Blood Cancer Research: A PROMISING NEW ERA BEGINS

“...I’m truly excited to get started on projects that will make a real difference for people here in B.C. and beyond.”

—Dr. Florian Kuchenbauer, clinician-scientist, BC Cancer

PLUS

DR. PARVEEN BHATTI TAKES HELM OF BC CANCER’S PREVENTION TEAM

BC CANCER AND MICROSOFT ESTABLISH GAME-CHANGING PARTNERSHIP TO ANSWER CANCER’S MOST COMPLEX QUESTIONS

PREDICTING TREATMENT RESPONSE IN BLADDER CANCER
Cloud computing breaks down cancer
A unique partnership between BC Cancer and Microsoft’s Azure accelerates the pace of research.

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The BC Cancer Foundation is the fundraising partner of BC Cancer. Together with our donors, we are changing the outcome for people affected by cancer in B.C. and beyond by connecting personalized care, innovative research and opportunities to give back. We are the largest charitable funder of cancer research in B.C. and every dollar raised stays right here at BC Cancer to advance research, enhance care and break down cancer.

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OPENING THOUGHTS

New talent brings world-class expertise and hope to British Columbians

While sitting in the bleachers at my son’s baseball games this season, I learned of several players in our little league whose parents are facing cancer. Imagine you are too ill to watch your child in his or her championship game, or to make your hungry athletes dinner after games and practices. This is a heart-wrenching experience that brings such hardship to families.

Our generous BC Cancer Foundation donors are helping to lessen this burden each time they make a donation, bringing hope to our loved ones and propelling vital research forward. The scientists and clinicians at BC Cancer are playing their critical part to break down cancer and reverse the ‘one in two British Columbians will face cancer’ statistic so that parents will be here for their young children and families can enjoy life together.

To this end, we’re delighted to announce the arrival of new, world-class talent to BC Cancer and the Foundation. On page 8, you will learn about one of the foremost clinician-scientists in blood cancer research, Dr. Florian Kuchenbauer, who joins BC Cancer from Universität Ulm in Germany. It is because of our donors that BC Cancer can recruit the best in the world and enable the creation of his lab where he will focus on breaking down leukemia and multiple myeloma.

BC Cancer also welcomes back Dr. Parveen Bhatti, senior scientist and scientific director of prevention, who takes the helm of the prevention research team. You will learn more about his role and exciting research into cancer risks and the future of prevention on page 10.

And, at our annual general meeting, the Foundation was thrilled to welcome Kirsten Tisdale, managing partner of Ernst & Young’s Canadian government and public sector practice as our new Chair of the Board. Kirsten has a long-standing relationship with the Foundation and brings a wealth of knowledge from her vast experience in the public sector space.

I’m tremendously excited about the new additions at BC Cancer and the Foundation and the work they will accomplish, and am continually proud and inspired by the people in our communities who support BC Cancer in its mission: improving the outcome for every patient.

Sarah Roth
President & CEO
BC Cancer Foundation
Relax
When someone receives a cancer diagnosis, it can bring forth a whole range of emotions that aren’t always easy to deal with.

Between 35% and 45% of all cancer patients experience significant emotional distress at some point. This is also true for family, friends and caregivers.

Through Patient & Family Counselling services at BC Cancer, patients are learning how to equip themselves with tools to help them both deal with their diagnosis and guide them through their treatments.

Support programs focusing on relaxation, mindfulness and stress reduction aim to provide patients with techniques they can practice on their own when dealing with heightened stress or anxiety.

Carrying feelings such as these on a day to day basis can wear on a person’s body, according to Dr. Kirk Austin, patient and family counselor at BC Cancer.

“When a doctor comes in and says you have cancer, your head all of a sudden tries to make sense of ‘what does this actually mean for me?’” he says.

“Quite often it provokes an emotional response and your ability to think logically and actually stay in the present goes offline.”

When feeling stressed and anxious, Dr. Austin emphasizes the importance of breathing diaphragmatically—using your abdomen to breathe slowly in and slowly out so breathing is more moderated and regulated.

It’s an essential skill he shares with his patients.

“It’s really about teaching people about the nature of stress and the nature of anxiety, but also the nature of relaxation and teaching practical skills they can take home and try,” he says.

“With practice, the new way of breathing can calm their overall stress response and help their overall quality of life and healing.”

Melanie McDonald, a patient and family counselor at BC Cancer, teaches programs in stress reduction, relaxation and mindfulness and says cancer impacts more than just the physical being of a patient.

“We need to look at the experience as a whole,” she says. “Cancer doesn’t just impact the physical; it also impacts the emotional, the patient and the family.”

Melanie teaches patients about bringing awareness to their breathing, trying to get them to practice “breathing down into their lower belly” to help calm their nervous system.

According to Melanie, research into practicing this type of breathing has shown significant benefits—including improved sleep.

“Bringing awareness to your breath and slowing down your breath is so good for your health and for your nervous system,” she says.

Support families in B.C.

You can help families facing a cancer diagnosis access critical support. Please contact Elissa Morrissette at 604.707.5992 or elissa.morrissette@bccancer.bc.ca
Generous patient will help hundreds with state-of-the-art tool

A state-of-the-art, high-resolution equipment suite for endoscopy is on its way to BC Cancer – Vancouver because of a generous and passionate donor, Carol Lai.

First of its kind in Canada, the Fujifilm endoscopy unit will be an integral tool used in staging cancers like lung and colorectal, where doctors must take a look inside a patient’s body to gain a better understanding of the disease.

Carol, a BC Cancer patient, was inspired to donate and bring this crucial equipment to patients; she faced cancer several times and her husband and father both succumbed to the disease.

Carol felt compelled to fund the entire suite because of her experience: “The doctors and nurses at BC Cancer were so patient and caring, and they have tough jobs,” she says.

“Sometimes, when cancer spreads we need accurate samples for molecular testing. This tool will provide a very simple way for us to harvest tissue, with accurate biopsies to assess as it is very efficient for small biopsy sites,” says Dr. Stephen Lam, chair of the lung cancer screening project and provincial lung tumour group, BC Cancer.

The tool is highly unique because of its elevated Fujifilm image quality, with a 10 degree view camera and the clarity is world-class. It also makes sampling extremely precise as it has a trajectory on the screen to tell doctors where the needle will hit.

“I believe that if you have the ability to give, it’s important to give back to the community through an organization like BC Cancer. To know that BC Cancer is able to offer the best care possible to British Columbians with the most advanced tools and equipment—I’m truly content,” says Carol.

More than 300 people per year in Vancouver will benefit from this technology.

Help change lives
You can support cutting-edge equipment at BC Cancer.
To learn more, please contact Katherine Pui 貝承桓 at 604.707.5912 or katherine.pui@bccancer.bc.ca
Carolyn Hoeschen is a nurse practitioner at BC Cancer – Vancouver. She shares about her role and the latest in pancreatic cancer clinical trials.

BREAKTHROUGH: How would you describe your work?
CAROLYN: My role offers direct contact with patients, including assessing symptoms or side effects from their disease or treatment, prescribing appropriate treatments or connecting them with health care professionals for medical help. I also act as a patient advocate and offer continuity of care throughout their cancer journey. Working at BC Cancer is very rewarding and work that I value very much; I work with a great team who are all committed to patient-centred care. It can be a very stressful time for patients and their families, and being a patient advocate and extra resource for support can make a big impact.

BREAKTHROUGH: What can you tell us about pancreatic clinical trials?
CAROLYN: There are some very interesting new studies going on at BC Cancer – Vancouver in areas of clinical treatments, hereditary factors and exploring the genomic make up of pancreatic cancer. We have a very dedicated clinical trials department and these trials hold a lot of potential to better understand pancreatic cancer and the opportunity for more effective treatments. There have also been some new findings from previous trials that show some really positive patient outcomes.

BREAKTHROUGH: What’s your hope for the future?
CAROLYN: I truly believe we are going to learn so much more about pancreatic cancer and will be able to offer more and more effective treatments for patients. These patients have very complex medical needs and it is important they have access to a multi-disciplinary team to assist in their care and management to minimize and alleviate symptoms and optimize their quality of life.

FAST FACTS:
CAROLYN’S FAVOURITES

TV show? I always get a good laugh from watching The Office.

Movie? Sleepless in Seattle has long been a favourite movie, but more recently The Way Way Back.

Activities/Pastime? I watch a lot of movies with my husband, but also enjoy hiking, kayaking, or trying out new places to eat.
Treatment strategies for acute myeloid leukemia have remained mostly unchanged for over three decades,” says Dr. Florian Kuchenbauer, clinician-scientist at BC Cancer. “Through optimizing established therapies, we aim to improve treatment outcomes for patients in British Columbia.”

Over 2,000 British Columbians are diagnosed with blood cancers each year. Dr. Kuchenbauer has come from Germany to B.C. to find solutions: “Our understanding of how blood cancers develop has expanded tremendously over the past decade,” he says. “With this new knowledge, we have an unprecedented opportunity to identify and develop more effective targeted drugs or immune-based treatments that will improve the standard of care.”

**BLOOD CANCERS: A CLOSER LOOK**

The human body produces three types of blood cells: red, white and platelets. When blood cancer occurs, this process is interrupted by uncontrolled growth of an abnormal type of blood cell. The rapidly growing cancer cells prevent the blood from performing its key functions, such as fighting off infection.

**THERE ARE THREE MAIN TYPES:**

- **Leukemia** are grouped into acute and chronic leukemias based on how rapidly or slowly the disease progresses. Intensive chemotherapy often results in long-term side effects and a diminished quality of life.

- **Lymphoma** affects the lymphatic system, which removes excess fluids from the body and produces immune cells. It is the fourth most common cancer type in Canada with many different subtypes. Although immunotherapy is effective in some patients, certain lymphoma subtypes remain difficult to treat.

- **Multiple Myeloma** is a cancer of the plasma cells—white blood cells that fight disease and infections. Many new drugs have been approved in recent years, yet multiple myeloma remains an incurable disease.
Dr. Kuchenbauer’s Vision for the Future

Dr. Kuchenbauer was recently recruited to BC Cancer to focus on new treatment solutions for leukemia and multiple myeloma. As a clinician-scientist, he brings a unique skill set and level of expertise that will see treatment protocols in the clinic advance based on evidence uncovered in the lab.

Dr. Kuchenbauer aims to pioneer a unique translational research program bridging the Leukemia/Bone Marrow Transplant Program of BC with state-of-the-art research at BC Cancer’s Terry Fox Laboratory (TFL). The priority is for more effective, less toxic treatments to be effectively delivered to patients as soon as possible.

The TFL conducts research into a wide spectrum of blood cancers. Dr. Kuchenbauer aims to bring groundbreaking research happening within the TFL labs to patients in the clinic. He will focus on three innovative areas of exploration:

- **Leukemia**: exploring underlying causes and creating more effective, less toxic therapies to replace and enhance older treatments which have remained unchanged for over three decades;
- **Stem Cell Transplantation**: tailoring chemotherapies prior to stem cell transplantation and reducing leukemia patients’ recovery period following transplantation
- **Multiple Myeloma**: supercharging the immune system and targeting myeloma cells to prevent relapse.

“I’m truly excited to get started on projects that will make a real difference for people here in B.C. and beyond,” says Dr. Kuchenbauer.

Immune-Based Solutions

Stem cell transplantation is the most established type of immunotherapy in B.C. and has improved the lives of leukemia patients for decades.

Today, with the expansion of immunotherapy approaches, BC Cancer is spearheading two innovative clinical trials for blood cancers that aim to supercharge the existing immune system to respond whenever and wherever cancer may recur:

- In the CAR-T (chimeric antigen receptor t cell) trial, patients’ T cells will be genetically modified to target B-cell cancers, such as acute lymphoblastic leukemia; and
- In the lymphoma trial, scientists will seek to identify, isolate and expand mutation-specific anti-tumour T cells to eradicate the disease.

Patient enrollment will commence soon, with the CAR-T trial planned for early 2019 and the lymphoma trial projected to commence in summer 2019.

Solving Treatment Failure in Lymphoma

Every year in Canada, 16,000 people are diagnosed with a lymphoid cancer, and more than 4,000 patients with lymphoma will relapse. With a relapse, the chances of survival drop drastically.

In January 2018, BC Cancer scientists Drs. Marco Marra, Christian Steidl and David Scott were awarded an $11.9 million Large-Scale Applied Research Project (LSARP) grant to uncover new solutions for patients facing a relapse of lymphoid cancer.

They plan to develop genomics-based clinical tests to identify targeted treatment options that will improve patient outcomes and quality of life, which hinges on a $1.9 million campaign in donor matching funds.

Support Blood Cancer Research Today

The funding focus of our *Inspiration Gala*, November 3 at The Fairmont Hotel Vancouver

Help the more than 2,000 facing blood cancers in B.C. each year. Contact Laura Ralph at 604.877.6156 or laura.ralph@bccancer.bc.ca
Cancer prevention research focuses on population-based studies, which involves recruiting sample groups and collecting biospecimens with an overarching goal of understanding what the risk factors are for getting cancer in day-to-day life. These risk factors can be environmental, occupational or lifestyle, and once these factors are identified, researchers look at what modifications can be made to lessen cancer risk.

While treatment is vital in extending lifespans and improving quality of life, prevention seeks to preclude people from getting cancer in the first place. “The hope is that with the answers we seek through our research, new policy can be put in place to remove risk, as well as allow us to continue to provide more recommendations for British Columbians to make positive changes to improve their health,” says Dr. Bhatti, senior scientist and scientific director, cancer prevention at BC Cancer.
Dr. Parveen Bhatti, senior scientist and scientific director of cancer prevention at BC Cancer describes his return to B.C. as “coming home.”

Born in Terrace and raised in Houston, British Columbia, Dr. Bhatti, has returned to BC Cancer after 15 years to pursue his passion—cancer prevention research. It was at BC Cancer in 2001 that Dr. Bhatti first completed a nine-month research position solidifying his interest in epidemiology and cancer prevention. “My dream was always to come back to BC Cancer to do research to benefit my fellow British Columbians. I’m very excited to be back in Canada and to be of service to B.C.”

Upon completing his bachelor and master’s degrees at the University of British Columbia, Dr. Bhatti moved to the U.S. to pursue his PhD, and worked at the National Cancer Institute in Washington, D.C.

His initial foray into this field began with a research project looking at how genetic differences in people who work with radiation may make them more susceptible to developing cancer.

He re-joined BC Cancer this spring after holding a faculty position at Fred Hutchinson Research Center in Seattle, where his research shifted away from radiation epidemiology to explore new areas of cancer prevention research.

**MELATONIN SUPPRESSION MAY LEAD TO HIGHER CANCER RISK**

Dr. Bhatti’s primary research for the last decade has investigated shift work and its connection to cancer.

Studies have shown people who work nights have a higher risk of cancer. His research aims to understand the mechanisms behind this and how to prevent it with modifications.

Melatonin suppression is thought to lead to higher risks of cancer. At night, we get a big surge of melatonin which is critical to a lot of biological systems, and as soon as we perceive any sort of light exposure, melatonin production is shut down.

Dr. Bhatti has found that because shift workers aren’t producing enough melatonin, this leads to higher levels of DNA damage, a major cause of cancer.

Dr. Bhatti hopes to conduct a clinical trial to explore melatonin supplementation in shift workers while testing levels of DNA damage.

**PAVING THE WAY FORWARD**

In collaboration with BC Cancer’s population oncology and cancer control research teams, Dr. Bhatti and his colleagues are excited about the future of cancer prevention research with the advent of new technologies, including new tests and systems that can be applied to analyze data at a deeper level. “There are things that the team can do now that weren’t possible decades ago and I’m excited to take it in new directions,” says Dr. Bhatti.

The team is also inspired by the BC Generations Project as part of the Canadian Partnership for Tomorrow Project—a cohort of about 30,000 people in B.C. who provided extensively detailed questionnaire data for research purposes, including medical data like height, weight, lung function, body fat content and bone density. This rich resource was collected in 2006 and is just maturing now, allowing the team to start digging into the data and asking questions about lifestyle and genetic factors linked to increased cancer rates in B.C. and beyond.

“Prevention is a very important area of research—there is great benefit to preventing people from getting serious illness in the first place,” adds Dr. Bhatti.

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**BC CANCER PREVENTION TEAM HIGHLIGHTS**

1987 Identified link between recreational sunlight exposure and malignant melanoma
1991 Quantified cancer risks associated with working in the aluminum smelting industry in British Columbia
2000 Demonstrated the benefits of broad spectrum sunscreen use in children in skin cancer prevention
2007 Identified exposure to certain environmental pollutants as risk factor for non-Hodgkin lymphoma
2008 Linked maternal alcohol consumption to development of childhood leukemia
2017 Quantified unique cancer burden among First Nations people living in British Columbia
BC Cancer and Microsoft have established a game-changing partnership that is answering cancer’s most complex questions at a rate never thought possible.

Fuelled by advances in molecular biology, genomics and computer science, BC Cancer researchers are applying a radically investigative approach known as single cell genomics to analyze the millions of individual cells that make up cancer, made possible by cloud computing. Together, BC Cancer’s single cell genomics expertise and Microsoft’s innovative computing resources are accelerating the pace of research to understand cancer at a granular level.

“We have taken a unique approach to try to dissect cancer to its most elemental level through single cell genomics. Partnering with Microsoft has empowered our group to analyze hundreds of thousands of individual cancer cells with the Azure cloud computing platform,” says Dr. Sohrab Shah, senior scientist, BC Cancer, and co-leader of the project.

Thanks to innovations in molecular biology, biophysics, microfluidics and DNA sequencing, single cell genomics can capture cancer mutations at the highest resolution. This level of detail will enable targeted and specific combinations of treatments for individuals, based on the unique characteristics of their cancer. The valuable information gathered and stored in the cloud will allow researchers to predict how individual...
cells within a patient’s tumour will respond to chemotherapy.

“This technology gives us an unprecedented look inside a tumour—like looking into a microscope for the first time. We’re able to see the genomes of single cells, which reveals the cellular makeup of individual cancers. Through the cloud we can store, analyze and share this data with the international research community,” says Dr. Shah.

For patients, this could one day mean a more precise understanding of their cancer at diagnosis with a targeted treatment plan that is the most effective for them, and ultimately, more time.

“Our project would not be possible without this partnership. Microsoft’s cloud infrastructure and Azure platform are essential, and because of these programs, we see promise in changing the outcomes for many Canadians,” adds Dr. Samuel Aparicio, distinguished scientist, BC Cancer.

BC Cancer has operated at the cutting edge of the field in developing and applying algorithms and statistical models to interpret the evolutionary properties of cancer. In partnership with colleagues at BC Cancer’s Genome Sciences Centre, Dr. Shah and Dr. Aparicio also plan to generate millions of whole genomes in the next three years, each with ~100,000 genomic features that will be analyzed, stored and shared that will accelerate further research on the data the team is generating.

To learn more about how BC Cancer is leading the way with unique and innovative partnerships, please contact Fatima Hassam at 604.877.6226 or fatima.hassam@bccancer.bc.ca
Bladder cancer is the fifth most common cancer diagnosis in British Columbia and advanced disease is often deadly.

Although most patients initially respond well to chemotherapy, the five-year survival rate is only 5-15%.

Yet there is hope. Knowledge of the genetic characteristics of bladder cancer is expanding and researchers have identified several unique subtypes. They’ve also discovered that bladder cancer has the third highest mutation rate of all cancers, which explains why treatment often fails.

**Donors are at the heart of this progress.**

—DR. BERNIE EIGL, PROVINCIAL DIRECTOR, CLINICAL TRIALS, BC CANCER

Currently, metastatic bladder cancer patients receive chemotherapy as a first line treatment, followed by immune checkpoint inhibitors (drugs that block proteins to allow immune cells to more easily kill cancer cells), but less than 50% of patients respond to either treatment.

**ctDNA: The Future of Cancer Care**

Scientists have known for several years that cancers shed small fragments of tumour DNA into the circulating bloodstream, but lacked the tools to extract these DNA fragments from patient blood samples and conduct meaningful analyses.

Thanks to recent technological advancements, leading experts at BC Cancer are now certain that circulating tumour DNA (ctDNA) has a powerful role to play in the future of cancer care: not only does ctDNA signal the presence of cancer in its earliest stages, it has the potential to reveal the unique mutational profile of each patient’s cancer and predict their response to treatment.

This approach is particularly promising for bladder cancer, given the high mutation rate and known release of abundant ctDNA into the blood. Over the past two years, BC Cancer researchers have established a suite of custom tools and bioinformatics pipelines designed to capture and analyze ctDNA in metastatic bladder cancer, but the potential clinical uses of ctDNA for bladder cancer remains largely unexplored.

Dr. Bernie Eigl, provincial director of clinical trials at BC Cancer, and Dr. Alexander Wyatt, leader of a genomics team at Vancouver Prostate Centre, are currently developing a biomarker program specific to bladder cancer with an overarching goal to discover biomarkers or “signatures” that might help experts determine which cancers respond to which treatments.

The collaborative study aims to determine whether ctDNA collected via a blood sample from patients with metastatic bladder cancer could help identify mutations that correspond to treatment response or resistance.

The results will help to refine the molecular landscape of aggressive bladder cancer and will lead to future clinical trials of targeted treatments.

A deeper understanding of the genetic changes within bladder cancer will also facilitate patient access to precision medicine and new, more effective treatment strategies for patients facing the disease, and BC Cancer Foundation donors are helping support these significant findings.

“Donors are at the heart of this progress,” says Dr. Eigl. “Their support is helping us move forward in our quest to improve treatment and outcomes for British Columbians.”

For more on bladder cancer research, contact Katherine Pui at 604.707.5912 or katherine.pui@bccancer.bc.ca
Over the next decade, the Fraser Valley will see the most significant increase in cancer diagnoses in the province, with a projected increase of 65% by 2030. This year alone, BC Cancer – Surrey will see 38,365 patient visits and 3,014 new patient consultations.

To help keep up with this demand, the Fraser Valley community banded together to support a much-needed upgrade to Surrey’s only cancer centre that provides diagnostic services, chemotherapy, radiation and supportive care.

Thanks to $1 million in donor support, BC Cancer – Surrey completed an expanded new chemotherapy unit and ambulatory care area that will see world-class cancer treatments provided close to home and have a direct impact on the lives of patients and their families facing cancer.

Harnessing the power of the airwaves, RED FM held a radiothon to raise funds for a brand new pharmacy at the centre. Thanks to the generosity of its listeners, the one-day event raised $240,000 and a major expansion for the state-of-the-art on-site pharmacy is now underway.

The newly expanded BC Cancer – Surrey centre now features nine additional patient chairs for a total of 33.

“With the expansion of our centre comes the ability to deliver exceptional care to our patients and their families, and for this we are both excited and grateful,” says Dr. Gary Pansegrau, regional leader, medical oncology at BC Cancer – Surrey. “An expanded, new pharmacy will allow us to treat more patients and develop the most advanced treatments for patients in need.”

Located adjacent to Surrey Memorial Hospital, the centre serves some of the fastest growing communities in Canada: Surrey, White Rock, North Delta, New Westminster, Port Coquitlam, Coquitlam and Port Moody. When it was built in 1995, it was originally constructed to accommodate 2,500 patients per year.

With the new expansion, the centre will now be able to accommodate a growing population by offering the latest in treatment and care.
#FACES OF CANCER

Share your story with us and help empower our community.

#FacesOfCancer is a social media campaign spearheaded by the BC Cancer Foundation to inspire our community. Every week we share an inspiring story of hope from those affected by cancer and those working to solve it.

Share your story with us! Email bccfinfo@bccancer.bc.ca or use the hashtag #FacesOfCancer on Instagram or Facebook.

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Deborah Jorgenson’s breast cancer was detected because of crucial screening tests.