DIABETES CANADA

2023 End Diabetes Award Winners

Contents | 2023 End Diabetes Award Winners

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TREATMENT | BIOMEDICAL RESEARCH

Project: Expanding the drug toolbox for type 2 diabetes

Through donor support, Dr. Alexandre Caron, the Canada Research Chair in Neurometabolic Pharmacology, is investigating new treatments to prevent complications for people living with type 2 diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Dr. Caron is testing two potential new drug treatments to help control blood sugars and prevent complications. The first treatment is for women, which may require female hormones to be present in order to be effective. The second treatment is a combination of two small molecules, which may help people who are overweight or obese.

His work will help fill the gaps in our understanding of type 2 diabetes and enable new drug therapies to be developed.

COMPLICATIONS | CLINICAL RESEARCH

Project: Home-based heat therapy to improve cardiometabolic function of adults living with type 2 diabetes

Through donor support, Dr. Daniel Gagnon, Associate Professor at the School of Kinesiology and Exercise Science at the University of Montreal is testing a new lifestyle habit that may help people with diabetes better manage their blood sugar levels and prevent heart disease.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

People who live with type 2 diabetes are more likely to develop heart disease. Cardiovascular diseases are the number one cause of death for people living with type 2 diabetes.

Previous research has shown that heat exposure, for example at saunas or spas, reduces the risk of developing or dying from heart disease.

Dr. Gagnon is studying the beneficial effects of heat exposure for people living with type 2 diabetes. Measurements of blood vessel health and of the ability of the body to eliminate sugars and fats from the blood after a meal will be measured before, during, and after
A 12-week study where people with diabetes immerse their legs in a hot water bath three to five times a week. They hope to discover that immersing the legs in hot water will improve blood vessel health and the ability of the body to eliminate sugars and fats after a meal.

This research could inform a new lifestyle habit that people living with type 2 diabetes could use to reduce their risk of developing cardiovascular diseases.

TREATMENT| BIOMEDICAL RESEARCH

Project: Cold-induced thermogenesis in diabetes

Through donor support, Dr. Denis Blondin, Associate Professor in the Faculty of Medicine and Health Sciences at the University of Sherbrooke, is learning of a potential new way to control blood sugars in people with diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Researchers have recently discovered brown fat, a tissue in people that helps to use excess energy in our body to generate heat when exposed to cold temperatures. Brown fat may help with controlling blood sugar levels in people with diabetes, by using up excess sugars and fats in the blood.

Dr. Blondin and his team aim to identify the importance of brown fat in using energy reserves. They will then determine the role of brown fat in type 2 diabetes. This research may help identify an innovative new treatment for controlling blood sugars in people with diabetes.

CURE | HEALTH SERVICES

Project: Evaluating a diabetes remission strategy and support in primary care

Through donor support, Dr. Diana Sherifali, Associate Professor in the School of Nursing at McMaster University and the inaugural holder of the Heather M. Arthur Population Health Research Institute/Hamilton Health Sciences Chair in Inter-Professional Health Research, is testing whether type 2 diabetes can be reversed.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Recent clinical trials testing an intense combination of oral medications, insulin and lifestyle interventions for four months found that up to 40 per cent of participants did not require any diabetes medications for several months after stopping them. This supports the theory that type 2 diabetes might be reversed, at least in the short term, with the correct evidence-based strategies.

Dr. Sherifali and her team are testing the effectiveness of an intensive diabetes remission strategy in individuals living with type 2 diabetes, and will examine:

- if participants can achieve diabetic remission
- how participants' quality of life is impacted
- what challenges and opportunities the strategy faces in a real-world setting

This could lead to a new strategy to potentially reverse type 2 diabetes, and evaluate how people with diabetes and health care providers can best implement this strategy.

TREATMENT | BIOMEDICAL RESEARCH

Project: Harnessing Bacteroides to improve blood glucose

Through donor support, Dr. Fernando Forato Anhê, Assistant Professor in the Faculty of Medicine at Laval University is learning whether the gut microbiome can be harnessed to control diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

The gut microbiome consists of trillions of microbes living in a person's gut that help us stay alive: protecting us against germs, breaking down food to release energy, and producing vitamins and other essential nutrients. The gut plays an important role in controlling blood sugar levels by absorbing sugars. Currently, we have no treatments to help control blood sugar levels through the gut microbiome.

Dr. Forato Anhê is studying whether the effectiveness of specific bacteria that help with sugar absorption can be boosted. He and his team will then test if transferring these boosted bacteria can help improve blood sugar control in the gut microbiome affected by type 2 diabetes.

This is a new, innovative treatment option that may help people with diabetes achieve better blood sugar control.

CAUSES | BIOMEDICAL RESEARCH

Project: SOX4 regulation of beta cell genesis and function

Through donor support, Dr. Francis Lynn, Associate Professor with the Department of Surgery and School of Biomedical Engineering at the University of British Columbia, is bringing us one step closer to understanding how genetics can contribute to diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Dr. Francis Lynn is using cutting-edge technologies to create human stem cells that carry the genetic differences predisposing people to type 2 diabetes. He and his team will then study how these differences cause insulin resistance and diabetes, and uncover new ways to treat and prevent the disease.

CURE | BIOMEDICAL RESEARCH

Project: Measuring insulin secretion from beta cells at the single cell level

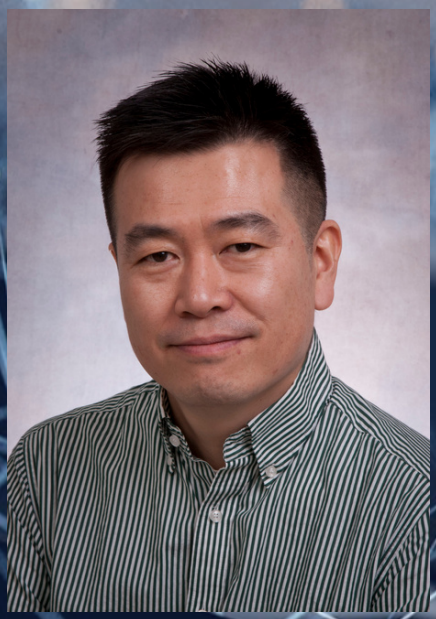
Through donor support, Dr. Hongshen Ma, Associate Professor in the Department of Mechanical Engineering and School of Biomedical Engineering at the University of British Columbia, is working to reverse the effects of type 1 diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. Insulin is produced by cells in the pancreas called beta cells. For people with type 1 diabetes, their beta cells have been destroyed by their own immune system. As a result, they can no longer produce insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

The Edmonton Protocol can reverse the effects of diabetes by transplanting donor beta cells into patients. However, the supply of donor beta cells is severely limited and can only serve a fraction of the patients in need.

Scientists are developing new methods to grow beta cells from stem cells to provide a limitless supply of beta cells for transplantation. However, the amount of insulin produced by these cells is highly variable, and as a whole, insufficient to reverse the effects of diabetes. If some beta cells produce more insulin than others, we want to manufacture more of these cells.

To help address this, Dr. Ma and his team are developing technologies to measure insulin production at the single beta cell level. Their work will help build an essential tool to develop improved stem cell derived beta cells, and to manufacture these cells at the scale needed to reverse type 1 diabetes.



COMPLICATIONS | BIOMEDICAL RESEARCH

Project: Mechanisms of sustained metabolic benefits of intermittent fasting

Through donor support, Dr. Hoon-Ki Sung, Associate Professor with the Department of Laboratory Medicine & Pathobiology at the University of Toronto, is examining whether intermittent fasting can help prevent liver disease in people with type 2 diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as liver disease, kidney failure, and even death.

Currently, medications to treat liver damage in people with diabetes are costly and ineffective over the long run. Intermittent fasting is an alternative that holds the promise of long-term, low-cost improved liver health.

A 2023 clinical study demonstrated that intermittent fasting led to the remission of type 2 diabetes in patients and improved liver function; however, we don't know if these benefits persist after fasting is stopped.

Dr. Sung is studying how intermittent fasting helps improve liver health.

Dr. Sung and his team's research will improve our understanding of how intermittent fasting can be used as a preventive, curative, safe and low-cost treatment for liver damage in people with diabetes.

PREVENTION| POPULATION HEALTH

Project: Working together to prevent Type 2 Diabetes in Black, African, and Caribbean Communities in Peel, Ontario

Through donor support, Dr. Ian Zenlea, Pediatric Endocrinologist, Clinician Scientist, and Lead for the Family and Child Health Initiative at Trillium Health Partners and the Institute for Better Health, is working to prevent type 2 diabetes in communities in Peel.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

The disease is a significant health concern in Peel, Ontario – by 2025, one in six adults living in Peel will have type 2 diabetes.

People from Black, African and Caribbean communities have a higher risk of type 2 diabetes and related complications. The risk of developing type 2 diabetes is carried across generations, requiring a family-based approach to diabetes prevention.

Dr. Zenlea is building on community advocacy work by mobilizing community agencies, service providers, researchers, and community caregivers who have prediabetes, gestational diabetes, or type 2 diabetes. Together, the will codesign community-based type 2 diabetes prevention interventions that are family-based and culturally sensitive to Black, African and Caribbean communities.

Their findings will support ongoing advocacy and activism to create more equitable and inclusive interventions to prevent diabetes. The co-designed interventions can also be adapted to other communities across Canada.

PREVENTION | BIOMEDICAL RESEARCH

Project: Sex-specific mechanisms in the development of type 2 diabetes

Through donor support, Dr. Jennifer Thompson, Associate Professor at the Libin Institute in the Cumming School of Medicine at the University of Calgary, is bringing us one step closer to understanding how estrogen impacts a person's risk of developing type 2 diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. Insulin is produced in the pancreas by cells called beta cells. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death. Type 2 diabetes is caused by several different risk factors, and accounts for 90% of diabetes cases in Canada.

Gaining weight can increase a person's risk of developing diabetes. Men are more likely to develop type 2 diabetes earlier in life than women, while women have an increased risk of type 2 diabetes as they get older. This is related to how and where fat cells develop in the body. For men, fat cells develop around their organs, which leads to a higher risk of diabetes; for women, fat cells develop beneath their skin. However, as women get older, where their fat cells develop changes as their estrogen levels decrease.

Dr. Jennifer Thompson is building our understanding of the impact of being a woman versus being a man on a person's risk of developing type 2 diabetes. She is exploring how estrogen influences where fat cells develop in women, and how it impacts a woman's risk of developing diabetes throughout her lifespan.

These findings can help us better understand how to reduce the risk of developing type 2 diabetes.

COMPLICATIONS | BIOMEDICAL RESEARCH

Project: Is the protein GRP78 important to diabetic kidney disease?

Through donor support, Dr. Joan Krepinsky, Professor of Medicine with the Faculty of Health Sciences at McMaster University, is helping develop new treatments to prevent kidney failure in people with diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as liver disease, kidney damage, and even death.

Diabetes is a very common cause of kidney failure. High blood sugars cause kidney cells to make scar proteins; when scar proteins build up over time, they cause kidney failure.

In people with diabetes, a protein called GRP78 interacts with other proteins, called a2M and integrin beta 1, to make scar proteins.

Dr. Krepinsky and her team are now examining if blocking the interaction between GRP78 and a2M can help slow or improve diabetic kidney disease. They are also learning how GRP78 and integrin beta 1 work together.

This research will help develop new treatments for people with diabetes impacted by kidney disease.

COMPLICATIONS | BIOMEDICAL RESEARCH

Project: Changes to muscle structure and function during type 2 diabetes

Through donor support, Dr. Joseph Gordon, Associate Professor with the College of Nursing, Faculty of Health Sciences at University of Manitoba, is working to prevent complications in young people with type 2 diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Over the past two decades, type 2 diabetes has been affecting more and more younger people across Canada. Developing type 2 diabetes at a younger age greatly increases the risk of severe complications in early adulthood.

Dr. Gordon is building our understanding of how muscle structure and metabolism change with type 2 diabetes. He and his lab are testing whether a protein found in muscle cells called Nix can protect against insulin resistance, and the changes that happen when diabetes develops.

This knowledge will help develop new therapies to treat type 2 diabetes in young people, and reduce their risk of developing long-term complications.

TREATMENT | CLINICAL RESEARCH

Project: Helping couples communicate better: Does this help persons with type 2 diabetes respond better to a step count prescription?

Through donor support, Dr. Kaberi Dasgupta, Professor of Medicine at McGill University and Director of the Centre for Outcomes Research and Evaluation at the Research Institute of the McGill University Health Centre, is determining if helping couples communicate better helps people manage their diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Being active can help improve health through better blood sugar control for people with type 2 diabetes. A “step prescription” is one way to help people set and meet physical activity targets.

Between doctor’s visits, a person’s partner can play a key role in supporting a person with diabetes’ increased activity levels.

Dr. Dasgupta is studying the impact of couples being physically active together to help manage one partner’s type 2 diabetes.

By encouraging couples to communicate better and exercise more together, she hopes partners with type 2 diabetes can better manage their blood sugar levels.

PREVENTION| CLINICAL RESEARCH

Project: A pilot study to measure energy expenditure in youth enrolled in weight management interventions

Through donor support, Dr. Katherine Morrison, Professor of Pediatrics and Director, Centre for Metabolism, Obesity, and Diabetes Research in the Faculty of Health Sciences at McMaster University, is studying ways to help young people manage weight gain.

Regaining weight is perhaps the most challenging aspect of weight management – and recurring cycles of weight loss and gain increase the risk of diabetes. In youth who regain weight after weight loss, we do not know if their energy expenditure declines.

Dr. Morrison is launching a pilot study to monitor energy expenditure in youth with obesity undergoing weight management interventions. Her team will follow participants for one year and will also invite participants to become part of a youth advisory group to assist in designing future studies.

Their research will help determine how energy expenditure changes during obesity management in young people, helping guide future treatments to prevent obesity and diabetes in youth.

COMPLICATIONS | CLINICAL RESEARCH

Project: Weight management for kidney transplantation in type 2 diabetes

Through donor support, Dr. Kristin Clemens, Assistant Professor of Medicine at Western University, is helping improve the lives of people with obesity and diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney disease, anxiety, amputations, and even death.

Obesity has a profound impact on people living with diabetes. For people with type 2 diabetes who develop kidney disease, obesity can also be a major barrier to life-saving kidney transplantation. Canadian transplant programs exclude people living with obesity from accessing a new kidney, due to the possible risk of surgical complications.

People with diabetes, obesity and kidney disease face longer wait times for a transplant, and sometimes, never receive a new kidney.

Dr. Clemens and her team of diabetes, obesity, and kidney doctors, as well as nurses, dieticians, social scientists and patient partners, are beginning a clinical trial to study the effectiveness of a weight management program for people living with diabetes, obesity and kidney disease.

This clinical trial will help reduce barriers to better health and quality of life for those living with type 2 diabetes and its complications.

TREATMENT | CLINICAL RESEARCH

Project: Adding two-sugar lowering drugs to an automated insulin delivery system, to further improve blood sugar levels

Through donor support, Dr. Michael Tsoukas, Associate Professor of Medicine in the Division of Endocrinology at the McGill University Health Centre, is testing a new combination therapy to help people with type 1 diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. Insulin is produced by cells in the pancreas called beta cells. For people with type 1 diabetes, their beta cells have been destroyed by their own immune system. As a result, they can no longer produce insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Despite advancements in automated insulin delivery or AID systems, not everyone with type 1 diabetes can reach desired blood sugar levels.

Dr. Tsoukas and his team want to find out if using a combination of two different drugs, semaglutide and empagliflozin , can improve blood sugar control in people with type 1 diabetes using AID system.

This will be the first type 1 diabetes study combining both of these drugs, and which the team hopes will help people with diabetes better control their blood sugars.

COMPLICATIONS | HEALTH SERVICES

Project: Best Foot Forward: Foot screening to avoid limb loss

Through donor support, Dr. Nicole Woods, Associate Professor in the Department of Family and Community Medicine at the University of Toronto, is saving people with diabetes from preventable leg and foot loss.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

Leg and foot loss due to diabetic foot injury is one of Canada's most pressing and preventable healthcare crises. Leg and foot wounds from diabetes-related complications account for more than 70% of lower limb losses in Canada.

Dr. Woods and her team are improving the prevention and early treatment of diabetes related foot wounds for structurally disadvantaged Ontarians living with diabetes, which can lead to loss of lower limbs and early death.

Her team will train healthcare workers and care providers to deliver foot check-ups, and co-design a care referral network with community partners and stakeholders. This will enable care providers to identify and intervene before foot wounds advance to limb loss.

This research will address disparities related to foot care in Ontario as well as connect persons living with diabetes to care when they need it.

COMPLICATIONS | BIOMEDICAL RESEARCH

Project: Inflammation, fibrosis and diabetic kidney disease

Through donor support, Dr. Pedro Geraldes, Assistant Professor of Medicine at the University of Sherbrooke is helping develop new treatments to prevent kidney failure in people with diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as liver disease, kidney damage, and even death.

Diabetes is a very common cause of kidney failure. Dr. Geraldes and his team have found that a protein called DUSP4 can help protect mice from diabetic kidney disease. They are exploring how DUSP4 works and its impact on kidney inflammation, cell damage, and kidney disease in diabetes.

Their work will help develop new treatments to prevent and reverse kidney disease in people with diabetes.

TREATMENT | CLINICAL RESEARCH

Project: Early Combination Therapy for Type 2 Diabetes

Through donor support, Dr. Ravi Retnakaran, Associate Professor in the Division of Endocrinology and Metabolism at the University of Toronto, is discovering if a new therapy may improve the quality of life for people with type 2 diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

A new treatment for type 2 diabetes combines long-acting insulin and another medication called GLP1-RA. Clinical trials have shown that, in patients who have lived with type 2 diabetes for many years, this combination can provide excellent blood sugar control, with no increased risk of low blood sugars or weight gain.

Dr. Retnakaran is studying whether this combination therapy affects the following three
hormones that can help with glucose control: glucagon, GLP-1 and GIP. His research will help inform whether this therapy should be used earlier for people with diabetes, improving their blood sugar levels and quality of life.

TREATMENT | HEALTH SERVICES

Project: Raising awareness about undiagnosed diabetes in children in three provinces in Canada: a pilot study

Through donor support, Dr. Rayzel Shulman, faculty member with the Institute of Health Policy, Management and Evaluation at the University of Toronto, is helping prevent a dangerous condition in children with diabetes.

In healthy individuals, blood sugars are controlled by a hormone called insulin, which lowers blood sugar levels. For people with diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as nerve damage, sight loss, heart disease, kidney failure, anxiety, amputations, and even death.

If a child develops diabetes and it is not recognized early, this can lead to a serious and life-threatening condition called diabetic ketoacidosis (DKA).

Dr. Shulman and her team are piloting a diabetes awareness campaign to prevent DKA in children in Canada.

They will focus on elementary school educators, caregivers, and health care providers training them to notice the signs of diabetes and DKA.

The study will be piloted in school boards in three provinces. If successful, they will then plan a larger study with other groups of people who interact with children and to other regions in Canada.

By recognizing signs of diabetes early and treating it right away, we can help children avoid a serious and life-threatening condition, making it easier for caregivers to cope with a new diagnosis and to take better care of their children in the future.

PREVENTION| CLINICAL RESEARCH

Project: Semaglutide for the prevention of post-transplant diabetes

Through donor support, Dr. Sunita Singh, Medical Director of University Health Network's Living Kidney Donation Program, is working on a new treatment to prevent diabetes in people receiving kidney transplants.

A kidney transplant is the best treatment for people living with kidney failure as it allows people to live longer with a better quality of life. However, one in four kidney transplant recipients will develop diabetes after transplant. This is largely due to the medications that must be used to prevent rejection of the transplant. Kidney transplant recipients who get diabetes after transplant are up to three times more likely to have heart disease and die prematurely.

To date, there are no treatments to prevent the development of diabetes after kidney transplant.

Semaglutide is a safe and effective drug that is commonly used to treat diabetes and obesity. Dr. Singh and her team believe that this drug may prevent the development of diabetes in kidney transplant recipients. They are studying whether semaglutide is effective in decreasing blood sugar levels and the rate of diabetes, as well as other important markers of health for kidney transplant recipients including body weight, cholesterol levels, and liver, kidney and heart function.

Their research will help determine if semaglutide is a safe and effective option for the prevention of diabetes in kidney transplant recipients.

COMPLICATIONS | BIOMEDICAL RESEARCH

Project: Correcting metabolic imbalance to treat heart disease during obesity and diabetes

Through donor support, Dr. Thomas Pulinilkunnil, Professor with the Department of Biochemistry and Molecular Biology at Dalhousie University, is working to prevent heart disease in people living with diabetes.

For people with type 2 diabetes, they can no longer produce or use enough insulin to control their blood sugars, which can lead to health complications such as heart disease, kidney failure, and even death. For people with diabetes and obesity, their risk for developing heart disease is even higher. We currently don't know exactly why.

Dr. Pulinilkunnil is determining whether a protein called TFEB may help maintain heart health. TFEB works by clearing heart cells of cellular "garbage." In people with type 2 diabetes and obesity, TFEB stops working in the heart, resulting in heart stress, damage, and cellular death.

He is testing if:

- A decline in the TFEB protein changes the heart's ability to burn fuel
- A decline in the TFEB protein prevents the heart from beating rhythmically
- Improving TFEB function helps heart health

This research will help develop new therapies to prevent damage and improve heart function in people with obesity and diabetes.