



STRATEGIC PARTNERSHIPS: MAKING INNOVATION POSSIBLE

Alberta Transplant Innovation Fund
2020 Impact Report



University
Hospital
Foundation



Alberta Transplant Innovation Fund (ATIF)

In October, 2016 the \$1.2 million Alberta Transplant Innovation Fund (ATIF) gave researchers the financial support they need to pursue projects that will transform the world of organ transplantation – sooner than you may think.

A pan-provincial partnership between the Government of Alberta Ministry of Economic Development, Trade & Tourism, Astellas Pharma Canada, Inc., and the University Hospital Foundation, ATIF invested in four key areas:

1

Advancing Alberta's transplant technologies

2

Providing better care for Alberta transplant patients through education and better technologies

3

Validating and testing new transplant technologies from Alberta and abroad

4

Increasing organ donations and availability

Creating strategic partnerships with private industry, the public sector and philanthropic community members is just another way the University Hospital Foundation serves as a catalyst for innovation and advances patient care at the University of Alberta Hospital.

“Much of the history of transplantation in western Canada originates from the University of Alberta Hospital. And partnerships such as ATIF will help ensure we continue to make history.”

Dr. Norm Kneteman, Director, Division of Transplantation

UNIVERSITY OF ALBERTA HOSPITAL

The University of Alberta Hospital (UAH) is home to the most complex organ and tissue transplant program in Canada. No other program offers this range of transplant procedures – heart, heart/lung, kidney, liver, small bowel, bone, eye, tissue and islet cells.

The specialized 18-bed, multi-organ transplant unit enables surgeons, physicians, nurses, physiotherapists, occupational therapists, nutritionists, social workers and other specialists to provide complex care before and long after transplant surgery to adult and pediatric patients.

UAH is also the coordinating centre of the Canadian Institutes for Health Research (CIHR) funded Canadian National Transplant Research Program (CNTRP), formed in response to a need to develop a national, integrated research structure to increase the number, quality and efficacy of transplants in Canada.



The program serves an area over 6.5 million square kilometres, or about 2/3 the area of Canada. It proudly provides gold standard care to more than seven million Canadians across Alberta, Saskatchewan, British Columbia, Manitoba, Nunavut, the Yukon and the Northwest Territories.

TRANSPLANT STORY IN NUMBERS



Only one in three people on the waitlist receive a lifesaving lung transplant.

600

Every day 600 Albertans with end-stage organ failure wait for a call that offers them a second chance at life.



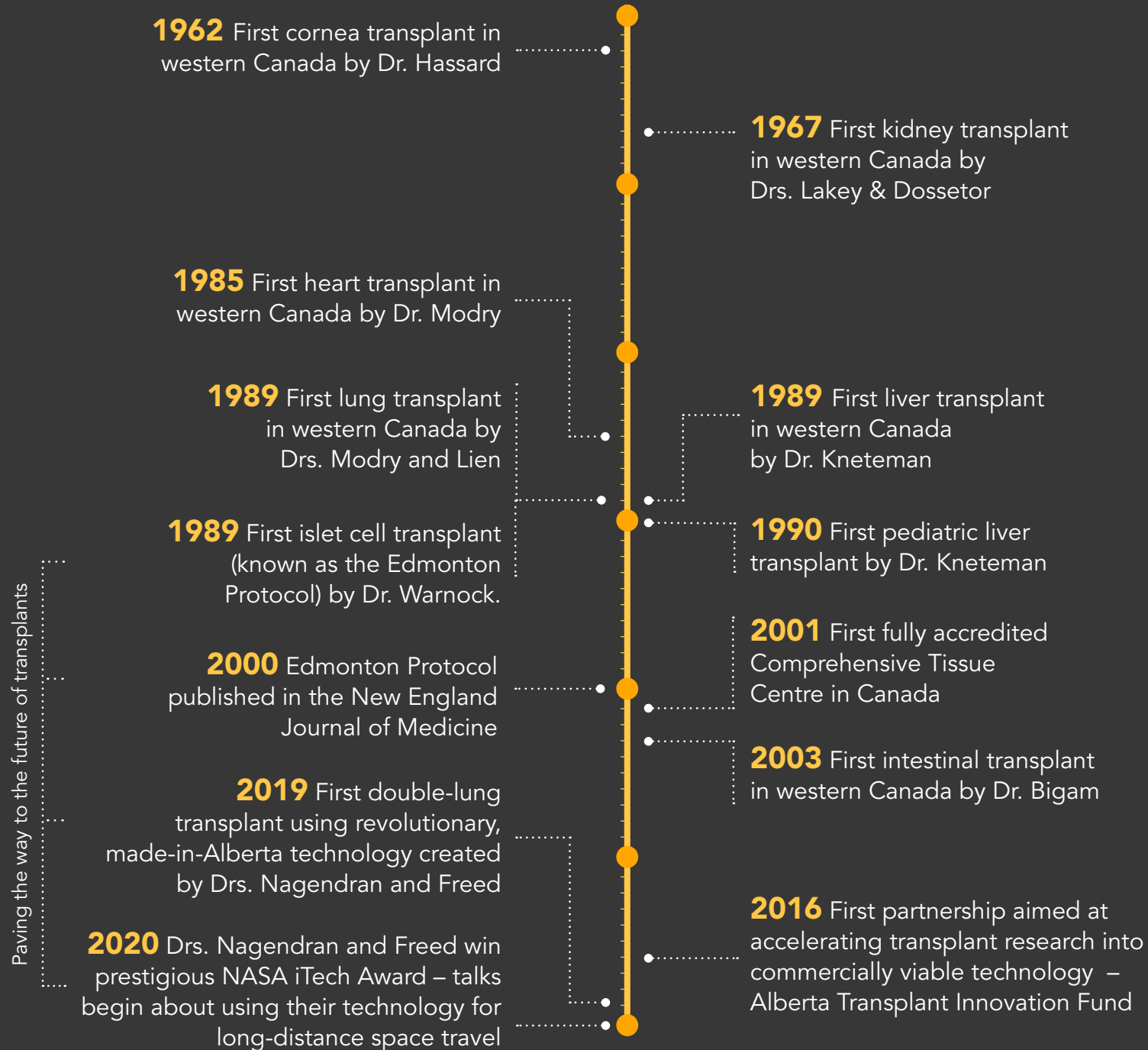
Only one in four donated sets of lungs are healthy enough to be transplanted.

300

Approximate number of transplants performed at the University of Alberta Hospital site each year.

HISTORY OF TRANSPLANT FIRSTS

AT THE UNIVERSITY OF ALBERTA HOSPITAL



Research of any kind has these two magical words attached to it...

WHAT IF...

What if we could double or triple transplants with organs that currently go to waste?

What if we could develop a natural way for the body to prevent rejection of implanted organs?

What if we could eliminate one of the leading causes of transplant failures?

What if we could keep explanted lungs “alive” longer?

What if we could create a machine that “breathes” the way lungs do?

The magic of the question “What if?” is that it multiplies on its very own. One “what if” becomes two, and then three. And, when these questions can be answered “yes, we can”, that’s when the magic turns into reality.



DR. NAGENDRAN

Less than one-third of donated lungs are suitable for transplantation. The rest are discarded, along with hearts, kidneys, livers and other organs deemed too damaged to transplant.

At least, that's how it's been until now.

Thanks in part to funding from the Alberta Transplant Innovation Fund (ATIF), Dr. Darren Freed and Dr. Jayan Nagendran, cardiac surgeons at the Mazankowski Alberta Heart Institute, have developed an ex-vivo organ support system (EVOSS) that's well on its way to transforming the way donor organs are "kept alive" outside the body prior to transplanting.

EVOSS, an automated and portable platform designed to maintain donor organs in an environment mimicking the human body, can keep lungs alive for up to 48 hours – instead of the standard 6-8 hours – giving doctors more time to upgrade damaged lungs to transplant-ready levels.

For example, lungs infected with pneumonia can be treated with massive doses of antibiotics to clear them out. This cannot be done with lungs stored on ice, and because the lungs are outside a human body, doctors can use extraordinary measures to treat them.

As a result, EVOSS increases organ availability, improves the quality of donor lungs and shortens the wait time for desperately ill patients, giving them a second chance at life that for many on the organ wait list, never arrives.

In a recently completed clinical trial, 12 patients at the Maz received double-lung transplants with lungs that had been repaired while on EVOSS. "All 12 patients received lungs that would have been thrown away if not for EVOSS technology," said Dr. Jayan Nagendran. "They are all doing extremely well. It's not a stretch to say that some of them may not be alive today if they hadn't received transplants by now."

The impact of EVOSS on a world scale rose to new heights when Dr. Nagendran and Dr. Freed's work won the NASA iTech Ignite the Night Pitch Competition in Tampa Bay, Florida this spring.

Competing against the top innovators in the world, Dr. Nagendran had three minutes to make his pitch that not only is EVOSS saving lives today, but it may even play a role in the future of space travel by enabling astronauts to go into a state of hibernation during long distance space flights.

For now, however, EVOSS technology is about saving and changing lives. "This is the only technology that has kept hearts, lungs, livers, kidneys and even limbs alive at room temperature," said Nagendran. "This can revolutionize the world of transplantation."



\$389,468

Amount awarded through ATIF



Lungs can be kept in EVOSS for a greater period of time up to 48 hours on the Lung EVOSS device versus 6-8 hours on ice

12

patients have had their lives changed by this made-in-Alberta technology that keeps donor lungs "alive" outside the body



DR. LORI WEST

Transplants save lives. However, recipients need lifelong immunosuppressants to prevent rejection and these can cause harmful, sometimes debilitating, side-effects that are especially worrisome in young children. Plus, the medications don't always work.

As a result, researchers around the world have been searching for ways to minimize the reliance on immunosuppressant medications.

In this regard, special immune cells called regulatory T cells, or 'Tregs', are of great interest because they naturally suppress immune responses.

Unfortunately, the number of Tregs in a person's body is very low, so isolating enough cells from the blood and increasing their numbers by inducing them to grow and divide in the laboratory is a challenge.

However, Dr. Lori West, Director of the Alberta Transplant Institute and the Canadian Donation and Transplantation Research Program, as well as a pediatric cardiologist who frequently cares for babies who need heart transplants, has found a source of what could potentially be the "mother lode" of Tregs – inside the thymus of infants.

Because it's located in the front upper chest, the thymus, a specialized primary lymphoid organ that produces T cells, is in the way when surgeons perform life-saving heart surgery on infants. So, they remove it and throw it in the garbage.

"To save the baby's life, they have to see the heart," says Dr. West. "This has been done for decades around the world."

Possibly not anymore, due to the huge potential in moving from a chemical immunosuppressive medication to a cellular therapy that would be potentially much more effective and with far fewer side effects.

To date, Dr. West and her team have discovered that Tregs extracted from the thymus of babies are abundant, easier to isolate than in adults, extremely potent at suppressing unwanted immune responses, and stable.

The next step is to put them through a good manufacturing process (GMP) that will help determine if they can be converted into a new medication. The University of Alberta is home to one of only five GMP facilities in Canada.

If successful, the impact of using Tregs as a natural immunosuppressant could be enormous, says Dr. West.

"If you could use these cells, for example, in juvenile diabetes to suppress the whole disease, it would have a huge, huge impact worldwide. The potential for the use of these cellular therapies is incredible."



\$400,000

Amount awarded through ATIF



Dr. Lori West's cellular research is going from the lab to a Goods Manufacturing Process (GMP). The University of Alberta is home to one of only five GMP facilities in Canada.

"If you could use these cells, for example, in juvenile diabetes to suppress the whole disease, it would have a huge, huge impact worldwide. The potential for the use of these cellular therapies is incredible."



DR. LUIS HIDALGO

Organ transplantation is a lifesaving option for many chronic conditions that lead to organ failure. Unfortunately, there are no guarantees that it will work.

Antibody-mediated rejection (ABMR) is a leading cause of transplant failure. By developing a new model of ABMR, researchers at the University of Alberta, working in tandem with clinicians at the University of Alberta Hospital, have gained a greater understanding of the components that they believe are at the core of this damaging process.

Today, researchers can do what's called a "virtual cross match" that predicts, based on antibody testing, whether or not the donor organ is a viable match for the recipient.

Advancements in cross-matching mark a critical step in the evolution of transplantation: the more doctors understand ABMR and, in turn, how to better align the right organ with the right recipient, the more likely the transplant will be successful.

Not only that, but by helping prevent rejections, cross matching also ensures that fewer organs go to waste, an important consideration given that the scarcity of available donor organs is still the number one challenge facing transplant programs across Canada.

Looking ahead, researchers are hopeful that similar technologies and strategies can be used to accurately predict how many immunosuppressant therapies an organ recipient may need following their transplant.

CNTRP PARTNERSHIP

Astellas Pharma Canada, Inc. established a partnership with the Canadian Donation and Transplantation Research Program (CNTRP) and provided additional funding to the Alberta Transplant Institute (ATI) to further support researchers within the field of transplant. 12 innovative research projects were funded and recognized as Astellas ATI CNTRP Innovation Grants.



Astellas ATI CNTRP Innovation Grants

May 21, 2017

\$100,000

DISTRIBUTED

4 projects each awarded

\$25K

July 20, 2018

\$120,000

DISTRIBUTED

4 projects each awarded

\$30K

September 9, 2019

\$120,000

DISTRIBUTED

4 projects each awarded

\$30K

\$99,108

Amount awarded through ATIF

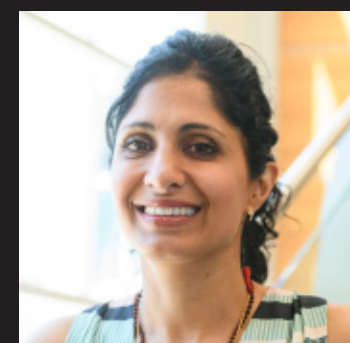


A lack of available donor organs is the #1 challenge facing transplant programs in Canada



Antibody-mediated rejection (ABMR) is a leading cause of transplant failure

Dr. Puneeta Tandon



was ranked number one in the 2017 competition. Her work is developing a personalized, online program to improve health outcomes for patients awaiting liver transplantation. "We know that physical frailty is one of the most important contributors to morbidity and mortality in our patients, and proper nutrition and exercise are essential to maintain health while patients are waiting to receive a life-saving transplant," explains Dr. Tandon.



Gwen was diagnosed with COPD, a progressive lung disease.

She eventually became eligible for a transplant, and was one of the 12 patients who participated in Dr. Jayan Nagendran and Dr. Darren Freed’s ground breaking clinical trial of the EVOSS (Ex-Vivo Organ Support System) at the Maz.

Before her life-saving lung transplant, her lungs were only working at 15 per cent capacity and she was on palliative care. She could barely talk and could not walk upstairs, having to climb them on her hands and knees.

Gwen received a double lung transplant using lungs that, without EVOSS, would not have been used for transplant. The lung donor had been on 100 per cent oxygen before they passed away. By putting the donor lungs on EVOSS, Dr. Nagendran was able to test the lungs and convert them into usable, transplantable organs.

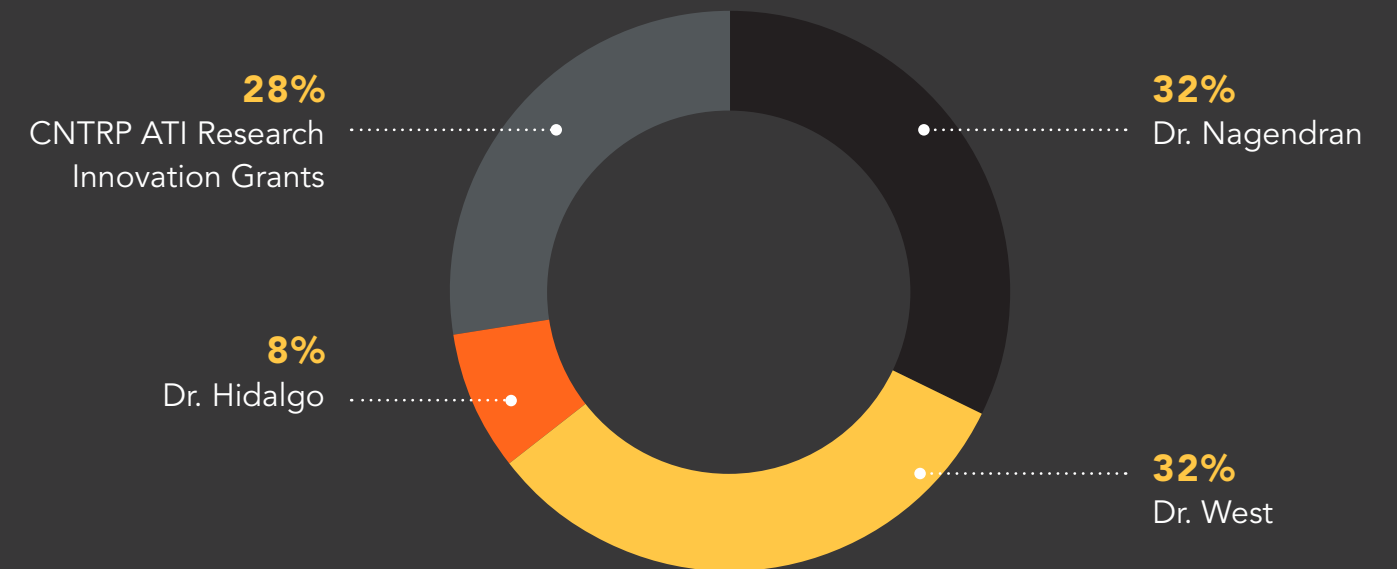
Now, a year later Gwen is recovering well and enjoys hiking, canoeing and playing with her grandchildren.

INITIAL INVESTMENT

Economic Development, Trade and Tourism	Cash	\$600,000
University Hospital Foundation	Cash	\$318,575*
Astellas Pharma Canada, Inc.	Cash	\$300,000
		\$1,218,575
University Hospital Foundation	In-Kind	\$250,000
Alberta Transplant Institute	In-Kind	\$200,000
		\$450,000

*Original UHF investment was \$300k - amount was updated at the time of the amendment.

DISTRIBUTION



MEDIA HIGHLIGHTS

Oct 26, 2016
Media Release crossed the wire at 13:30 ET



June 21 2018
Feature on
Global News



f LIVE

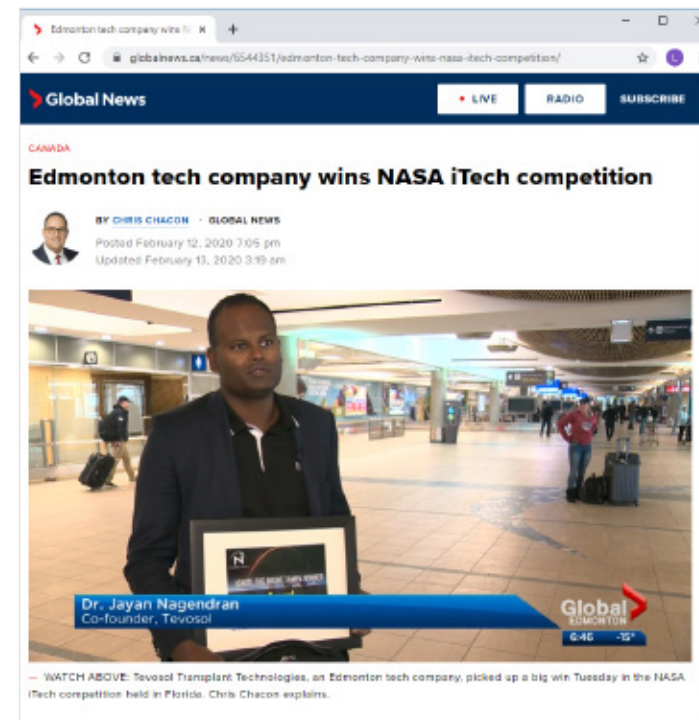
4.5K Reached
2.2K Video Views
1.8K Engagements

t

25 Posts
11,392 Total Impressions
483 Engagements

Earned Media Nov 7, 2019

15 M Potential Reach
24 Story Pick Up



Feb 12, 2020
Feature on
Global News

Fall, 2019
Feature in
HERE Magazine

Front page
placement +
In-hospital and
launch event

45,000
Distribution



ECONOMIC OUTCOMES

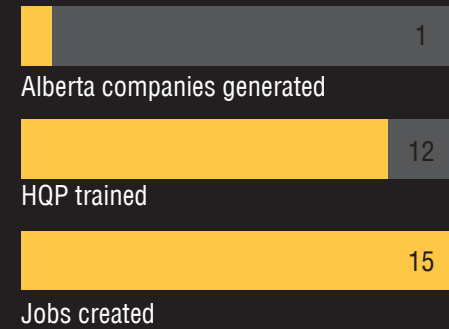
The outcomes from ATIF have contributed to building a resilient, robust and dynamic Alberta economy



\$1.2 million investment accelerated translational research into human clinical trials

A new start-up company, Tevosol Ventilation Inc, emerged using made-in-Alberta technology

Influx of highly qualified people to fill jobs as Alberta's life sciences sector grows



“ Research plays a vital role in advancing patient care for Albertans, and this collaboration exemplifies how surgeons at the Maz are at the forefront of innovation. Thanks to donor support from the University Hospital Foundation and research partnerships with the University of Alberta's Faculty of Medicine & Dentistry, AHS is improving patient outcomes and changing the way care is delivered. ”

Dr. Verna Yiu
President and CEO, Alberta Health Services



Latest prototype of the Ex-Vivo Organ Support System (EVOSS)



Groundbreaking cellular research funded by ATIF will be moving into a Good Manufacturing Process (GMP), a one of its kind in Western Canada



Dr. Freed and Dr. Nagendran won a NASA iTech Competition and are now amongst the top 10 innovators in the world to explore applications for their organ preservation technology in space



LEADING THE WAY

It's one thing to fund innovation. It's quite another to make innovation possible.

Through our Strategic Partnerships, the University Hospital Foundation is accelerating the translation of new ideas in the lab to life-saving treatments for all Albertans by unlocking greater opportunities for research funding, and attracting and retaining leaders in healthcare from around the world.

One of North America's top healthcare charities, the University Hospital Foundation has raised over \$217 million in the last 10 years, supporting research, recruitment and bringing the newest technologies in patient care to the University of Alberta Hospital.



University Hospital Foundation

www.GivetoUHF.ca

THANK YOU

for being our partner. Without Astellas, there would be no ATIF, leaving thousands of Canadians in need of organ transplants without the hope they have today. We look forward to our next challenge together in healthcare areas most important to you – prostate cancer and urology.

Dr. Jodi L. Abbott
President & CEO, University Hospital Foundation

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