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LIFESCIENCES BRITISH COLUMBIA SOCIETY

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Executive Summary

The Life Science as a sector is built on a foundation of research, development and commercialisation; this does not come cheap. Estimates of drug development run in the neighbourhood of \$1-\$2B from discovery to market and are accompanied by sustainable businesses with patents protection and jobs.

So, this requires the coordination and orchestration of academia, health research & development organizations, the health system and investment by industry that all go into the underpinnings of a life sciences community based on innovation. This will provide for the economic development and contribution to the Province through the companies that are created and developed in British Columbia.

It is a sector that needs nurturing, significant life-long education and training, capable and intelligent minds that pursue the innovation and positively impacts on treatment and patients care. It takes courage and curiosity to be part of this discovery process with everyday heroes who charge ahead to try and find a better way to manage the universal challenge of overcoming illness.

In British Columbia we are fortunate as we already have the key components for a flourishing life science bio-cluster; excellence in research, world class programmes of disease management and the most entrepreneurial-rich region in all of Canada. This is not enough. We can do more and at LifeSciences BC to coalesce the community while prioritising and coordinating our efforts and reduce the redundancy, and waste, of support for life sciences entrepreneurs and the community; we endeavour to do more.

We are a self supporting non-profit organization that generates income from our sponsorship and membership fees. The money is raised daily, weekly, monthly and annually and it is with that money that we endeavour to build a cohesive, integrated and sustainable life science cluster that will benefit British Columbians for years to come. We want to be the best in the world and there is not a scientist, physician, bio-engineer, clinical researcher and innovator in this Province, that doesn't believe we can get there.

We are pursuing the growth of a dynamic and vital life science cluster that includes the Government of British Columbia as a partner. We are asking for a renewable contribution of \$250,000, to grow and strengthen the efforts of the most successful life science sector in Canada.



Overview

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

The Life sciences sector, including biopharmaceuticals, diagnostics, medical technology, digital health and medical devices, are integrated into our organization and all that we do in ensuring that no life sciences sector is working in isolation; the sector comes together in a comprehensive, complementary and coordinated fashion.

Throughout the year, LifeSciences BC undertakes numerous events, 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 thus facilitating investment and global partnering opportunities and helping nurture bio-economic development in British Columbia through the life sciences industry.

B.C. offers a solid foundation for economic opportunities. The province is one of the best jurisdictions to do business, and has recently taken the top spot for business tax competitiveness in a global survey (KPMG, 2012). In addition to offering a favourable economic environment, B.C. possesses an innovative and skilled workforce and is consistently ranked as one of the best places in the world to live. As an association we are leveraging our economic opportunities to pursue a position of significance in the global life sciences sector and have embarked upon a continuing pursuit of raising awareness, while attracting new opportunities to British Columbia.



How We Are Financed

LifeSciences BC is exclusively supported by the sale of memberships and sponsorships at events that are held throughout the year in the Lower Mainland. We receive no government support except for \$20,000 from the Ministry of International Trade to participate at the LifeSciences BC trade booth at BIO International in the United States.

The life science sector and the companies within it are research intensive while at the same time capital intensive. As go the capital markets, the ebb and flow of investors and availability of capital, so goes the life sciences sector. The continual cycling between the ups and downs of the markets results in constant adjustments being managed by companies and their ability to support LifeSciences BC; hence annual operating budgets are uncertain. As a result, the annual sponsorship and membership fees that we rely on to operate, create annual budget planning difficulties. Additionally, we recognize that to serve and advance the life sciences sector we need to focus on building and growing new companies, increase R&D investment into B.C., attracting capital to support growth and gain access for B.C. innovation, both in Canada and Internationally. We need to partner with the provincial government to support out-bound and in-bound trade missions, to attend international conferences to tell our story to the world, to plan local events that will elucidate the integrated life sciences community, (leading academic institutions, formidable R & D institutes and the deep entrepreneurial talent), and to prioritise and coordinate the delivery of support to companies as they move their innovation along the path to commercialisation. These activities will serve to strengthen the foundation of the sector and in turn, stimulate greater economic benefit for the province's bio-economy.

With a staff of four individuals at LifeSciences BC, here is what we deliver;

- >35 networking events a year for our community, attracting approx. 3000 attendees, that showcase local companies and programs at health institutions that are enabling the life sciences sectoral growth,
- LifeSciences BC hosts a JOB BOARD that receives 66,000 hits a month for job seekers looking to work in BC's life sciences sector,
- Twice a week e-newsletter (BioLinks) with a readership of approx. 3200 that details our local companies and life sciences sector globally



- @lifesciences_bc Twitter with > 2700 followers who receive local and international health news from Life Sciences BC,
- LifeSciences BC – Sauder School of Business Summer Internship that places 12-15 MBAs in our companies for the summer (annually),
- Sanofi BioGenius Competition (annually) for Grade 11 & 12 Sciences Students in B.C. to develop 10-20 of their scientific projects, and their abilities, with a mentor at a university laboratory
- HOW TO PITCH DAY for entrepreneurs (annually),
- INVESTOR DAY for BC Life Sciences companies (annually),
- Two out-bound missions to USA (BIO) and the UK (annually) that engages companies and institutions with our expertise and collaborators in these jurisdictions,
- ACCESS TO INNOVATION Conference (annually) that explores the R&D enterprise in the provinces and brings industry and government to discussion mutually beneficial private-public partnerships that impact on health outcomes and reduce healthcare costs
- LifeSciences BC Annual Awards Dinner (last year with 545 participants) that recognises the talent within our community from benchtop researcher to clinical researcher to companies that commercialise innovation as well as those that have supported the growth of life sciences in B.C.

Our ability to continue to support and deliver this level of activity for the life sciences community requires greater and consistent support from the province. LifeSciences BC is one of the only life science associations operating in Canada that does not receive any provincial financial support and yet we are recognised as delivering the highest quality programs and collaborative opportunities across Canada.

Finally, this sector success will positively impact on the GDP contribution to the province. Therefore, we ask for your financial support in the amount of **\$250,000** annually. Half of this amount will be put towards a position to focus on Government-Industry collaboration through life sciences industrial policy work around i) Access to Capital, ii) Access to Data (under anonymized-aggregate privacy framework), iii) Access to R&D to continue to drive the innovation that powers the life sciences industry and iv) Access to Talent, creating and finding jobs in the life sciences. The other half will be used to support the policy fora and publications that will be presented to government on behalf of the life sciences sector.



Whom Do We Represent?

In British Columbia where our active life sciences community continues to make advances through collaboration while creating value across the province, we need to reach further, beyond our provincial and national borders, if we really and truly are committed to growing a globally recognised life sciences community. Life sciences R&D and industrial pursuits are part of the global enterprise and the B.C. life sciences community cannot succeed in isolation; our community must be globally focused and engage with willing and able partners around the world.

In September 2013, LifeSciences BC released *Growing Canada's Bio-Economy – An Economic Overview*, a report detailing the sector's footprint in British Columbia.

The following is a reflection from this report indicating the impact of the life science cluster in B.C.

- Number of life sciences organizations in British Columbia: 310
- Total estimated expenditures: \$902 million
- Total estimated employment: 8,500 FTEs (direct) + 5,500 FTEs (indirect) = 14,000 FTEs
- Total estimated wages and salaries paid: \$570 million
- Average annual life sciences industry wage: \$68,000
- Total estimated life sciences research funding from for-profit, not-for-profit and government organizations: \$424 million
- Total estimated impact on provincial GDP: \$1.03 billion



The BC Life Science Cluster

British Columbia has the third largest cluster of life sciences organizations in Canada and plays an important role in the growing global life sciences industry. Prominent commercial organizations include; STEMCELL Technologies, Arbutus Biopharma (formerly Tekmira), StarFish Medical, Aquinox Pharmaceuticals, Xenon Pharmaceuticals, Zymeworks and Amgen British Columbia, to name just a few local companies. Also, we have significant health organizations including; Genome British Columbia, the Michael Smith Foundation for Health Research, the Centre for Drug Research and Development (CDRD) and the Life Sciences Institute at UBC.

The health institutions in this province are strong and enable the development of innovation. These include; BC Cancer Agency, BC Renal Agency, Prostate Centre, Centre for Brain Health, Institute for Heart and Lung Health, PROOF, HIV/AIDS Centre of Excellence, as well as the five Health Authorities, Vancouver Coastal Health Research Institute, and Providence Health Care Research Institute. These organizations and many others hold the promise of rapid innovation development, spin off companies into new commercial enterprise, and develop products & services that have and will continue to contribute to the province's successful and dynamic life sciences sector.

B.C.'s life sciences industry has proven to be successful in translating commercially promising health research into new treatments that improve patient outcomes and save lives. Each year, the sector develops novel technologies and clinical practices while advancing other research towards commercialization. With the guidance and expertise of world-renowned talent, B.C. is quickly becoming a global leader in moving academic discoveries beyond concept and into the clinic.



Life Science Community Profile *(See Appendix A for Member & Sponsor listing)*

Our community continues to grow, and in the case of BC biotechnology and medical technology, 2014 - 2015 was a lift for the industry. With six IPOs, the BC life sciences community had much to celebrate in terms of value creation: Aquinox Pharmaceuticals in March '14 (\$53.1 M) and September '15 (\$109.25M); Xenon Pharmaceuticals (\$41.4 M); Neovasc (\$86.8M); ProNAi Therapeutics (\$158.4M), all listed on NASDAQ. Aequus Pharmaceuticals and ESSA Pharmaceuticals were both listed on TSX Ventures and DelMar Pharmaceuticals (\$2.6M) listed on OTCQX. Each of these public offerings was the result of years of research & development, passion for patient care, and a commitment to success and community support.

In addition, there was significant private capital invested in B.C. life science companies including: Tekmira (now Arbutus Biopharma) (\$14.5M), Aurinia Pharmaceuticals (\$52 M), Cardiome (\$60M), and Zymeworks (\$19M). This is indicative of a sector that provides solid returns to investors and shareholders and can attract FDI into the province going forward.

Attracting large global partners in collaborative deals is another important activity in our sector. A large number of significant partnership & agreements have been established and are on-going, including: Zymeworks & Eli Lilly, MedGenesis & Pfizer, PHEMI & Merck, Xenon & Genentech/Roche, Augurex & LifeLabs. We also have a number of British Columbia/China agreements in place, including: Response Biomedical & Hangzhou JoinStar; DelMar Pharmaceuticals & Guangxi Wuzhou Pharmaceuticals; Sirona Biochem & Wanbang Pharmaceuticals; Ondine Biomedical & Zhengzhou Zhenghe Medical Devices; Cardiome & EddingPharm. We believe that these agreements are the harbinger of life sciences collaboration and business with the Chinese. In addition, these successful partnerships are demonstrative of a sector that has the ability to attract global investments to build a sustainable bio-economy in B.C.

New companies also continue to be formed with the Centre for Drug Research and Development (CDRD)/CVI spinning out Kairos and Sitka. CDRD continues to establish itself in the innovation space by establishing collaborations with innovation institutes and large pharma including Pfizer, GlaxoSmithKline, Johnson & Johnson, and Hoffman La-Roche.

Genome British Columbia's leading edge genomics development continues to advance personalised and precision medicine in B.C. The Personalised Medicine Institute (PMI) hosted its first ever SUMMIT meeting to explore how to



stimulate uptake of genomics into the B.C. healthcare system. Working with PwC, PMI was able to articulate the ROADMAP to aid B.C. in being at the forefront of genomics in Canada.

Whether it is the excellent basic research carried out at our universities & colleges, the pre-clinical work that gives way to clinical research¹, or B.C.'s entrepreneurial spirit, our community's collaboration results in solid and lasting value for not only the life science sector, but the overall health of the B.C. bio-economy.

¹ There are >800 open/active clinical trials in B.C., which is 21% of all open/active trials in Canada.



Continuing to Grow – the Challenge for Life Sciences in BC

Continuing to grow and contributing to the economy is a significant challenge for any sector.

British Columbia has all the needed ingredients to commercialize innovation. We are home to one of the most entrepreneurial regions in North America. B.C.'s strength is in developing companies, and our province is home to a significant number of life sciences start-ups. Yet we need an established methodology to grow these start-ups into SMEs (small to medium-sized enterprises) and beyond. Limitations in human and financial resources are a pressing challenge that requires our focus in order to develop our companies, our community, and our cluster.

The life sciences industry is part of the larger life sciences community in B.C., which includes academia, research institutions, health institutions/authorities, hospitals, and government. The innovation that is critical to our industry is dependent upon our ability to support academics that do research. Equally critical is the rapid identification of commercialization potential, which can then lead to pre-clinical/clinical research and expedite the process to bring the innovation to life.

Both our provincial and federal governments have continued to support this knowledge-based economy at the early stages of commercial development – the challenge is now to support access to innovation. The ecosystem that is the foundation of the life sciences industry requires coordination from the entire community and a focus on efforts to accelerate access to innovation.



What are the Priorities for LifeSciences BC ~ *Continuing to Grow*

Our priorities are many, but growing and supporting the B.C. life sciences bio-cluster is our biggest goal as a non-profit society representing this vital economic engine.

How do we get there?

- We need to review how companies access resources to allow them to grow and coordinate their support.
- We need to explore how we can collectively attract investment and investors to B.C., be they Angels, Venture Capitalists or Corporate BioPharma Venture, to fund innovation and build companies.
- B.C. needs to become an attractive destination to perform clinical research for international organizations. The quality of the clinical research performed in our health institutions and hospitals is not in question; rather, it is our ability to deliver this at a competitive global price point.
- We must attract talented individuals who are not only employees for our companies but will also inject new ideas and energy in the development of our B.C. community.
- Our success is rooted in prioritizing and coordinating the development of our life science companies, our community, and our bio-cluster in B.C.
- Our ability to work collaboratively will establish the foundation of our future bio-economy, which will deliver both improved economic value and better health for British Columbians.

Appendix A - LifeSciences B.C. Sponsors & Members

<p>AbbVie Corporation AbCellera ACCT Canada ACETECH AdvantageBC Aequus Pharmaceuticals Inc Ag-West Bio Inc. Alectos Therapeutics Inc. Amgen British Columbia Inc. AON Aquila Veterinary Diagnostics Ltd. Aquinox Pharmaceuticals Inc. Arbutus Biopharma Corporation ARC Medical Devices Inc. Aspect Biosystems Ltd. Aspera, an IBM company AstraZeneca Canada Inc. Augurex Life Sciences Corp. Aurinia Pharmaceuticals Aurora Biomed Inc. B.C. Technology Industry Association BC Cancer Agency BC Preclinical Research Consortium BCIC Biocan Diagnostics Inc. Biofilm MEDIA Biolux Research Ltd. Biopep Solutions Inc. BioPharma Solutions BioTalent Canada BIOTECanada Blake, Cassels & Graydon LLP Blender Media Boehringer Ingelheim (Canada) Ltd. Borden Ladner Gervais LLP Boreal Genomics Bovivor Pharmatech Inc. Bridge Solutions Group British Columbia Centre for Excellence in HIV/AIDS British Columbia Clinical Research Infrastructure Network Bull, Housser & Tupper LLP</p>	<p>Campbell & Co. Strategies Canada Tidybio Science and Technology Co Canada's Research-Based Pharmaceutical Companies Canadian External Quality Assessment Laboratory Celator Pharmaceuticals Celgene Corporation Centre for Heart Lung Innovation Chernoff Thompson Architects Christensen O'Connor Johnson Kindness Conquer Mobile Contextual Genomics CPG Systems Inc. Curatio Networks Inc. Del Mar Pharmaceuticals DigiBC Discovery Parks DTG Partners DuMoulin Black LLP E-Fund Emergo Group EMMES Canada ESSA Pharma Inc. Eupraxia Pharmaceuticals Inc Farabloc Development Corp. Farris, Vaughan, Wills & Murphy LLP Fasken Martineau DuMoulin LLP Flanders Investment & Trade Fusion Genomics Corporation GE Healthcare Life Sciences Genome British Columbia Genome Me GenomeDx Biosciences Inc. Genzyme Canada GlaxoSmithKline Gowling Lafleur Henderson LLP Hoffmann-La Roche Ltd. iCo Therapeutics Inc. ICORD</p>	<p>Innovatek Medical Inc. Innovation Boulevard Innovative Targeting Solutions IonsGate Preclinical Services iProgen Biotech Jackson Laboratory Janssen Inc. JBL Group Inc. Kardium KPMG LLP Leapfrog Innovators Consultancy Inc. Lifescan Canada Ltd. LightIntegra Technology Inc. LionsGate Technologies Inc. (LGTmedical) Lipont Pharmaceuticals Malachite Management Inc. McCarthy Tétrault LLP MedGenesis Therapeutix Inc. Medisacare Inc. Merck Canada Inc. Michael Smith Foundation for Health Research MPI Research MSI Methylation Sciences Inc. National Research Council Canada Neovasc Inc. Network Immunology Inc. Neurodyn Life Sciences Inc. New β Innovation Limited NEXSM Inc. Northern Lipids Inc. Northview Ventures Novartis Pharmaceuticals Canada Inc. Novateur Ventures Inc. NSERC Pacific OGEE Finance Solutions Corp OncoGenex Pharmaceuticals, Inc. Ondine Biomedical Inc. Oyen Wiggs Green & Mutala LLP Pfizer Canada Inc. PHEMI Systems</p>	<p>Phyton Biotech PI Pharma Inventor Inc. PR1ME Precision NanoSystems, Inc. ProNAi Therapeutics, Inc. PROOF Centre of Excellence Providence Health Care Research Institute PwC Qu Biologics Inc. ReFlex Wireless Inc. RepliCel Life Sciences Inc. Research Universities' Council of British Columbia Response Biomedical Corp. Rick Hansen Institute Rostrum Medical Innovations Inc. Sanofi Group Seed Intellectual Property Law Group PLLC Simon Fraser University Sirona Biochem Corp. Sitka Biopharma Inc. SOHO Biotech Inc. Sorin Group Canada Inc. StarFish Medical STEMCELL Technologies Inc. Student Biotechnology Network Symvivo Incorporated Tait Laboratories Inc. Takeda Canada Inc. Tantalus Medical Communications Tel-Array Diagnostics Inc. TELUS Health The Centre for Drug Research and Development The Clinical Trial Company (Canada) Ltd Trinity Western University, Department of Biology TRIUMF True North Synergy UBC Faculty of Pharmaceutical Sciences University of BC - Sauder School Of Business University of British Columbia</p>	<p>University of British Columbia - UILO University of Northern B.C. University of Victoria Vancouver Board of Trade Vancouver Coastal Health Research Institute Vancouver Economic Commission VANTEC Versant Ventures Viable Healthworks Corporation viDA Therapeutics ViewsIQ Inc. VWR International Ltd. Washington Biotechnology & Biomedical Association Wavefront Wireless Innovation Society of BC Wax-it Histology Services WEX Pharmaceuticals Inc. World Courier of Canada Ltd. Xenon Pharmaceuticals Inc. Zymeworks Inc.</p>
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<p>Business In Vancouver</p>	<p>ImStar Therapeutics Inc. Inception Sciences Canada Inliant Dental Technologies</p>	<p>Phoenix Molecular Diagnostics</p>		
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