Prostate cancer is the most common malignancy diagnosed in North American men with one in seven men developing the disease during his lifetime. One in six of those men will die from the disease. The exact cause of prostate cancer is still unknown though a combination of genetic, nutritional and environmental factors appear to play a role in its development.

Men diagnosed with low risk prostate cancer are often best monitored on active surveillance, delaying intervention for several years. Higher risk cancers diagnosed when locally confined are often amenable to cure with surgery or radiotherapy. Prostate cancer can spread to other parts of the body (metastasize), or may recur after initial surgery or radiotherapy, requiring systemic therapy with androgen deprivation therapy (ADT).

Following ADT, cancer can adapt to become resistant and recur as life threatening castrate resistant prostate cancer (CRPC). The development of treatment resistance is the main obstacle to improving survival and the quality of life for cancer patients.

The Vancouver Prostate Centre (VPC) is focused on understanding how this cancer resistance occurs and on developing new therapies to overcome it to improve cancer outcomes and to promote regional growth of biotechnology.
The mission of the Vancouver Prostate Centre is to foster the paradigm of team-driven translational health research to discover molecular mechanisms of cancer progression and therapeutic resistance, and to use this information to develop new services and products that reduce suffering, improve survival for patients with cancer and promote regional growth of biotechnology.
The VPC is an integrated, multi-disciplinary team focused on prostate disease at every level with ongoing research to improve diagnosis, treatment, outcomes and education.

This melding of treatment and research on one site, to focus specifically on prostate cancer, is unique in Canada and represents a classic model of translational research and excellence in clinical care. The VPC is considered one of the top translation cancer research centres in the world. The engagement and generosity of local business leaders since the early years has played an integral role in leveraging growth and raising the profile of the VPC. As an embedded centre in the community and the go-to place for any man in British Columbia with prostate issues, the VPC has remained at the top of its game and is an international leader in research, training, education and clinical care.

The strength of the VPC can be traced back to the founding surgeon scientists - Dr. Larry Goldenberg, Dr. Martin Gleave and scientist Dr. Paul Rennie, when they consolidated their laboratories on the Vancouver General Hospital campus under the umbrella of the Vancouver Coastal Health Research Institute. Over the last decade and a half their pivotal work in the application of neoadjuvant hormone therapy, intermittent ADT, active surveillance, mechanisms of treatment resistance, drug development and more recently, the introduction of circulating tumour assays and precision oncology have solidified the VPC as a major contributor to improved outcomes of new diagnoses of prostate cancer. In that time the life expectancy of men with CRPC has more than tripled, thanks to the introduction of several new drugs and a better understanding of how to use them, but there is much more to do to combat this disease.

1998
The VPC receives its first Terry Fox Foundation program/project grant.

1998
The prostate cancer team moves to a larger facility at the Jack Bell Research Centre to accommodate growth and momentum.

1999
Local businessman Jim Pattison donates $20 million to the Prostate Centre at VGH. The VGH and UBC Hospital Foundation launches a $45 million campaign to raise matching funds. Health Canada, under the direction of The Honourable Allan Rock, names the Prostate Centre at VGH and BCCA as a National Centre of Excellence with a grant of $10 million.

2001
The Canadian Prostate Cancer Research Initiative awards $600,000 to the Prostate Centre at VGH, for the creation of a Training and Education Centre for Prostate Cancer.
DEFINING AND TARGETING DRIVERS OF TREATMENT RESISTANCE

Our research has created breakthroughs in understanding disease progression, discovered new drugs and biomarkers to control treatment resistance, and attracted international partnerships and clinical trials, while expanding our province’s biotechnology sector.

2001
The Terry Fox Foundation/NCIC announces that Dr. Rennie and his team of investigators have been awarded a five-year renewal research grant totaling $6.3 million to continue their work on the study of prostate cancer progression has been renewed every five years since then.

2001
The VPC partners with the University of Washington for the first national Specialized Programs of Research Excellence (SPORES) in prostate cancer.

2001
The VPC spins out OncoGenex, a drug discovery and development company founded by Dr. Gleave and team, uniquely focused on the challenge of cancer treatment resistance.

2002
Western Economic Development Fund provides $1 million to fund renovations and expansion of the Gene Array Facility/Genome BC Microarray Platform.
While many new drug therapies induce responses and prolong survival, most cancers adapt and develop treatment resistance. To combat this, the VPC integrates world-leading genomics, structural biology, translational cancer research and computer aided drug design (CADD) to optimize and accelerate cancer drug discovery. This research has created breakthroughs in understanding disease progression, discovered new drugs and biomarkers to control treatment resistance while expanding our province’s biotechnology sector, and attracted international partnerships and clinical trials.

Over the past decade, the investment made by the national Networks of Centres of Excellence (NCE) and the Canadian Foundation for Innovation (CFI) into the VPC has established an international centre of excellence in discovery cancer research: Prostate Centre’s Translational Research Initiative for Accelerated Discovery and Development (PC-TRiADD). PC-TRiADD is a globally unique, research-driven, prostate cancer drug design pipeline comprised of five powerful research cores.

2004
Dr. Martin Gleave and team are awarded $19.2 million from the Canada Foundation for Innovation for infrastructure funding for the Prostate Centre’s translational research program PC-TRiADD.

2006
Dr. Martin Gleave is appointed as Executive Director of the Prostate Centre at VGH. The Terry Fox Foundation renews funding for the VPC for a third time.

2007
Introduction of surgical robotics thanks to a generous donation from the late Mr. Jack Poole and his wife Darlene.

2008
The Prostate Centre’s Translational Research Initiative for Accelerated Discovery and Development (PC-TRiADD) is named as a national Centre of Excellence for Commercialization and Research by the Networks of Centres of Excellence and awarded $15 million in funding.
Through its five cores — Genomics and Computer Science, Molecular Pathology, Functional Genomics, Therapeutics Development and Clinical Trials — VPC researchers identify novel protein targets, then structurally characterize and screen them to design new drugs.

This expertise, focusing specifically on treatment-resistant cancer, is a world first. Its ability to accelerate the discovery of novel new drugs for previously “undruggable” cancer targets makes the VPC a globally unique centre. What distinguishes the VPC is the team-based organization and research cores that integrate oncology, genomics, pathology, biobanking, computer science (including bioinformatics and CADD), engineering, biology, animal models and drug technologies.

2009
Cutting-edge computer aided drug modeling and design enables huge advancements in drug therapy development.

2009
The name is changed to Vancouver Prostate Centre and ground is broken on a new research building with support from the Canadian Foundation for Innovation and a generous donation from Mr. Robert H. N. Ho.

2011
The Robert H. N. Ho Research Building is completed and the VPC gets much needed laboratory and research space. The Terry Fox Research Institute (TFRI) commits a fourth renewal for the VPC.

2012
NIH SPORE is renewed for a second time.
The VPC’s translational cancer research model uniquely integrates genome sequencing from tissue biopsies and circulating tumour DNA in plasma to pathway analysis and biologic mechanisms of treatment resistance in unique model systems. Unlike many other centres that focus on genomic evaluation of biopsies at diagnosis, the VPC’s genomic profiling focuses on treatment resistant and metastatic cancers. Coupled with longitudinal clinical follow-up (before, during and after treatment) these enable the study of the evolution of treatment resistance in patients. These key components of precision oncology are established at VPC and are already guiding treatment decisions in patients with advanced cancer.

The functional interpretation of genomic data sets linked to CRPC is enabled by deep and broad expertise in cancer biology (metastasis, invasion, and drug resistance), structural biology, preclinical modeling (e.g. patient-derived organoids, xenografts), drug discovery, and molecular imaging. These capabilities support functional evaluation of genes, prioritization of cancer-driving targets, and preclinical/clinical pharmacology testing of promising drug candidates. Underpinning this richly diverse and highly collaborative environment is an established track record in traversing the bench-to-bedside gaps, with programs in experimental therapeutics and Phase I, II and III clinical trials.

2013
Prostate Cancer Survivor Care (PCSC) program is embedded throughout clinical care process with a $500,000 investment from the BC Medical Association and the Province of BC.

2013
The Vancouver Prostate Centre’s PC-TRIADD program receives an additional award of $11.3 million for 2013 - 2018 as a CECR.

2014
Beijing Genomics Institute (BGI), the world’s largest genomics organization, and the VPC announce the establishment of the BGI-VPC Joint Research Laboratory, a sequencing and translational research facility, to jointly discover and advance basic and translational programs in oncology, including precision oncology. The collaboration is the first between BGI and any Canadian research institution.

2015
The VPC leads UBC’s richest intellectual property deal in its history – over $140 million USD with pharmaceutical giant Roche.
The VPC is led by Dr. Martin Gleave (Director) and Co-Directors of Development (Dr. Larry Goldenberg), Laboratory Research (Dr. Paul Rennie), Clinical Research (Dr. Kim Chi), Genomics (Dr. Colin Collins), and Operations (Dr. Graeme Boniface). Dr. Gleave, Distinguished Professor and Chair of the Department of Urologic Sciences at UBC, was awarded a BC Leadership Chair in 2005; the 2007 BC Innovation Council Frontiers in Research Award; the Barringer Medal from the American Association of GU Surgeons; the Eugene Fuller Award from the American Urological Association (AUA); the Aubrey Tingle Prize from the Michael Smith Foundation for Health Research; and the NCIC William Rawls Award for contributions to cancer control in Canada. Dr. Goldenberg was named to the Order of British Columbia in 2006 and the Order of Canada in 2009 for his contributions to prostate cancer and men’s health, and received the Hugh Hampton Young Award from the AUA in 2017. In 2007, Dr. Rennie was inducted into the Canadian Academy of Health Sciences. Dr. Kim Chi is Director of the Vancouver Cancer Centre (BCCA) and Chair of GU cancer trials section of the Canadian Cancer Trials Group.

The VPC today includes a team of 24 Senior Scientists from around the globe who bring with them international collaborations and funding opportunities. It is this group that is mentoring and building the next generation of scientists and clinicians. But all of this – the breakthroughs, the people, buildings, equipment and energy - takes consistent, ongoing investment. Every dollar brought into the VPC is spent on research and highly leveraged at a one to four ratio by attracting competitive research grants, industry partnerships, and out-licensing of patent-protected discoveries. Government investments reap rewards economically in the form of highly trained personnel and spinout companies that directly impact the local economy.

The VPC is housed in a 60,000 square foot, CFI-funded, state-of-the art research laboratory space and an adjacent clinic that treats over 2,500 prostate, bladder and other urologic cancer patients annually. The VPC is also home to an integrated Clinical Trials Unit which enables the evaluation of promising new treatments to improve survival for men with prostate cancer, and a Prostate Cancer Supportive Care (PCSC) Program to assist knowledge dissemination and study of cancer survivorship. The PCSC Program offers a comprehensive survivorship program for prostate cancer patients, their partners and their family from the time of initial diagnosis to end of life care.

Over the next five years the VPC will capitalize on convergent advances in genomics, structural biology, and computer sciences to expand its computer-aided drug design (CADD) platform and enhance its drug discovery capabilities. We are collaborating with D-Wave Systems Inc. to integrate advanced computer modeling for this purpose. Identification of drugs that inhibit protein targets associated with treatment resistance is critical to improve control of cancer progression. In parallel, the VPC is developing plasma circulating tumour DNA assays to better risk stratify cancers and support drug discovery in Vancouver and globally.
Drs. Paul Rennie and Artem Cherkasov are working on the development of novel anti-androgens which target new sites on the androgen receptor. Their approach is designed to outsmart prostate cancer by targeting a site in the cancer cells that is not prone to mutation, thought to be a significant reason why drug resistance may occur. One of these drug candidates, targeting the DNA binding site of the receptor, led to UBC’s largest licensing deal with Roche Pharmaceuticals.

Dr. Amina Zoubeidi’s research program addresses the importance of various signaling pathways in prostate cancer. With her collaborators she has studied a highly aggressive form of cancer that sometimes emerges as an adaptive mechanism in patients undergoing ADT called treatment-induced neuroendocrine prostate cancer (NEPC). Dr. Zoubeidi’s discovery of the protein driving the emergence of NEPC (BRN2) has allowed her to use genome editing CRISPR technology to turn off the gene producing that protein. When the gene was turned off, the emergence of NEPC was prevented. Combined with Dr. Xuesen Dong’s important work of understanding the gene splicing mechanisms occurring during the development of treatment-induced NEPC, there are now novel prospects to target the resistance mechanisms with new drugs that may improve outcomes in this lethal form of the disease.

Dr. Martin Gleave’s multidisciplinary program was the first to develop novel antisense drugs targeting clusterin and Hsp27 (OGX-011, OGX-427), leading to founding of OncoGenex (Canada’s biotech Company of the Year, 2010) and the first human studies and later phase II and III trials showing anti-cancer activity in prostate, lung and bladder cancer when administered in combination with standard-of-care treatments. More recently his team has successfully crystalized the hsp27 protein and discovered a new small molecule inhibitor (VPC-27) using CADD. Dr. Gleave is also developing a biocompatible polymer paste formulation that allows sustained delivery of active drugs at site of injection, accurately delivered using MRI-ultrasound fused image-guided injection. ST-4PC is loaded with docetaxel and bicalutamide for image-guided injection into early prostate, bladder, and kidney cancers. Several other drug pastes in development include therapeutics targeting post-surgical incisional pain and chronic pain control.
Recently a study led by Dr. Wyatt and Dr. Kim Chi using this technology demonstrated that metastatic treatment-resistant prostate cancer patients with certain genetic characteristics will respond poorly to androgen receptor-targeted therapy. This key discovery confirms that tailoring treatment to patients, as in the MyPOP program where every patient with aggressive prostate cancer has their genome sequenced, is a major advancement in prostate cancer care. This precision medicine approach enables the care team to develop more insight into which drug therapies should be delivered to a particular patient at an appropriate time.

Dr. Alex Wyatt works on the development of liquid biopsy techniques and the use of serial circulating free DNA sequencing for the analysis of tumour mutations, the outcome of which may be used for precision medicine. Previously, the only only way to genetically profile a person’s metastatic cancer was through a bone biopsy, which is expensive and painful, difficult to target, and associated with complications. His work has garnered international attention with high impact publications and several grants to optimize and produce prognostic and predictive tests.

Dr. Chris Ong investigates molecular mechanisms of disease, and develops new targeted therapies for treating a variety of diseases, including prostate cancer and immune related disorders such as transplant rejection and inflammatory diseases. A strong underlying basis of his research efforts is in translational research with the aim of translating laboratory-based discoveries into new therapeutics. He has identified a key signalling protein, SEMA3C, that functions as a master regulator of growth and survival of prostate cancer and is now working to develop novel protein therapeutics to inhibit this pathway.

Dr. Mads Daugaard has pioneered a novel approach to stopping tumour growth. A drug created from a malaria protein stopped tumour growth of chemotherapy-resistant bladder cancer in preclinical models, offering hope for cancer patients not responding to standard treatments. This was the first time that malaria proteins for cancer therapy was put into a direct clinical context. The study advanced previous research that showed that a protein from the malaria parasite, called VAR2CSA, could target a wide range of cancer tumours. A spinoff company is now progressing this promising new therapy towards clinical trials.
**Dr. Colin Collins** is focused on the sequencing of tumours and surrounding tissue, and building novel databases to address clinically relevant questions such as distinguishing between indolent vs. aggressive cancer. Much of his work uses computer science and bioinformatics to perform sophisticated data analyses. This work provides fellow scientists with a focus for validation and evaluation of new drug development.

**Dr. Yuzhuo Wang** discovered how the membrane transporter MCT4 allowed cancer cells to reprogram cell metabolism to increase energy production and export excessive lactic acid. MCT4 antisense inhibitors suppressed tumour growth by decreasing cancer cell intra-cellular pH and/or increasing tumour microenvironment pH, helping restore host anticancer immunity. Supported by the CADD platform in VPC, novel antisense and small molecules targeting MCT4 have been generated and a spin-off biotech company (LAST Innovation) established.

**Dr. Peter Black** is working on new methods to predict which patients with bladder cancer will respond to chemotherapy and which patients may not, potentially sparing the latter from the toxicity of chemotherapy. He has developed a gene signature panel which has been licensed to a local diagnostic company, GenomeDx, and is being validated in larger clinical cohorts prior to commercial launch.
EXECUTIVE TEAM

Dr. Martin Gleave

Executive Director, Vancouver Prostate Centre
Chief Executive Officer, PC-TRiADD
Distinguished Professor and Head, Department of Urologic Sciences, University of British Columbia
BC Leadership Chair in Prostate Cancer Research

Dr. Gleave (MD, FRCS, FACS) is a clinician-scientist and urologic surgeon. His major research focus involves the study of cellular and molecular mechanisms mediating progression of prostate cancer to its lethal stage of androgen independence, and use of this information to develop integrated multimodality therapies that specifically target these mechanisms.

Dr. Larry Goldenberg

Director of Development and Supportive Care, Vancouver Prostate Centre
Professor, Department of Urologic Sciences, University of British Columbia
Stephen A. Jarislowski Chair in Urologic Sciences at VGH

Dr. Goldenberg (CM, OBC, MD, FRCS, FCSA, FCAHS) is a urologic surgeon and clinical scientist with an international reputation for excellence in prostate cancer research and treatment. His current research involves the evaluation of the role of multiparametric MRI in prostate cancer, the potential use of focal therapy, patient education, daVinci robotic prostatectomy and novel treatments for benign prostatic hyperplasia. He has been recognized for his contributions to health care by being inducted into the Order of British Columbia and the Order of Canada.

Dr. Paul Rennie

Director, Laboratory Research, Vancouver Prostate Centre
Professor, Department of Urologic Sciences, University of British Columbia

Dr. Rennie is a PhD research scientist. His current research is aimed at determining how androgens regulate gene transcription and how to use this knowledge to prevent progression to androgen independence in prostate cancers. He is also studying prostate-specific elements of gene promoters and working to develop lentiv and herpes virus-based vectors as a targeting vehicle for delivery and prostate-specific expression of genes that can control or kill prostate tumour cells.

Dr. Graeme Boniface

Chief Operating Officer, Vancouver Prostate Centre
Chief Operating Officer, PC-TRiADD

Dr. Boniface joined the Prostate Centre in 2008 as COO, after more than 20 years in drug development in both the academic and private industry sectors. Prior to joining the Centre, he was Senior Director of Clinical Research at QLT Inc. where he oversaw the clinical development of the company’s drug platform in Oncology, Urology, Dermatology, and Endocrinology indications. Trials conducted by his team have lead to successful regulatory marketing approvals by the US FDA, Canadian, and European agencies.

Mr. Brian Shankaruk

Chief Financial Officer, Vancouver Prostate Centre
Chief Financial Officer, PC-TRiADD

Brian Shankaruk has over 25 years experience in the financial field. For 20 years prior to joining the Centre, Brian worked in the insurance and financial services industry, focusing on Canadian and US statutory government reporting. Brian studied accounting at UBC and received his Certified General Accountant designation in 1990 from the Certified General Accountants Association of BC. He was admitted to the Chartered Professional Accountants Association of BC in June 2015.

Dr. Kim Chi

Associate Director, Clinical Research, Vancouver Prostate Centre
Senior Research Scientist, Vancouver Prostate Centre
Regional Medical Director, BC Cancer Agency – Vancouver Centre
Medical Oncologist, BC Cancer Agency – Vancouver Centre
Director, Clinical Research, BC Cancer Agency
Professor, Department of Medicine, University of British Columbia

Dr. Chi is a medical oncologist with the BC Cancer Agency who, at a relatively early stage in his career, has received national and international recognition for his contributions to prostate cancer research.

Dr. Colin Collins

Senior Research Scientist, Vancouver Prostate Centre
Director, Laboratory for Advanced Genome Analysis, Vancouver Prostate Centre
Professor, Department of Urologic Sciences, University of British Columbia

Dr. Collins is a PhD research scientist and Director of the Laboratory for Advanced Genome Analysis (LAGA). In addition, he is an associate adjunct professor at the University of California San Francisco (UCSF) Helen Diller Family Comprehensive Cancer Center and a visiting scientist at Lawrence Berkeley National Laboratory. He has held positions at Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, and UCSF.
The government of BC invests $6 million into the PCSC Program to expand its network across the province.

Large, multi-year programmatic research grants from the Terry Fox Research Institute, Prostate Cancer Canada and the Prostate Cancer Foundation have supported ongoing research and a key objective around supporting trainees, postdoctoral fellows and knowledge sharing. The VPC’s research team is training the next generation of scientists and clinicians, and has spun out numerous successful companies.

Thanks to the generosity of our donors over the past two decades, Vancouver Prostate Centre researchers and clinicians have:

› Developed and delivered optimized care to BC men with prostate cancer.
› Created a globally recognized Centre of Excellence in prostate cancer research that attracts top research talent.
› Discovered and developed a number of new drugs and biomarkers, and led numerous human studies in prostate, kidney, and bladder cancer.

MAJOR INDIVIDUAL DONORS

The VPC has benefitted greatly from the generous donations of individuals including:

Jim Pattison
Bill and Lilian Hudson
R Stuart (Tookie) Angus
Dick and Val Bradshaw
Bruce Buchanan
Jack Diamond (Diamond Foundation)
Gordon Shrum
Robert H. N. Ho
Wilbur Couling
John and Cheryl Aldred
Doug MacDonald
Jack and Darlene Poole
Ted Tickner

“We thought prostate cancer was a slow moving, old man’s disease. I was diagnosed with an aggressive, invasive kind. We know now that it’s not just a men’s disease — it affects everyone.”

— Rod Senft, Patient and Board Member

DONATING/FUNDING

2016

The TFRI renews its commitment of VPC funding for a fifth time.

2016

A patient donation of $10 million enables the VPC to complete the development of MyPOP (My Precision Oncology Program) for sequencing patients with prostate, bladder and kidney cancers.

2017

The government of BC invests $6 million into the PCSC Program to expand its network across the province.

“We thought prostate cancer was a slow moving, old man’s disease. I was diagnosed with an aggressive, invasive kind. We know now that it’s not just a men’s disease — it affects everyone.”

— Rod Senft, Patient and Board Member
BY THE NUMBERS SINCE 2008

As a vibrant, integrated research and innovation hub, the Vancouver Prostate Centre has continued to have major impact in all aspects of its key objectives by improving cancer outcomes.

ACCELERATE DISCOVERY, DEVELOPMENT, AND COMMERCIALIZATION OF ANTI-CANCER THERAPEUTICS AND CANCER BIOMARKERS.

PROMOTE REGIONAL AND NATIONAL GROWTH OF THE BIOTECHNOLOGY SECTOR.

9 NEW COMPANIES SPUN-OFF

10 NEW DRUGS ADVANCED THROUGH DEVELOPMENT

$19m IN NEW CONTRACTS
ENHANCE COMMERCIALIZATION OF OUR EXPERT SERVICES, NOVEL PRODUCTS, AND PATENTED TECHNOLOGIES.

- 277 PATENTS ISSUED/FILED
- 198 PEER-REVIEWED RESEARCH GRANTS WORTH: $92.1m

IMPROVE MANAGEMENT OF CANCER PATIENTS IN BC AND CANADA. ACCESS TO NEW DRUGS, AND NEW CLINICAL TRIALS.

- 2179 PATIENTS ENROLLED IN:
- 125 NEW CLINICAL TRIALS
HOW TO GIVE:

The Vancouver Prostate Centre receives directed donations through the VGH & UBC Hospital Foundation, the UBC Faculty of Medicine and the Sullivan Urology Foundation.

www.prostatecentre.com/donate

INSTITUTIONAL PARTNERS

As with any successful research enterprise the key to success is establishing and maintaining strong networks and partnerships with local, national, and international collaborators, as well as funders, patients and benefactors.