

Improving the lives of children and their families living with type 2 diabetes

STRATEGIC PLAN

FOCUS AREAS



Trainees



Communications



Interventions



Infrastructure



Indigenous Engagement

ACHIEVEMENT

VISION

By 2025, DREAM will be a centre of research excellence and training that creates and advances knowledge to improve the wellness of children with T2D.



INCREASE
Citations
Publications
Presentations
Trainees



ROI



MILLION
External
Grant
Funding

Co-developed research project and publications with stakeholder/patient input

MISSION

To improve the wellness of children and their families living with T2D by making clinically relevant discoveries that translate discovery into practice and policy.



INNOVATION
IN DIABETES RESEARCH

- Cutting edge infrastructure
- Patient-oriented research
- Integration of inter-disciplinary research
- Sustainable funding



EXCELLENCE
IN DIABETES RESEARCH

- Recruit and engage motivated trainees
- Innovative career development opportunities
- Involvement in national level training programs



EFFECTIVE
COMMUNICATION STRATEGIES

- Effective team meetings
- Effective knowledge translation with all audiences
- Raise profile at conferences
- Transparency at all levels

GOVERNANCE

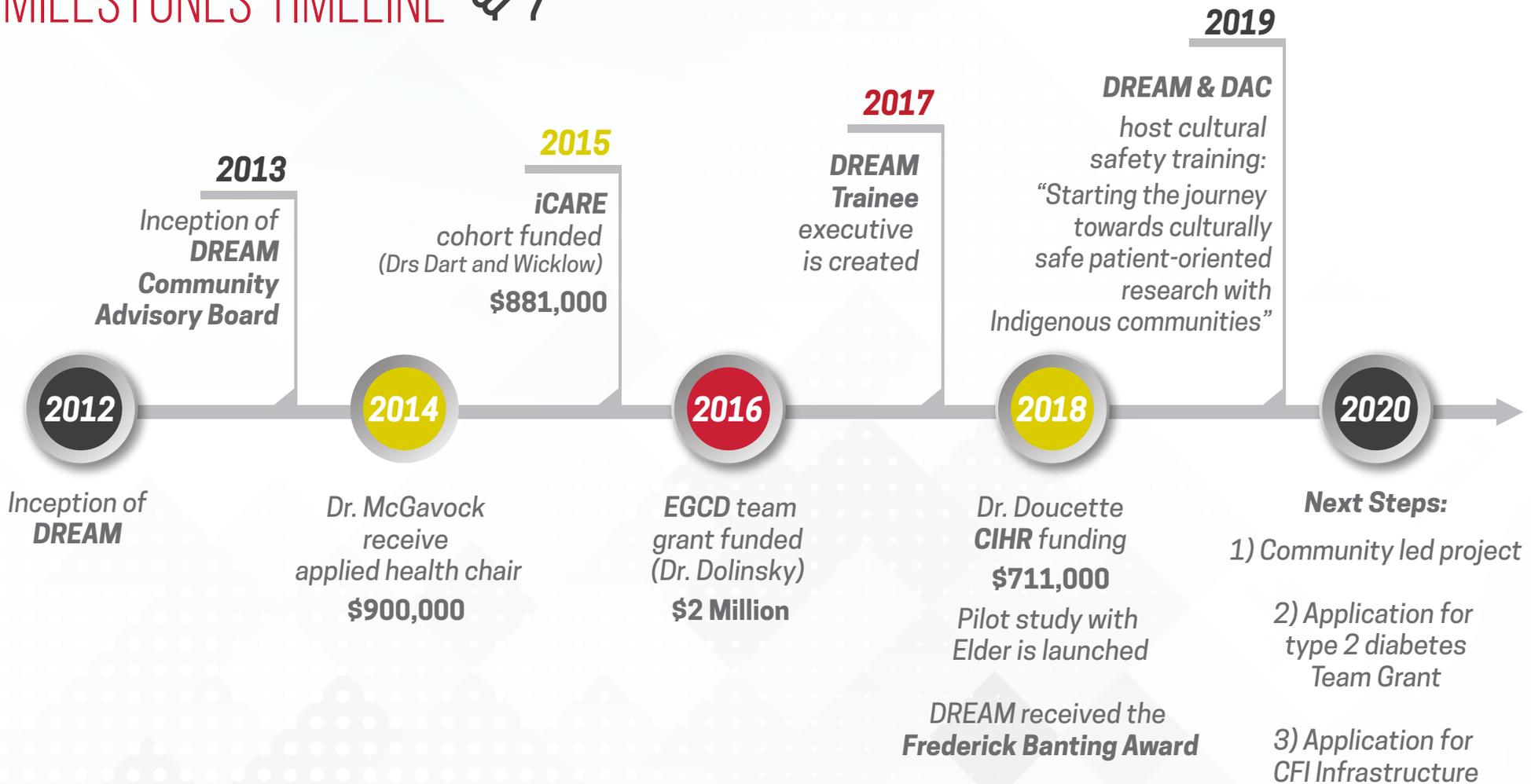
Integration of Clinical, Basic and Population Health Researchers with Stakeholders and Trainees in Decision Making

VALUES

Equity, Inclusion, Collaboration, Innovation, Respect, & Transparency

DREAM INCEPTION

MILESTONES TIMELINE

**Thank you to our partners, stakeholders and community leadership groups.

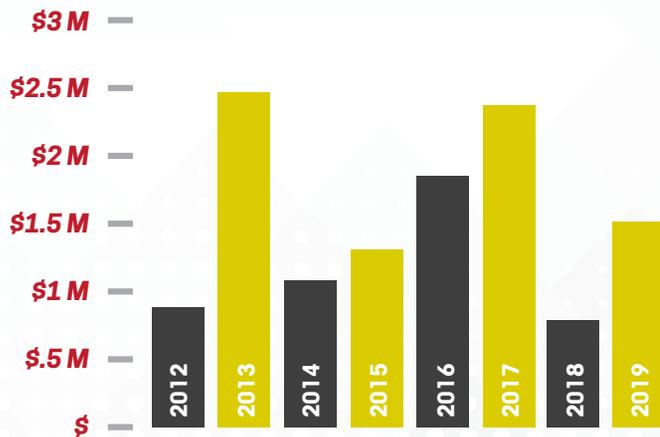


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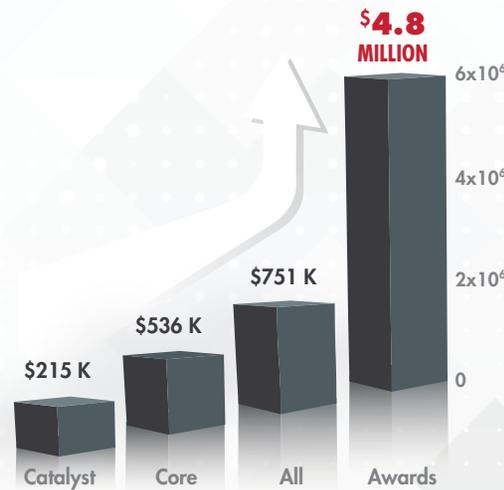
PROGRESS TO DATE



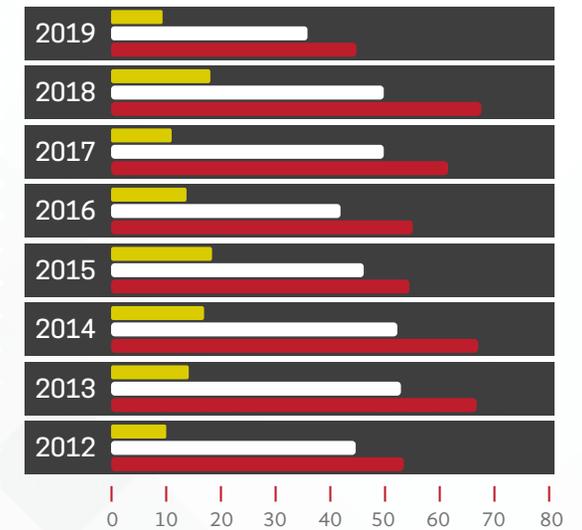
New Funding



Accomplishments



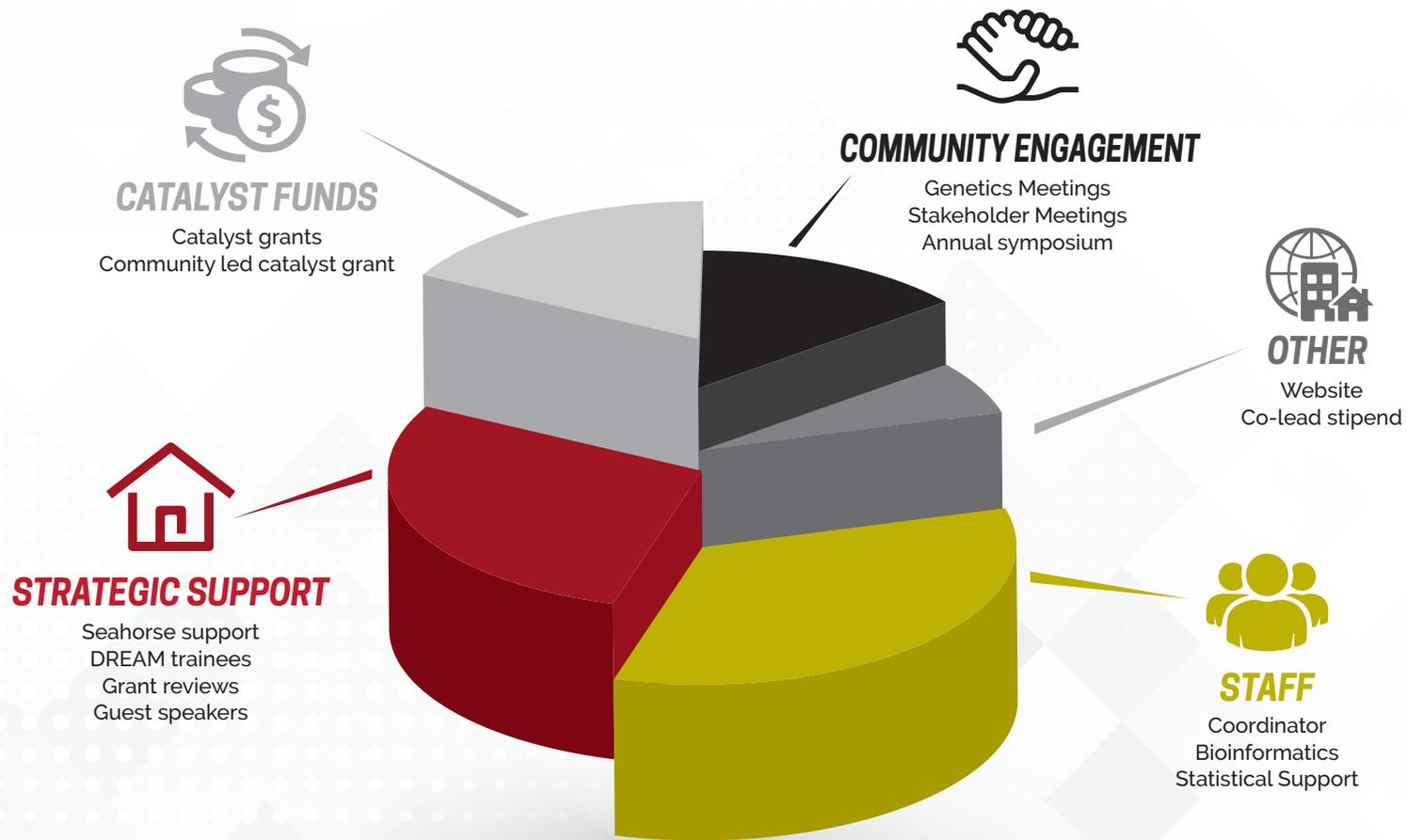
Publications



ANNUAL BUDGET \$225,000.00

Where Will This Money Go?

Thanks to the Children's Hospital Research Institute of Manitoba's ongoing support.



BUDGET BREAKDOWN 2020



The Children's Hospital Research Institute of Manitoba

Research Theme Annual Report

PURPOSE:

The purpose of this report is to inform the Board of Directors of our research activity for this past year. The audience is diverse in their understanding of the scientific method, biology and medical terminology. It is critical to be concise, brief, and to use lay language. The Board uses this information to ensure that CHRIM's vision, mission and values are being fulfilled on an ongoing basis, and to report to the Foundation on productivity and responsibility to our donors.

Name of Theme

DREAM - Diabetes Research Envisioned and Accomplished in Manitoba

Group Leader and Members

(Please list in alphabetical order by last name with primary departmental affiliation, if any, and indicate whether MD or PhD or both)

Untitled

Mandy Archibald, PhD, College of Nursing

Meghan Azad, PhD, Department of Pediatrics and Child Health/Community Health Sciences/Human Nutritional Sciences

Allison Dart, MD, MSc, Department of Pediatrics and Child Health

Vernon Dolinsky, PhD, Department of Pharmacology and Therapeutics (co-lead)

Christine Doucette, PhD, Department of Physiology and Pathophysiology

Joseph Gordon, PhD, Department of Human Anatomy and Cell Science/ Physiology and Pathophysiology

Grant Hatch, PhD, Department of Pharmacology and Therapeutics
Meaghan Jones, PhD, Department of Biochemistry and Medical Genetics
Jonathan McGavock, PhD, Department of Pediatrics and Child Health (co-lead)
Ayesha Saleem, PhD, Faculty of Kinesiology and Recreation Management
Elizabeth Sellers, MD, MSc, Department of Pediatrics and Child Health
Brandy Wicklow, MD, MSc, Department of Pediatrics and Child Health

Goals of the Program: Who We Are, What We Do and Why

Please give a narrative summary of your group's identity and purpose. This account should be written in lay language and should identify how the theme has added value to the research efforts of the individual investigators (MAX 1 page)

Untitled

Mission: The goal of the DREAM research theme is to improve the wellness of children and their families living with type 2 diabetes by making clinically relevant discoveries (that improve their lives). Using an integrated interdisciplinary approach we will translate discoveries into practice and policy.

Vision: We hope that discoveries we make in our clinical studies of children can be used to discover new mechanisms that lead to disease. The group of scientists that we have assembled will work closely on all aspects of research to make sure that our discoveries are meaningful to parents and children affected by diabetes. By working closely as a team, we are better able to make our discoveries meaningful and advance our knowledge faster than anything we could do on our own.

Who we are: The DREAM theme consists of 20 trainees, 13 investigators and 6 Indigenous stakeholders committed to improving the lives of children and their families living with, or at risk for type 2 diabetes. Within that commitment we recognize that type 2 diabetes disproportionately affects Indigenous youth in Manitoba, and in accordance with TRC Call to Action #18 acknowledge that this inequity is the direct result of trauma associated colonial policies and practices designed to marginalize Indigenous people in Canada. Our investigator team consists of pediatric specialists in endocrinology and nephrology, basic scientists with expertise in molecular biology, genetics, muscle physiology and cardiovascular disease and epidemiologists with expertise in maternal child health and community based participatory action research. Collectively we are all committed to solving the complex issues faced by young people living with diabetes, ranging from the fundamental question "Why did I get diabetes at such a young age" to "What is the best way help children living with diabetes experience meaningful complication free lives?" We rely on translational, "team science" approaches, grounded in culturally safe practices, to address these questions.

What we do: Our team focuses on three primary pillars of research related to type 2 diabetes in youth: (1) Novel interventions to prevent and treat type 2 diabetes; (2) Biopsychosocial determinants of complications of diabetes and (3) the developmental origins of type 2 diabetes in youth. Within each of these pillars scientists design studies to unravel the complex factors that lead to type 2 diabetes and its complications using pre-clinical, clinical and population health approaches. Scientists from a range of backgrounds work collaboratively to design impactful research that could have the greatest impact on the children and families affected by type 2 diabetes. Since our inception, we have secured over \$22M in external funding to tackle these problems, created patient and stakeholder advisory committees to ensure that our work is relevant to families we serve, hosted symposia for members of the scientific and lay community and made numerous discoveries that have shaped the way doctors and families understand type 2 diabetes in youth. We are also deeply committed to fostering the next generation of scientists and clinicians in this area. To date, our trainees have secured over \$500,000 in funding to support their education, hosted numerous educational and interprofessional events to advance their careers and created national collaborations with other trainee groups to share knowledge and expand social networks. Collectively, this work has made the DREAM theme a nationally recognized centre of excellence in the area of pediatric diabetes research.

Why do we do it? Type 2 diabetes is the fastest growing pediatric chronic disease in Canada. Manitoba is disproportionately affected by type 2 diabetes in youth. For every children diagnosed with type 2 diabetes in other parts of Canada, there are 15 children diagnosed with type 2 diabetes in Manitoba. Type 2 diabetes in youth is associated with a large burden of complications and reduced life expectancy. Nearly 50% of children living with type 2 diabetes will be on dialysis by the time they are 35 years old. Type 2 diabetes affects youth that suffer from profound structural disadvantage. Most are poor, live in rural/remote areas and experience significant mental health comorbidities. Type 2 diabetes in youth is a major health challenge in Manitoba and requires Manitoba-made solutions.

Major Accomplishments (Milestones)

Please list up to 5 major accomplishments/milestones from the past year. (media, impact on child health, events, awards and recognitions)

Untitled

Cultural safety training:

This year we have dedicated time and resources to focus on cultural safety within our team and with our trainees. All researchers completed the online San'yas training course. We also hosted a cultural safety training workshop "Starting the journey towards culturally safe patient-oriented research with Indigenous communities" with support from Diabetes Action Canada. We hosted 35 scientists, patient partners and trainees from across Canada in culturally safe practices for research, taught by Elders and leading Indigenous scholars. The workshop was co-developed by an Indigenous patient advisory circle and DREAM trainees. A sub group of our trainees also piloted novel cultural safety training with Dr. Barry Lavallee and presented their experience at the annual symposium.

Stakeholder and patient engagement:

The 2019 DREAM annual symposium was co-developed with our Indigenous stakeholders. They helped to decide on speakers for our annual symposium which led to a variety of speakers that we may otherwise not have considered. This also contributed to having many more community members and stakeholders attend the symposium than we have in our past years. Based on advice from the iCARE participant advisory group Drs. Dart and Wicklow have been piloting having an elder in their diabetes/renal clinic during this year. So far, the feedback from the youth and their caregivers has been overwhelmingly positive with the elder being included in the opening sharing circle and group activities to start clinic.

DREAM trainees:

Our trainees continue to excel. As a collective they brought in \$235,800 in studentships this year, and \$38,124 in travel awards. Also, Taylor Morriveau (PhD candidate) was named Vanier Scholar and one of Canada's Most Powerful Women (Top 100 by WXN).

Funding:

This year DREAM investigators secured 15 grants totaling \$4.8M in new funding. Major awards came in the way of two large CIHR team grants that will support First Nations women in Northern Manitoba during their pregnancy care and support type 2 diabetes prevention among Indigenous youth within 30 communities across Canada. Another CIHR grant was awarded to explore microglia and cognitive impairments in offspring exposed to gestational diabetes. Two early career investigators Drs Jones and Saleem, received their first tri-council grant and Dr Azad secured a large grant from Canada Foundation for Innovation to support a Manitoba Interdisciplinary Lactation Center.

Publications:

This year our team published 45 papers, with 9 that included two or more members of DREAM.

A published paper by Drs Doucette, Hatch and Dolinsky titled "Gestational Diabetes Adversely Affects Pancreatic Islet Architecture and Function in the Male Rat Offspring" in the journal Endocrinology, was

highlighted by Endocrine News as a top endocrine discovery of 2019.

Drs Dart and Wicklow published a paper describing a new pathway to explain kidney injury in youth living with type 2 diabetes that included artwork and an Indigenous framework that was developed by youth and their parents.

Research Funding

1. Total dollar value of your membership's research funding currently held (2015-2020)

Untitled

\$22,788,309

2. Give a subtotal of **ACTIVE** research funding awarded (and held in Manitoba) in the past 12 months.

Untitled

\$1,501,967

Highlight of current major funding:

Grant Hatch Canada Research Chair 2013-2020 "CRC in Molecular Cardiolipin Metabolism" \$1,400,000

Vernon Dolinsky CIHR Operating Grant 2014-2019 "Adiponectin in gestational diabetes and the developmental origins of disease" \$503,000

Jon McGavock CIHR Applied Public Health Chair 2014-2019 "Public Health Chair in Resilience and Childhood Obesity" \$1,000,000

Allison Dart / Brandy Wicklow CIHR Operating Grant 2015-2020 "An assessment of psychological factors, inflammatory biomarkers and kidney complications: the Improving renal Complications in Adolescents with type 2 diabetes through REsearch (iCARE) cohort study" \$881,609

Jon McGavock Lawson Foundation and MHRC 2015-2020 "DEVOTION: Developmental Origins of Chronic Diseases in Children Network" \$1,200,000 + \$2,500,000

Jon McGavock CIHR Team Grant 2016-2019 "Expanding the circle: Peer-based, resilience centred school programs for preventing obesity and type 2 diabetes in Indigenous Youth" \$900,000

Vernon Dolinsky CIHR team grant 2016-2021 "The developmental origins of obesity and obesity-related complications in children" \$2,000,000

Jon McGavock CIHR SPOR Chronic Diseases 2016-2021 "Network in Diabetes and its Related Complications" \$25,000,000

Allison Dart CIHR SPOR/Research Manitoba/CIHR 2016-2021 "Canadians Seeking Solutions and Innovations to Overcome Chronic Kidney Disease (CAN-SOLVE CKD)" \$125,000 + \$200,000 + \$301,293

Meghan Azad Canada Research Chairs Program 2017-2022 "Canada Research Chair in Developmental Origins of Health and Disease" \$500,000

Grant Hatch HSFC Grant-in-Aid 2017-2020 "Regulation of Cardiolipin Biosynthesis in the Heart" \$298,336

Christine Doucette CIHR Project Grant 2018-2023 “Examining the mechanistic impact of the HNF1aG319S polymorphism on beta cell function and its contribution to early-onset type 2 diabetes” \$711,450

Jon McGavock CIHR Team Grant 2018-2023 “Deepening the roots of living in a good way for Indigenous Children. The Indigenous Youth Mentorship Program” \$1,500,000

Meghan Azad Canada Foundation for Innovation 2019-2024 “Manitoba Interdisciplinary Lactation Center (MILC): a provincial infant feeding database and human milk biorepository” \$700,000

Meghan Azad Bill & Melinda Gates Foundation: Grand Challenges Explorations 2019-2020 “Does Inoculation of Bangladeshi Neonates with Pre-lacteals Cause Harmful Microbiome Disruption, Impairing Growth and Resilience?” \$200,000 USD

Joseph Gordon NSERC Discovery Grant 2019-2024 “Modulation of cell death and differentiation by myocardin-regulated microRNAs during mammalian development” \$160,000

Grant Hatch NSERC Discovery Grant 2019-2024 “Regulation of Membrane Transport by Cardiopilin” \$160,000

Meaghan Jones and Ayesha Saleem SSHRC - NFRF 2019-2021 “Reversing frailty through transmission of epigenetic age by extracellular vesicles” \$250,000

3. Identify any Catalyst Grants awarded in the past year (Title, PI, funding amount)

Untitled

CHRIM catalyst grants

1. Development and Validation of a Patient-Reported Outcome Measure for Children with Chronic Kidney Disease (PRO-Kid) Allison Dart \$60,000
2. Gene-targeting of skeletal muscle Nix to prevent cardiometabolic complications in offspring exposed to gestational diabetes Joseph Gordon \$60,000
3. CHRIM Operating Grant - Meaghan Jones \$60,000
4. Extracellular Vesicles in Prenatal Fetal-Maternal Communication Ayesha Saleem \$60,000

DREAM catalyst grants 2019

1. Establishing epigenetic editing tools for mechanistic investigation of diabetes-related epigenetic changes Meaghan Jones \$19,998
2. Plasma adipo-myokines and EV profiles in exercise responders and non-responders Ayesha Saleem \$21,050

Collaborations

Give a list of NEW collaborations in the last 12 months with other groups or organizations, and a brief description of your activity with each.

Untitled

Jon McGavock

- Deborah Lawlor University of Bristol

- Kaitlin Wade University of Bristol

- Ed Manley Urban Analytics at the School of Geography and Leeds Institute for Data Analytics (LIDA) at University of Leeds

- All collaborations for use of the ALSPAC data and mendelian randomization methodologies. Has led to the focus of my PhD student Nicole Brunton's project and opportunity to spend time in Bristol working with this team.

Ayesha Saleem

- Dr. Noga Ron-Harel, Technion Institute, Israel - works on metabolic regulation of immune cells in cancer and aging.
- Dr. Hiroshi Yamada, Tsukuba, Japan - works on cognitive and behavioural neuroscience using Macaque monkeys.

Vern Dolinsky

- Animesh Acharjee, Senior Fellow, Institute of Cancer and Genomic Sciences, University of Birmingham - one co-authored paper submitted
- Marica Bakovic, Professor, Dept Human Health and Nutrition, University of Guelph - one co-authored paper published

Grant Hatch

- Jerry Vockley, Professor, Pittsburgh Liver Research Center, University of Pittsburgh – work on inborn errors of mitochondrial fatty acid oxidation

Supporting Documents (graphics, figures, impact reports)

Email for Copy of Submission

jslaght@chrim.ca