•
Novateur Ventures Inc.	•	•			•	•				•
Ondine Biomedical Inc.	•	•	•			•		•	•	•
PHEMI Systems Inc.							Big data software			•
ReFlex Wireless Inc.		•	•			•	Health data hosting services	•	•	•
Response Biomedical Corp.		•						•		
Rostrum Medical Innovations Inc.		•				•		•		•
SOHO Biotech Inc.		•		•				•		•
Starfish Medical		•		•	•	•	Airway management, QMS	•		•
Tel-Array Diagnostics Inc.				•				•		
ViewsIQ Inc.		•			•			•	•	•
ViroGin				•					•	



Biggest life sciences companies in B.C.

RANKED BY | Number of R&D employees in 2015

Rank '16	Company	Top local executive(s)	Areas of research	Ownership	Year founded	No. staff globally '15/'14	No. B.C. staff '15/'14	No. R&D staff '15/'14
1	Stemcell Technologies Inc 570 7th Ave W Suite 400, Vancouver V5Z 1B3 P: 604-877-0713 F: 604-675-7830 www.stemcell.com	Allen Eaves , president and CEO	Stem cell biology focused on hematology, immunology, neurobiology, breast, prostate, pancreas, regenerative medicine and tissue engineering	Privately held Allen Eaves	1993	615 496	515 482	190 ¹ 188
2	Arbutus Biopharma ² 8900 Glenlyon Pkwy Suite 100, Burnaby V5J 5J8 P: 604-419-3200 F: 604-419-3201 www.arbutusbio.com	Mark Murray , president and CEO	RNA interference (RNAi) therapeutics	TSX:TKM; Nasdaq:TKMR	1992	NP 103	NP 99	105 75
3	Kardium Inc 8518 Glenlyon Pkwy Suite 155, Burnaby V5J 0B6 P: 604-248-8891 F: 604-304-3478 www.kardium.com	Doug Goertzen , CEO	Cardiovascular	Privately held Privately held	2007	99 89	99 89	80 77
4	Zymeworks Inc 1385 8th Ave W Suite 540, Vancouver V6H 3V9 P: 604-678-1388 F: 604-737-7077 www.zymeworks.com	Ali Tehrani , president and CEO	Antibody and protein therapeutics development for oncology, autoimmunity and anti-inflammation applications	Privately held	2003	70 52	64 46	60 46
5	Xenon Pharmaceuticals Inc 3650 Gilmore Way Suite 200, Burnaby V5G 4W8 P: 604-484-3300 F: 604-484-3450 www.xenon-pharma.com	Simon Pimstone , president and CEO	Pain, epilepsy, dermatology	Nasdaq:XENE	1996	83 74	76 71	55 48
6	Amgen British Columbia Inc 7990 Enterprise St, Burnaby V5A 1V7 P: 604-676-8300 F: 604-676-8349 www.amgen.com	John Delaney , director of research	Antibody therapeutics for the treatment of oncology, inflammation and infectious diseases	Nasdaq:AMGN; Amgen Inc	1980	18,000 20,000	50 63	50 50 ¹
7	ABM Applied Biological Materials Inc 3671 Viking Way Suite 1, Richmond V6V 2J5 P: 604-247-2416 F: 604-247-2414 www.abmgood.com	Peter Li , CEO, Lisa Young , CFO, Vivian Gao , general manager, Earnest Leung , COO	Expression libraries for CRISPR, ORF, siRNA and miRNA; lentivirus and adenovirus systems; cell immortalization; stem cells; next-generation sequencing	Privately held Peter Li	2004	124 71	61 46	45 32
8	Neovasc Inc 13700 Mayfield Pl Suite 2135, Richmond V6V 2E4 P: 604-270-4344 F: 604-270-4384 www.neovasc.com	Alexei Marko , CEO	Develops, manufactures and markets innovative vascular devices offering pericardial tissue processing, vascular product development and design and manufacturing solutions to industry partners	TSX:NVC; Nasdaq:NVCN	2000	NP 133	132 ¹ 132	25 ¹ 25 ¹
9	Response Biomedical Corp 1781 75th Ave W, Vancouver V6P 6P2 P: 604-456-6010 F: 604-456-6066 www.responsebio.com	Barbara Kinnaird , CEO	Rapid immunoassay diagnostics for clinical cardiovascular applications, environmental infectious disease testing and bio-threat identification	TSX:RBM TSX:RBM	1991	60 71	51 68	14 15
10	CICTAN Health Group Corp 4238 Lozells Ave Suite 109, Burnaby V5A 0C4 P: 604-420-4999 F: 604-420-7072 www.cictanhealth.com	Fuchang He , president & CEO	Natural health products, personal skin care products, water devices, food and drink sciences	Privately held	NP	30 24	15 10	13 8
11	Aquinox Pharmaceuticals Inc 887 Great Northern Way Suite 450, Vancouver V5T 4T5 P: 604-629-9223 F: 778-331-4486 www.aqxpharma.com	David Main , president and CEO	Discovering and developing targeted therapeutics in disease areas of inflammation and immuno-oncology that target SH2-containing inositol-5'-phosphatase 1, or SHIP1, a key regulator of an important cellular signalling pathway in immune cells, known as the PI3K pathway	Nasdaq:AQXP	2006	NP 23	NP 23	11 ¹ 11
11	Qu Biologics Inc 887 Great Northern Way Suite 138, Vancouver V5T 4T5 P: 604-734-1450 F: 604-676-2235 www.qubiologics.com	Hal Gunn , CEO, Russell McAllister , vice president, finance	Treatment of cancer and immune-related diseases such as Crohn's disease and ulcerative colitis	Privately held; Hal Gunn	2007	17 16	13 14	11 9
13	Kinexus Bioinformatics Corp 8755 Ash St Suite 1, Vancouver V6P 6T3 P: 604-323-2547 F: 604-323-2548 www.kinexus.ca	Steven Pelech , president and CSO	Proteomics and bioinformatics products and services	Privately held; Steven Pelech	1999	13 14	13 14	10 10
14	Alectos Therapeutics 8999 Nelson Way, Burnaby V5A 4B5 P: 604-628-7129 F: 604-628-0137 www.alectos.com	Ernest McEachern , president and CEO	Neuroscience, oncology	Privately held	2007	NP NP	NP NP	7 7
14	MSI Methylation Sciences Inc 4475 Wayburne Dr Unit 108, Burnaby V5G 4X4 P: 604-435-5155 F: 604-435-5110 www.methylationsciences.com	Barry Guild , CEO	Develops and markets S-Adenosyl Methionine, a prescription drug used as a dietary supplement	Privately held	2007	NP NP	NP NP	7 ¹ 7 ¹
16	Celator Pharmaceuticals Inc 887 Great Northern Way Suite 250, Vancouver V5T 4T5 P: 604-708-5858 F: 604-708-5883 www.celatorpharma.com	Lawrence Mayer , president and chief scientific officer	Advanced cancer therapies	NASDAQ:CPXX	2000	NP 35	NP 18 ¹	6 ¹ 5 ¹
16	PNP Pharmaceuticals Inc 9388 North Fraser Cres, Burnaby V5J 0E3 P: 604-435-6200 F: 604-435-6213 www.pnp-pharmaceuticals.com	Glen North , president and CEO, Dennis Thneah , vice-president	Nutraceutical, OTC OD tablets	Private	1999	NP NP	NP NP	6 NP
18	Del Mar Pharmaceuticals 999 Broadway W Suite 720, Vancouver V5Z 1K5 P: 604-629-5989 F: NP www.delmarpharma.com	Jeffrey Bacha , chairman and CEO	Cancer Therapeutics	OTCQX:DMPI Public Company. Company coFounders Jeffrey Bacha & Dennis Brown are largest individual shareholders.	2010	12 NP	5 NP	4 NP
19	MRM Proteomics Inc 4464 Markham St Suite 2108, Victoria V8Z 7X8 P: 604-800-2296 F: 604-800-2297 www.mrmproteomics.com	Christoph Borchers , chief scientific officer, Gary Kruppa , CEO	Proteomics (large-scale study of proteins)	Privately held; Christoph Borchers, University of Victoria	2010	6 6	5 6	3 3
20	AbCellera Biologics Inc 2125 East Mall Suite 305, Vancouver V6T 1Z4 P: 604-877-7128 F: NP www.abcellera.com	Carl Hansen , president and CEO	Antibody discovery	Privately held Carl Hansen	2012	13 2	10 NP	2 NP

Sources: Interviews with representatives of the above biotech firms and *BIV* research. Other firms may have ranked but did not respond to information requests by deadline. Figures were reported between December 30, 2014, and January 21, 2015, unless otherwise noted. NP Not provided 1 - *BIV* estimate 2 - formerly Tekmira Pharmaceuticals Corp 3 - 2015 figure 4 - 2013 figure

Business in Vancouver makes every attempt to publish accurate information in the List, but accuracy cannot be guaranteed. Researched by Anna Liczmanska, aliczmanska@biv.com.

Patents
Trademarks
Copyrights
Related Litigation

Seed^{IP}

Seed Intellectual Property Law Group PLLC



Protecting your IP.

Seed IP Law Group provides Custom Crafted Intellectual Property Solutions™ to clients pursuing patents, trademarks, copyrights and other IP protection. With expertise in cell and molecular biology, immunology, chemistry, biochemistry and pharmacology, Seed IP helps clients patent biotechnology inventions by offering a team of scientists who also understand the legal and business sides of biotechnology.

LIFESCIENCES BC MEMBERSHIP DIRECTORY 2016

Growing Canada's bio-economy

ACADEMIC & RESEARCH INSTITUTIONS

BC Cancer Agency

675 West 10th Ave., Vancouver, BC V5Z 1L3
604-877-6000 www.bccancer.bc.ca

BC Clinical Research Infrastructure Network

400 – 575 West 8th Ave.,
Vancouver, BC V5Z 0C4
604-675-1023 www.bccrin.ca

BC Institute of Technology, Biotechnology Program

3700 Willingdon Ave., Burnaby, BC V5G 3H2
604-432-8310 www.bcit.ca

BC Preclinical Research Consortium (BCPRC)

4145 Wesbrook Mall, Vancouver, BC V6T 1W5
604-822-6283 www.bcprc.ca

British Columbia Centre for Excellence in HIV/AIDS

608 – 1081 Burrard St., Vancouver, BC V6Z 1Y6
604-806-8477 www.cfenet.ubc.ca



Transforming Discovery into Opportunity

Centre for Drug Research and Development (CDRD)

2405 Wesbrook Mall, 4th floor,
Vancouver, BC V6T 1Z3
604-827-1147 www.cdrd.ca

Centre for Heart Lung Innovation

166 – 1081 Burrard St., St. Paul's Hospital,
Vancouver, BC V6Z 1Y6
604-806-8346 www.hli.ubc.ca

entrepreneurship@UBC

6163 University Blvd., Vancouver, BC V6T 1Z1
www.entrepreneurship.ubc.ca



Genome British Columbia

400 – 575 West 8th Ave.,
Vancouver, BC V5Z 0C4
604-738-8072 www.genomebc.ca

ICORD

Blusson Spinal Cord Centre, 818 West 10th Ave.,
3rd floor, Vancouver, BC V5Z 1M9
604-675-8810 www.icord.org

Jackson Laboratory

841 – 236 West Portal Ave.,
San Francisco, CA 94127
415-548-0863 www.jax.org

Life Sciences Institute

1.365b 2350 Health Sciences Mall,
Vancouver, BC V6T 1Z3
604-827-4383 www.lsi.ubc.ca

Michael Smith Foundation for Health Research

200 – 1285 West Broadway,
Vancouver, BC V6H 3X8
604-730-8322 www.msfrh.org

PROOF Centre of Excellence

1190 Hornby St., 10th floor
Vancouver, BC V6Z 2K5
604-682-2344 ext. 62612 www.proofcentre.ca

Providence Health Care Research Institute

1190 Hornby St., 10th floor,
Vancouver, BC V6Z 2K5
604-806-9464 www.providencehealthcare.ca

Research Universities' Council of British Columbia

400 – 880 Douglas St.,
Victoria, BC V8W 2B7
250-480-4859 www.tupc.bc.ca

Rick Hansen Institute

Blusson Spinal Cord Centre, 6400 – 818 West
10th Ave., 6th floor, Vancouver, BC V5Z 1M9
604-827-2421 www.rickhanseninstitute.org

Simon Fraser University

8888 University Dr., Strand Hall, Room 3195,
Burnaby, BC V5A 1S6
778-782-4152 www.sfu.ca

Trinity Western University, Biotechnology Program

7600 Glover Rd., Langley, BC V2Y 1Y1
604-888-7511 www.twu.ca/undergraduate/academics/majors-and-programs/faculty-of-natural-applied-sciences/biotechnology.html

TRIUMF

4004 Wesbrook Mall, Vancouver, BC V6T 2A3
604-222-1047 www.triumf.ca

University of British Columbia

6328 Memorial Rd., Old Admin. Building, Room
103, Vancouver, BC V6T 1Z2
604-822-4571 www.ubc.ca

University of British Columbia, Faculty of Pharmaceutical Sciences

3309 – 2405 Wesbrook Mall,
Vancouver, BC V6T 1Z3
604-827-2673 www.pharmacy.ubc.ca

University of British Columbia, Sauder School of Business

2053 Main Mall, Vancouver, BC V6T 1Z2
604-822-8555 www.sauder.ubc.ca

University of British Columbia, University-Industry Liaison Office

103 – 6190 Agronomy Rd.,
Vancouver, BC V6T 1Z4
604-822-8580 www.uilo.ubc.ca

University of Northern BC

3333 University Way, Prince
George, BC V2N 4Z9
250-960-5555 www.unbc.ca

University of Victoria

3800 Finnerty Rd., Victoria, BC V8P 5C2
250-721-7211 www.uvic.ca

Vancouver Coastal Health Research Institute (VCHRI)

3665 – 910 West 10th Ave., Jim Pattison
Pavilion North, VGH, Vancouver, BC V5Z 1M9
604-875-4372 www.vchri.ca

ASSOCIATIONS

ACCT Canada

1 – 189 Queen St. East,
Toronto, ON M5A 1S2 www.acctcanada.ca

ACETECH

900 – 1188 West Georgia St.,
Vancouver, BC V6E 4A2
604-683-5852 www.acotech.org

AdvantageBC

Three Bentall Centre,
3093 – 595 Burrard St., P.O. Box 49067,
Vancouver, BC V7X 1C4
604-683-6626 www.advantagebc.ca

Ag-West Bio Inc.

101 – 111 Research Dr., Saskatoon, SK S7N 3R2
306-975-1939 www.agwest.sk.ca

BC Technology Industry Association (BCTIA)

101 – 887 Great Northern Way,
Vancouver, BC V5T 4T5
604-683-6159 www.bctia.org

BioAlberta

314 Ledgeview Business Centre, 9707 110 St.
NW, Edmonton, AB T5K 2L9
780-425-3804 www.bioalberta.com

BioTalent Canada

300 – 130 Slater St., Ottawa, ON K1P 6E2
613-235-1402 www.biotalent.ca

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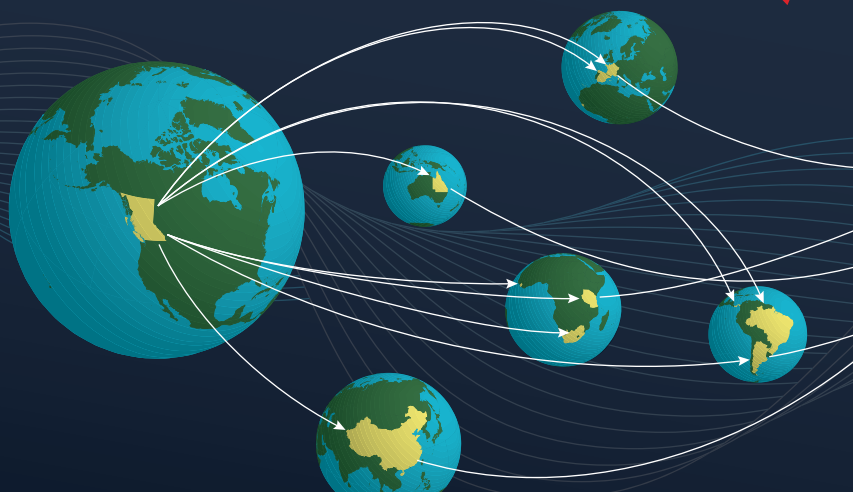
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2015

Clinical milestones in British Columbia's life sciences sector

<i>Date</i>	<i>Company</i>	<i>Clinical milestones</i>
Jan 21	Zymeworks Inc.	Zymeworks Announces Bi-Specific Antibody Collaboration with Celgene
Feb 17	Alectos	Alectos Engages As Industry Partner in the Canadian Glycomics Network (GlycoNet)
Feb 25	Lionsgate Technologies Inc.	LGTmedical Issued U.S. Patent for Kenek Core™ Audio Waveform Technology
Mar 25	Tekmira Pharmaceuticals	Preclinical Results Show Super-Additive Effects on Plasma Triglyceride Lowering
Mar 31	Qu Biologics Inc.	Granted U.S. Patent for Use of E. coli to Treat Crohn's Disease
April 2	TEVA Pharmaceuticals & Xenon Pharmaceuticals	1st Patient Enrolled in Phase 2b Study Evaluating TV-45070 for Postherpetic Neuralgia
April 15	RepliCel Life Sciences	Evaluating TV-45070 for Postherpetic Neuralgia (PHN)
May 4	Aquinox Pharmaceuticals Inc.	Enrolment in Phase 2 KINSHIP Trial of AQX-1125 in Atopic Dermatitis Completed
May 7	MSI Methylation Sciences Inc.	Completes Recruitment of Phase 2 Trial for Novel Treatment STRADA
May 11	Qu Biologics Inc.	Granted European Patent for Use of Bacterial Compositions for Cancer Treatment
June 16	Sanofi Biogenius Canada Award	Austin Wang, Vancouver Grade 11 Student Wins Global Environment Challenge
June 30	RepliCel Life Sciences	1st Participant Enrollee in Phase 1/2 Clinical Trial of RCT-01 for Chronic Achilles Tendinosis
July 21	RepliCel Life Sciences	Receives Two Important Approvals for Dermal Rejuvenation Clinical Trial
July 28	Qu Biologics Inc.	Begins Phase 2 Clinical Trial in Ulcerative Colitis
July 28	Aequus Pharmaceuticals Inc.	Announces Completion of Acquisition of TeOra Health
Aug 3	Contextual Genomics	PMI Add ArcherDX, 6th Consortium Partner to National Access Project
Aug 6	Aquinox Pharmaceuticals Inc.	Announces Positive Results from Secondary Endpoints from Phase 2
Aug 25	MSI Methylation Sciences Inc.	Treats Last Patient in Horizon Trial & Receives four Patents for Proprietary Treatment STRADA
Aug 11	Qu Biologics Inc.	Opens Additional Ulcerative Colitis Clinical Trial Sites in Canada
Sept 1	RepliCel Life Sciences	Cleared to Initiate Clinical Trial of RCS-01 for Dermal Rejuvenation
Sept 2	DelMar Pharmaceuticals Inc.	Announces Expansion of VAL-083 Program to Include Ovarian Cancer
Sept 10	DelMar Pharmaceuticals Inc.	Presents Updated Phase I/II Clinical Data on VAL-083
Sept 15	Contextual Genomics	Announce Scientific Collaboration with NCIC to Study Cancer Gene Mutations
Sept 15	RepliCel Life Sciences	Announces Clinical Site & Participant Recruitment for European Skin Aging Study
Sept 24	Xenon Pharmaceuticals Inc.	Announces Initiation of XEN801 Phase 1 Clinical Trial
Sept 29	Qu Biologics Inc.	Granted U.S. Patent for Use of <i>Staphylococcus aureus</i> -based Immunotherapies to Treat Melanoma
Oct 21	Contextual Genomics	Receives Accreditation from College of American Pathologist (CAP)
Oct 22	Xenon Pharmaceuticals Inc.	Xenon Partner Genentech Advanced GDC-0310 to Clinical Development
Nov 2	Aquinox Pharmaceuticals Inc.	Announces Results from Phs II KINSHIP Trial
Nov 6	DelMar Pharmaceuticals Inc.	Announces Positive Results of VAL-083 in Chemo-Resistant Tumors
Nov 10	Sirona Biochem Corp.	Announces Discovery in Antiaging and Regenerative Medicine
Nov 16	Aequus Pharmaceuticals Inc.	Receives Health Canada Approval for Phase 1 Clinical Trial of Aripiprazole Transdermal Patch
Nov. 17	Qu Biologics Inc.	Granted Three New Patents Treating Inflammatory Bowel Disease, Colon and Skin Cancer
Nov 24	Qu Biologics Inc.	Clinical Trial Enrolment for Crohn's Disease Complete
Dec 3	Zymeworks Inc.	Enters Licensing Agreement w/ GSK
Dec 17	RepliCel Life Sciences	Clinical Phase 1 Trial Complete

2015

Investments into British Columbia's life sciences sector

Date	Company/Organization	Type of investment	\$ millions (CAD)
Jan 21	Zymeworks - Celgene	Antibody collaboration	164.00
Feb 16	Response Biomedical Corp	Milestone payment	0.72
March 4	Sirona Biochem Corp.	Milestone payment	9.50
March 17	Aequus Pharmaceutical Inc.	TSX Venture List	0.41
March 25	Tekmira Pharmaceuticals Inc	Public Offering NASDAQ	190.00
June 26	RepliCel Life Sciences	Private Placement	2.04
July 15	ProNAi Therapeutics Inc.	IPO NASDAQ	185.40
July 27	DelMar Pharmaceuticals Inc.	Direct Placement OTCQX	2.00
Aug 11	PHEMI	Venture Financing	12.20
Aug 20	DelMar Pharmaceuticals Inc.	Direct Placement OTCCQX	3.00
Sept. 16	Aquinox Pharmaceuticals Inc.	Public Offering NASDAQ	133.00
Sept 28	Sirona Biochem Corp.	Purchase Warrants TSX -V	1.02
Sept 29	Precision NanoSystems	Private Series A	17.60
Oct 5	Accel-Rx Health Sciences Accelerator	First Investment in Early Stage Company Encycle Therapeutics	3.00
Oct 30	Aequus Pharmaceutical Inc.	Public Offering TSX -V	1.24
Dec 11	Michael Smith Foundation for Health Research	Province of BC Funding	50.00
Dec 23	Qu Biologics	Private Financing (closed oversubscribed)	19.00
Total			794.13



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LIFESCIENCES BC ANNOUNCES 2016 ANNUAL AWARD WINNERS



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It is a rich pool of highly skilled talent, which makes our selection a difficult task, but once decided, it is a brilliant cross-section of our community's depth of innovation and knowledge-based resources

LifeSciences BC is pleased to announce the recipients of the 18th Annual LifeSciences BC Awards, presented by FARRIS. These awards are presented annually to recognize talented individuals and organizations that represent the life sciences ecosystem in B.C., which includes academia, health institutions, advisers, government and industry. The award winners represent the full spectrum from discovery to commercialization, underscoring the depth of knowledge that significantly contributes to the B.C. bioeconomy, while improving the lives of patients here and around the world.

THE 2016 WINNERS ARE

Dr. Christoph Borchers	Genome BC Award for Scientific Excellence
Dr. Randy Gascoyne	Michael Smith Foundation for Health Research - Aubrey J. Tingle Prize
Dr. Victor Ling	Dr. Don Rix Award for Lifetime Achievement
Dr. Richard Glickman	Milton Wong Award for Leadership
Jonathan Kallner	Strategic Life Sciences Partner of the Year
The Friedman Lab	Award for Clinical Research Excellence
Aequus Pharmaceuticals Inc.	Growth Stage Life Sciences Company of the Year
Precision NanoSystems, Inc.	Growth Stage Medtech Company of the Year
Arbutus Biopharma Corporation	Deal of the Year
Zymeworks Inc.	Life Sciences Company of the Year

About LifeSciences BC

LifeSciences BC is a not-for-profit, non-government, industry association that supports and represents the life sciences community of British Columbia through leadership, facilitation of investment and partnering, advocacy, and promotion of our world-class science and industry.

Life sciences sectors, from biopharmaceuticals and medical

technology, to digital health and medical devices, are integrated into our organization and all that we do, ensuring that no life sciences sector is working in isolation — and that all sectors come together in a comprehensive, complementary and coordinated fashion.

Throughout the year, LifeSciences BC undertakes numerous programs and projects in support of these

sectors. These include public policy initiatives, facilitating linkages between global industry and our local organizations, raising the profile of our industry internationally and thus facilitating investment and global partnering opportunities, and helping nurture economic development in British Columbia through the life sciences industry.

GENOME BC AWARD FOR SCIENTIFIC EXCELLENCE

DR. CHRISTOPH BORCHERS, FCAHS,
Director, University of Victoria - Genome BC Proteomics Centre Professor, Department of Biochemistry and Microbiology, University of Victoria, Don and Eleanor Rix BC Leadership Chair in Biomedical and Environmental Proteomics Research Professor, Department of Oncology, McGill University, Montreal, Segal Family Chair, Molecular Oncology, McGill University, Montreal

This award honours an individual, group or company located in B.C. that has received significant national or international recognition in the fields of genomics and one of the following in 2015: proteomics, bioinformatics or systems.



Dr. Borchers received his BS, MS and PhD from the University of Konstanz, Germany. After his postdoctoral training and employment as a staff scientist at NIEHS/NIH/RTP, in North Carolina, he became the director of the UNC-Duke Proteomics Facility and held a faculty position at the UNC Medical School in Chapel Hill, NC (2001-2006). Since then, Dr. Borchers has been employed at the University of Victoria (UVic) and holds the current positions of professor in the department of biochemistry and microbiology and the Don and Eleanor Rix BC Leadership Chair in Biomedical and Environmental Proteomics.

He is also the Director of the UVic - Genome BC Proteomics Centre, which is a member of the Genome Canada-funded Genomics Innovation Network. Dr. Borchers is also appointed as professor at McGill University in the department of oncology, Montreal, and received the Segal Chair in Molecular Oncology at the Jewish General Hospital of McGill University.

His research is centred on the improvement, development and application of proteomics technologies with a major focus on techniques for quantitative targeted proteomics for clinical diagnostics. Multiplexed LC-MRM-MS approaches and the immuno-MALDI (iMALDI) technique are of particular interest. Another focus of his research is on technology development and application of the combined approach of protein chemistry and mass spectrometry for structural proteomics.

Dr. Borchers has published over 200 peer-reviewed papers in scientific journals and is the founder and CSO of two companies, Creative Molecules Inc. and MRM Proteomics, Inc.

He is also involved in promoting proteomic research and education through his function as HUPO international council member, past scientific director of the BC Proteomics Network and vice-president, external, of the Canadian National Proteomics Network.

MICHAEL SMITH FOUNDATION FOR HEALTH RESEARCH - AUBREY J. TINGLE PRIZE

DR. RANDY GASCOYNE, MD, *Clinical Professor of Pathology, University of British Columbia, Hematopathologist, BC Cancer Agency, Medical Director – Provincial Lymphoma Pathology Program, Department Head – Lymphoid Cancer Research, BCCRC, Distinguished Scientist, BC Cancer Research Centre, Research Director, Centre for Lymphoid Cancer, BCCA*

This prize is given to a British Columbia clinician scientist whose work in health research is internationally recognized and has significant impact on advancing clinical or health services and policy research — as well Randy D. Gascoyne is a clinical professor of pathology at the University of British Columbia (UBC), a Hematopathologist at the BC Cancer Agency (BCCA) and a distinguished scientist at the BC Cancer Research Centre and department head of Lymphoid Cancer Research in Vancouver.

Dr. Gascoyne obtained his B.Sc. and MD degrees at UBC, completed an internship at St. Paul's Hospital in Vancouver and a residency in hematopathology at UBC. He joined the staff of the BCCA in 1988.

Dr. Gascoyne is best known for his work investigating the pathogenesis of lymphoid cancers using genomic approaches, gene expression profiling studies and biomarker and prognostic factor development in Hodgkin lymphoma and non-Hodgkin lymphomas. The

Gascoyne laboratory has published seminal work regarding the role of the tumour microenvironment in lymphoid cancer biology and tumours of immune privilege. Recent publications include high-ranking journals such as the *New England Journal of Medicine*, *Science*, *Nature*, *Nature Genetics*, *Nature Medicine*, *Cell*, *Cancer Cell* and *Nature Immunology*.

Dr. Gascoyne has more than 460 peer-reviewed publications, has co-authored more than 470 abstracts at major meetings and has written 32 book chapters. During his tenure at the BCCA he has been a principal investigator/co-investigator on research grants totalling over \$94 million. He serves on numerous advisory boards related to lymphoma and the editorial boards of both the *Journal of Clinical Oncology* and *Advances in Anatomic Pathology*. He served as associate editor of *Haematologica* (the journal of the European Hematology Association) from 2008–2012. He is the pathology co-chair of the Eastern Cooperative Oncology Group (ECOG) Lymphoma Committee of the USA, previous co-chairman of the Lunenburg Lymphoma Biomarker Consortium (LLBC) and an active member of the LLMP consortium. He serves on the scientific advisory board of the Lymphoma Research Foundation in the U.S. He is an active member of the International Lymphoma Study Group (ILSG). He is currently the research director for the Centre for Lymphoid Cancers at the BC Cancer Agency in



Vancouver and head of the Department of Lymphoid Cancer Research. His current h-index is 90.

In 2011–12 Randy received several awards, including a Killam Research Award in Science from the University of British Columbia, establishing him as the first clinical faculty to be awarded such a prize. In late 2011 he

was awarded an honorary doctorate degree (Docteur Honoris Causa) from the University of Paul Sabatier in Toulouse, France. In 2012 he received an Award for Excellence in Research and Discovery from the department of laboratory medicine at UBC. In 2014 he was listed by Thomson-Reuters ISI in the top 1% of influential scientific minds based on citations and impact factors during the 11-year period 2002–2012 in the category of Clinical Medicine. Of the 89 Canadians listed (3,200 total scientists across 21 categories), Randy was ranked in the top 20 Canadians. He received this same distinction again in 2015 for published work in 2003–2013. In 2015 he received the David Hardwick Lifetime Achievement Award from the department of pathology and laboratory medicine at UBC and the Ulmann Award at the 15th Annual Lymphoma and Myeloma meeting in New York City for lifetime achievements in lymphoma research. Finally, in early 2016 Dr. Gascoyne was awarded the Aubrey J. Tingle Prize from the Michael Smith Foundation for Health Research as its uptake — to improve health and the health system in B.C. and globally.

DR. DON RIX AWARD FOR LIFETIME ACHIEVEMENT

DR. VICTOR LING, O.C., O.B.C., PhD, *President and Scientific Director, Terry Fox Research Institute, Distinguished Scientist and Professor, BC Cancer Agency and University of British Columbia*

This award is presented to an exceptional senior executive individual in celebration of an outstanding career in the life sciences sector. The individual's contributions may be a new innovation, new knowledge or ways to improve professional practice. The performance will be based on several factors, including financing, partnerships, accomplishments of milestones and growth.

Victor Ling was born in China, came to Canada as a child and took his undergraduate degree in physiology and biochemistry at the University of Toronto, PhD in biochemistry at University of British Columbia (UBC), and postdoctoral fellowship with Professor Frederick Sanger (a double Nobel Laureate) in Cambridge, England. He spent the first half of his scientific career at the Princess Margaret Hospital in Toronto and moved to Vancouver in 1995 to become the founding vice-president of research at the BC Cancer Agency (BCCA) and UBC.

Currently, Dr. Ling is the founding president and scientific director of the Canada-wide Terry Fox Research Institute, an institute that involves more than 70 cancer research institutes, hospitals and universities across Canada (www.tfri.ca). He is a distinguished scientist at the BCCA, professor of pathology, and professor of biochemistry at UBC.

As VP of research at the BCCA and assistant dean at UBC, he was instrumental with Dr. Michael Smith in launching in 1998 the Genome Sciences Centre in Vancouver that was the first to decode the SARS virus. He founded and served as director of the interdisciplinary oncology graduate training program (www.iop.ca), a partnership between BCCA and UBC. He headed the CFI application that resulted in the construction of the \$90 million BC Cancer Research Centre that opened in March 1, 2005, that currently is home to over 650 staff and trainees.

He served and played leadership roles on many national and international boards and committees including: Associate Chair, Governing Council of CIHR; Board of NCI Canada, Medical Advisory Committee of the Gairdner Foundation, Board of Scientific Counselors at NCI/NIH; Awards Assembly; General Motors Cancer Research Foundation; Premier's



Technology Council of British Columbia; Chair, Research Committee, Canadian Strategy for Cancer Control; Scientific Advisory Committee of the Alberta Heritage Foundation for Medical Research; Awards Committee, Burroughs Wellcome Trust Fund; Chair, External Advisory Committee of CTR-Net; and Board of Directors of Genome British Columbia.

As a scientist, Dr. Ling is best known for his discovery of P-glycoprotein (MDR) associated with multiple drug resistance in cancer; for the sister of P-glycoprotein (BSEP), the bile acid transporter in liver; and for the super-family of ABC transporter proteins. He has over 200 peer-reviewed publications. He has been honored by the General Motors Kettering Prize United States, the Dr. Josef Steiner Cancer Research Award from Switzerland, the Gairdner Foundation International Award from Canada, a Michael Smith Foundation Distinguished Scholar Award from British Columbia, the Terry Fox Gold Medal and many others. He has received honorary degrees from four different Canadian universities, the Order of British Columbia, the Order of Canada and the Queen Elizabeth II Diamond Jubilee medal, and he is a fellow of the Royal Society of Canada.

2016 Annual LifeSciences BC Award Winners

MILTON WONG AWARD FOR LEADERSHIP

DR. RICHARD GLICKMAN, LL.D (HON.)

This award is designed to recognize an individual inside or outside the direct life sciences and biotechnology industry in British Columbia who has demonstrated a significant contribution to the development of the sector. The award highlights the accomplishments of a person who has impacted and strengthened relationships with external supporters favouring the sector.

Dr. Glickman has co-founded more than six biotech companies and played a key role in launching numerous others during his career in the biotech sector. He has recruited dozens of leading experienced senior executives from out of province, which now form the senior leadership at many B.C. companies. His career path has left an indelible mark on many of B.C.'s life science companies and has propelled the sector forward on an international level.

He has brought well over \$500 million in foreign capital into B.C. to fund corporations which he founded or co-founded. Dr. Glickman

has completed most of Canada's largest cross-border public and private financings in the industry. Many in the biotech sector are not aware that he played a significant role in government policy including the way institutions such as the venture exchange, modified regulations which allowed industry to flourish here and of course a role in the creation of LifeSciences BC (BC Biotech).

As co-founder of Aspreva; which created the standard of care for patients with the most severe form of lupus, lupus nephritis, brings him a certain amount of pride, he was able to effect better patient outcomes for people suffering from this dreaded disease.

Dr. Glickman has served as chairman of Essa Pharma's board of directors since October 2010, and is responsible for the management of the board of directors to ensure Essa has appropriate objectives, an effective strategy and is operating in accordance with a high standard of corporate governance. Dr. Glickman was a co-founder, chairman and chief executive officer



of Aspreva Pharmaceuticals Inc. Prior to establishing Aspreva, Dr. Glickman was the co-founder and chief executive officer of StressGen Biotechnologies Corporation. Dr. Glickman currently serves on the board of directors of Cardiome, Vida Pharmaceuticals and Engene Inc., and is chairman of the board of directors of Aurinia Pharmaceuticals Inc. In addition, Dr. Glickman has served on many other biotechnology boards of directors. Dr. Glickman received the 2004 Ernst & Young Entrepreneur of the Year Award for the Pacific Region Life Sciences Group, both Canada's and British Columbia's Top 40 under 40 Award for Entrepreneurs, the 2006 BC Biotech Leadership Award and the Lupus Foundation of America Leadership Award.

When Richard is not in the boardroom, he can be found in the mountains where he serves as an outdoor emergency care and rescue instructor and coordinator. Richard and his wife, Michelle, live on a farm just outside Victoria and have six children.

STRATEGIC LIFE SCIENCES PARTNER OF THE YEAR

JONATHAN KALLNER, FCA, GVA Regional Managing Partner, Professional Associations, Institute of Corporate Directors (ICD) – Member, Governor of Business Council of British Columbia

Jonathan is KPMG's regional managing partner for the Greater Vancouver area. He is also an active member on KPMG Canada's Consumer Markets Industry Steering Committee and a member of KPMG Canada's Executive Committee.

Previously, Jonathan served as national

leader for KPMG's Industrial Markets Group and the leader for the firm's national and British Columbia life sciences practices.

Over his 25 years in practice, he has advised many life sciences (and related health care) companies in the early stages of development through to transactions, IPOs and financings. In fact, he has worked with clients on some of the biggest transactions and IPOs involving life sciences companies in the province.

During his tenure as national and provincial leader for KPMG's life sciences practices, Jonathan successfully built the team and its



capabilities across the country so as to bring the best skills and value to the Life Sciences sector. Jonathan's commitment to the life sciences sector is evident in his contributions as mentor, founder, supporter and active participant, particularly in the Greater Vancouver area. His commitment and passion for the life sciences continues to this day.

Jonathan also serves on numerous boards and community programs including as governor with the Business Council of British Columbia and on the faculty advisory board, Sauder School of Business, University of British Columbia.

AWARD FOR CLINICAL RESEARCH EXCELLENCE

THE FRIEDMAN LAB, Jan Friedman, MD, PhD, Professor, The Friedman Lab, Department of Medical Genetics, University of British Columbia

This award is intended to recognize a group, institution or company that has demonstrated excellence in the development and/or delivery of clinical research in the province of British

Columbia.

The Medical Genetics Research Unit is a translational research group in the University of British Columbia, department of medical genetics.

It is located at the Children's and Women's Health Centre in Vancouver, and affiliated with the Child and Family Research Institute.

The group is led by professor Jan M. Friedman and includes investigators with expertise



in clinical genetics, clinical genomics, clinical teratology, genetic counselling and health services research.

All of its research is collaborative and multidisciplinary.

Its goal is to improve the care of families affected by genetic disorders.

Current projects focus in three areas:

- genetic causes of intellectual disability
- neurofibromatosis
- birth defects epidemiology

Congratulations Arbutus Biopharma for the “Deal of the Year” Award!

Farris is proud to be legal advisor to Arbutus Biopharma in creating an industry leading global biopharmaceutical dedicated to developing a cure for HBV.

Success At All Levels

Life sciences is a global business for our clients; Farris is a high performance law firm with a proven track record of successfully advising Canada’s leading life sciences companies in complex and diverse cross-border and international transactions.

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2016 Annual LifeSciences BC Award Winners

GROWTH STAGE LIFE SCIENCES COMPANY OF THE YEAR

AEQUUS PHARMACEUTICALS INC.

This award is presented to an early-stage life sciences company which, although may not be nearing commercial success, has demonstrated outstanding performance and achieved significant milestones in 2015 and positioned

itself well for potential future commercial success.

Aequus Pharmaceuticals (TSX-V: AQS, OTCQB: AQSZF) is a rapidly growing specialty pharmaceutical company focused on developing and commercializing high quality, differentiated products. Aequus' sales and marketing efforts are based in Canada, targeting highly specialized therapeutic areas including neurology,



ophthalmology and transplant. Aequus is developing a pipeline of products in neurology and psychiatry with a goal of addressing the need for improved medication adherence through enhanced delivery systems. Aequus intends to commercialize its internal programs in Canada and to establish strategic partnerships to accelerate and maximize the potential of its product candidates worldwide.

GROWTH STAGE MEDTECH COMPANY OF THE YEAR

PRECISION NANOSYSTEMS, INC.

This award is presented to a company developing a non-biopharmaceutical medical technology that stood out in 2015 by achieving major milestones. This award acknowledges a unique solution or product that clearly demonstrates an alternative solution or a next-stage development

in medical technology.

Precision NanoSystems Inc. ("PNI") is a revenue stage biotechnology company based in Vancouver. PNI's proprietary equipment (NanoAssemblr™) and companion Reagent Kits (SUB9KITS™) enable the simple manufacture of novel nanoparticles that are used in medicine (nanomedicine). Nanomedicines are the "FedEx" of the health-care industry and are used for cell-specific delivery of research tools, diagnostic imaging agents and



**PRECISION
NANOSYSTEMS**

drugs to study, diagnose and treat disease. PNI's products solve high-value problems in the discovery, development and manufacture of personalized medicines. PNI's SUB9KITS™ bring clinical-based nanomedicine technologies to scientists to allow them to more rapidly discover the genetic basis of disease. PNI's NanoAssemblr™ platform allows drug developers to develop and manufacture nanomedicines for the treatment of disease faster and easier.

DEAL OF THE YEAR

ARBUTUS BIOPHARMA CORPORATION

This award honours an individual or a service providing organization that, over the last 12 months, has positively impacted on the life sciences sector in British Columbia. Service providers include, but are not limited to the areas of law, finance, accounting, economic development, incubation, clinical research and consulting. This award is open to significant collaborations, transactions or innovations that have taken place between the service provider and companies in the life sciences sector.

Arbutus Biopharma Corporation is a biopharmaceutical company dedicated to discovering, developing and commercializing a cure for patients suffering from chronic hepatitis B (HBV) infection. Its strategy is to target the three pillars necessary to develop a curative regimen for HBV: suppressing HBV replication within liver cells, stimulating and reactivating the body's immune system so that it can mount an effective defense against the virus and eliminating the reservoir of viral genomic material known as covalently closed circular DNA (cccDNA) that is the source of



HBV persistence. Its portfolio of assets includes a broad pipeline of drug candidates for use in combination to develop a cure for HBV. To support continuous discovery of potential novel drug candidates and technologies, Arbutus has a research collaboration agreement with the Baruch S. Blumberg Institute that provides exclusive rights to in-license any intellectual property generated through the collaboration. The Baruch S. Blumberg Institute was established in 2003 by the Hepatitis B Foundation. Arbutus is headquartered in Vancouver, with offices in Doylestown, Pennsylvania.

LIFE SCIENCES COMPANY OF THE YEAR

ZYMEWORKS INC.

This award is presented to a company that is operating in the British Columbia life sciences area and whose accomplishments stood out in 2015 by a strong overall performance. This performance may be measured by achieving major milestones such as moving the business from an early stage to a more mature company, raising significant funds, launching a

first product on the market and/or achieving or nearing commercial success.

Zymeworks is a privately held biotherapeutics company that is developing best-in-class Azymetric™ bi-specific antibodies and antibody drug conjugates for the treatment of cancer, autoimmune and inflammatory diseases. The company's novel Azymetric™, AlbuCORE™ and EFECT™ platforms, and its proprietary ZymeCAD™ structure-guided protein



engineering technology enable the development of highly potent bi-specific antibodies and multivalent protein therapeutics across a range of indications. Zymeworks is focused on accelerating its preclinical biotherapeutics pipeline through in-house research and development programs and strategic collaborations. Its first two therapeutic candidates, ZW25 and ZW33, are scheduled to start Phase 1 clinical trials in the second half of 2016.

Powering Big Data Movement for Global Research

Connect. Collaborate. Share. Accelerate.


Data drives innovation in the life sciences. Collaborative teams in biomedical research, pharmacology, academia, government and national laboratories need to quickly and efficiently exchange and process vast amounts of data. New research technologies – in particular, next-generation genomic sequencing – create tens of gigabytes of data for each experimental run.

Supporting the movement of these huge data sets, Aspera software provides breakthrough high-speed file transfer across the globe for projects such as 1000 Genomes, BGI's "EasyGenomics" cloud-based bioinformatics solution and GigaScience, the online life sciences journal and integrated database.

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