Diabetes Research Envisioned and Accomplished in Manitoba (DREAM) Theme

The Children's Hospital Research Institute of Manitoba

ANNUAL REPORT

November 12, 2015

Submitted by:

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Co-Directors of DREAM

EXECUTIVE SUMMARY

Highlights:

- 2 New CIHR Grants awarded to young investigators totalling **$1.4M** over the next 5 years to study (1) the mechanisms through which gestational diabetes lead to cardiometabolic diseases in youth (Dolinsky) and (2) the biopsychological determinants of renal disease in youth living with type 2 diabetes (Dart-Wicklow).
- 2 Large team grants from Research Manitoba and the Lawson Foundation totalling **$3.7M** over the next 5 years to create a network to study developmental origins of chronic diseases
- 2 potential new networks in type 2 diabetes prevention (McGavock) and the genetic-environmental determinants of obesity and type 2 diabetes in youth (Dolinsky) passed the LOI stage and may be launched in 2016 if funded by CIHR.
- 1 team member elected as a fellow to the Canadian Academy of Health Sciences
- 1 team member receives prestigious young investigator award
- DREAM symposium focuses on patient oriented research and invites young persons living with type 2 diabetes to present alongside scientists/trainees
- Launch of new Manitoba-based clinical childhood obesity initiative (Wittmeier)

New Initiatives

- New patient advisory group
- Launch of the DEVOTION Network
- Hired full-time clinical research nurse
- Hired new DREAM coordinator
- DREAM Catchers student group launches first Manitoba-based student network within the Canadian Obesity Network

Funding

- >$9,000,000 in funding over 22 grants from DREAM Investigators
- 4th year in a row we have leveraged DREAM funding over 20:1 to secure external funding.
- >$2,000,000 in in new operating grants to young investigators
- 3 new investigators received their first tri-council grants

Productivity

- >90 new publications
- >40% of publications contain more than 2 DREAM investigators
- Release of a DREAM Special Issue in the journal Biochemistry and Cell Biology

Anticipated Items for 2016

- Funding for 2 new diabetes-based networks by CIHR
- Potential links to 3 new SPOR Networks
- Launch of DEVOTION pathing Exercise
- Recruitment of 2 new scientists to DREAM/DEVOTION through CRC Chairs
- Symposium on Big Data with University North Dakota.

History of DREAM

The DREAM theme was established 2011, and began formal operations April 1st, 2012.

VISION

To improve the health of children with diabetes by making clinically relevant discoveries that will serve as the foundation for strategies to improve diagnosis, prevention and management of complications related to obesity and diabetes.

LOCATION OF DREAM

DREAM is located on the 5th and 6th floors of the John Buhler Research Centre within the Children's Hospital Research Institute of Manitoba.

CHANGE IN STRUCTURE TO DREAM

Some of the changes made last year were the transfer of funds away from pilot grants to sub-themes and towards core staff and collaborative opportunities. In an effort to align ourselves with CIHR's Strategy for Patient Oriented Research (SPOR), we also allocated funds towards the creation and maintenance of a patient advisory committee and investing in input from external experts into our program. Funds have also been allocated to writing retreats as well as external reviewing to encourage and support writing grants. The small catalyst grants are provided on the basis of need, timeliness and novelty, with the intention of getting pilot data that in turn can lead to more substantial funding. We will continue to fund core clinical and basic science staff. Salaries for these individuals will be shared by members of DREAM.

In the spring of 2014, the DREAM executive met with the executive from the Biology of Breathing (BoB) to discuss the potential for a collaboration on the recently launched Research Manitoba initiative to fund new clusters (or teams) of researchers focused on areas that were of interest to Manitobans. As the DREAM research group had previously demonstrated an interest in focusing our team on the study of the developmental origins of diabetes. The rationale for the shift in our mission was related in large part to clinical observations and seminal discoveries by the pediatric endocrinologists on the team, that children born to mothers with pre-gestational diabetes displayed a dramatically higher risk for type 2 diabetes, than children not exposed to diabetes in the womb.

At a group retreat in Hecla, we decided that the developmental origins of diabetes would be our primary theme over the next three years and that collaborating with BoB would enhance our capacity to study more extensively the developmental origins of the most common chronic diseases facing children in Manitoba: type 2 diabetes, obesity, asthma and allergies. In collaboration with members of BoB we submitted a letter of intent to Research Manitoba at the end of June 2014. The outline of the proposed Cluster is provided below (page 6). We will cover all four pillars of research described by CIHR and are aligned with the signature initiative of the Institute for Human Development, Child and Youth Health. The team, now named DEVOTION (DEVelOpmenTal Origins of chronic diseases In children Network), was asked to submit a full proposal in January 2015, and this proposal was successful which resulted in bringing in an additional $2.5 million to MICH. The official launch for this research team took place on October 2, 2015.

Some of the other changes in structure that have occurred over the past year have been the implementation and maintenance of a stakeholder advisory group for DREAM, and a patient advisory group for the iCARE study. In the future we are also going to be looking creating and implementing other patient advisory groups in order to carry out patient oriented research throughout DREAM projects and DEVOTION projects.

PROGRESS IN 2015

CLINICAL EPIDEMIOLOGY CORE

To facilitate the productivity of our clinician scientists, one of the long-term goals for the DREAM Theme is to create a metabolic core within the Clinical Research Unit that consists of core staff trained in diabetes and metabolic assessments. In 2014, we hired our first part-time clinical research nurse and moved key employees into the CRU to strengthen the relationship between research assistants involved in the program. In 2015, that research nurse position became a 1.0 FTE funded through DEVOTION and DREAM. Her time is dedicated with clinical and epidemiological studies related to DREAM and studies involved in DEVOTION. In addition to the research nurse, the DREAM research coordinator position was restructured to provide additional support to DREAM clinician investigators to support new projects. This additional support facilitates the completion of pilot projects that are destined to become larger nationally funded research projects. Our vision is for the use DREAM core funding to support 20-50% salaries for several key research positions within the CRU with the remainder of funding provided through individual researcher grants. In 2016, we hope to expand to another part-time research nurse and part-time research assistant.

ADVISORY GROUP

The majority of the youth treated for type 2 diabetes in the Children's Hospital are First Nations, Metis or Inuit. In an effort to comply with guidelines for participatory action research and ensure that the research we are doing is tailored to the needs of Aboriginal families, Dr. Heather Dean assembled a group of Aboriginal stakeholders, health care providers and scientists to advise the Developmental Origins sub-theme.

Since 2012 researchers at the Children's Hospital Research Institute of Manitoba (formerly MICH) have had regular correspondence and information sharing with representatives of our patients and families, regional and national indigenous agencies. Our Community partners include Manitoba First Nations Diabetes Committee (MFNDC), Diabetes Integration Project (DIP), Four Arrows Regional Health Authority (FARHA), First Nations and Inuit Health (FNIH)-Manitoba Region, National Aboriginal Diabetes Association (NADA)- national head office in Winnipeg, Aboriginal Network Community Resources (ANCR)and the chronic disease teams of Norman RHA and Burntwood RHA. Members of the research team meet biannually with these groups, particularly the MFNDC and DIP, to share our clinical experience, results of research, publications and plans for next steps in research. Since 2014 we have aspired to develop equitable research relationships with the community based health workers, elders, and indigenous agencies to move from collaborative Knowledge exchange to Knowledge synthesis. We have developed a forum to share ideas and to derive research priorities and to involve community members in the design, analysis and presentation of research projects/data. We plan to continue fostering these working relationships and expand our advisory membership to include youth, and families affected by diabetes.

The iCARE (improving renal Complications in Adolescents with type 2 diabetes through REsearch) project has also created a patient/parent advisory group this year. As far as we know, this is the first youth-centred patient advisory group ever assembled at CHRIM/MICH and group consists of youth with T2D, recent graduates and their caregivers. They will help our group to set research priorities that are patient oriented. This group will play a key role in the oversight of specific iCARE study aims and provide input regarding interpretation of results and knowledge translation activities to ensure they are relevant to the needs of patients. This group is highly engaged, and committed to the project and the importance of addressing psychological factors as determinants of physical health. This initiative is also a key factor for our team as we position ourselves for a 2nd round of SPOR network opportunities.

1 DAY STRATEGIC PLANNING RETREAT

In the spring of 2015, as a follow-up to the retreat held in Hecla in 2014, DREAM conducted a Pathing Exercise (see image below) to guide our team over the next 3 years. This Indigenous approach to strategic planning was selected as it provided our team to (1) be exposed to Indigenous methods and culture and (2) refine team goals for 2015. The meeting was held north of the on traditional Ojibwe land at "Windy Hill Community Learning and Wellness Centre" run by the Ma Mawi Wi Chi Itata Centre. The day was led by Indigenous (Metis) leaders from the faculty of Social Work. They provided us with an opportunity to discover strengths and weaknesses within our group, identify goals as members of DREAM and finally create a short and long-term road map to accomplishing long-term aims for the team. This was very well received by the group and we agreed it is an important exercise to complete annually to ensure we remain on track towards our long-term vision and remain grounded in Indigenous culture and needs of our stakeholder group. The Pathing exercise for 2016, will include members of the Indigenous stakeholder committee.

RECRUITMENT OF NEW SCIENTISTS

Through the new DEVOTION Team grant through Research Manitoba and the Lawson Foundation as well as the CIHR Applied Health Chair position that DREAM scientists were recently awarded, the Department of Pediatrics will be provided with funding to recruit new world class scientists to study the developmental origins of chronic diseases, like diabetes and Indigenous child health. The University of Manitoba will commit ~$125,000 annually over 5 years to support the recruitment of a new scientist into a Tier 2 CRC Chair. We are working closely with the associate dean of research within the Faculty of Health Sciences to develop the expectations and vision for the chair. This position will be posted in the new year with an expected 2016 start date.

A similar process will be put in place thanks to a commitment to the Lawson Foundation to recruit and Indigenous scholar into CHRIM to support the capacity for research related to Indigenous child health. With a commitment of $120,000 annually over 5 years, we plan to recruit a scholar in the area of Indigenous approaches to population health or qualitative research that will work closely with the Healthy Child Manitoba Office and the First Nations Social Secretariat of Manitoba (Assembly of Manitoba Chiefs) to support world class research in Indigenous child health, particularly focused on inequities in chronic diseases, like type 2 diabetes.

TRAINING ENVIRONMENT FOR DREAM TRAINEES

Trainees of DREAM are provided access to a top-notch training environment at MICH. MICH fosters multi-disciplinary research interactions that facilitate translational research between the pre-clinical, clinical and population health-based sciences. Additionally, MICH provides an open and collaborative environment, which houses many eminent researchers with whom our trainees forge strong research collaborations and receive mentoring and guidance. Another excellent training opportunity for our trainees is participation in our Annual Diabetes Symposium, which is organized and hosted by DREAM. This symposium provides an excellent opportunity for trainees to showcase their work and allow them to network with both local and international leaders in the diabetes field.

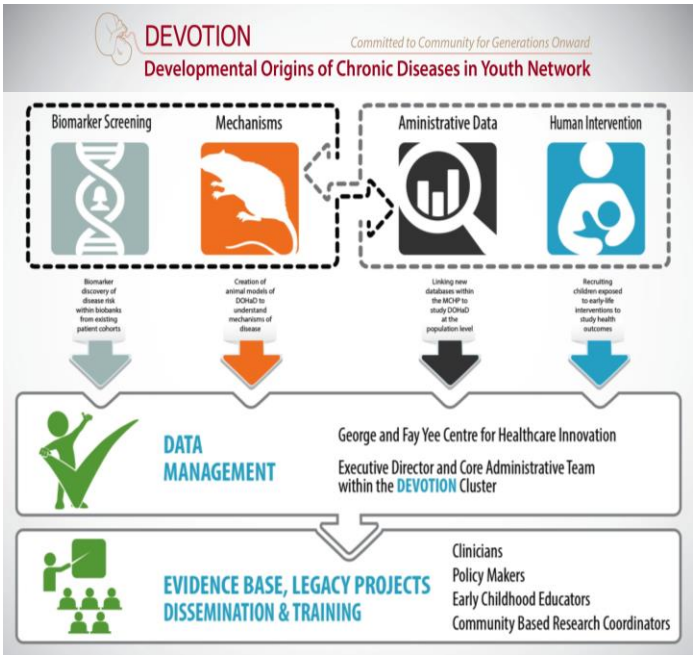
Last year, DREAM successfully formed a journal club (named “DREAM Catchers”), which provides students and trainees opporunities to share and discuss relevant hot research papers as well as discuss work in progress, obtain critical feedback on research projects and hone oral communication skills. The DREAM Catchers journal club is also used as a forum to invite world-renowned researchers to meet with trainees and discuss exciting new avenues of research, career paths and advice on balancing work and home life. This year, with the creation of the DEVOTION research cluster, the DREAM catchers and the student group from the Biology of Breathing group (BReaTH) have joined forces to participate in joint professional development sessions. The translational nature of this environment cultivated a greater appreciation for the clinical and fundamental aspects of research related to type 2 diabetes in youth.

This year some of the DREAM trainees have taken the initiative to create a local chapter of the Canadian Obesity Network, for students and new professionals. This group facilitates interdisciplinary connections for the advancement of research on obesity and obesity-related diseases. Supported by the DREAM theme and linked to the parent Canadian Obesity Network (CON) and the nationally distributed sister chapters for Students and New Professionals (SNP), Manitoba’s first CON-SNP chapter is excited to bring students, health professionals and researchers together to promote research excellence, collaboration, networking, and career development.

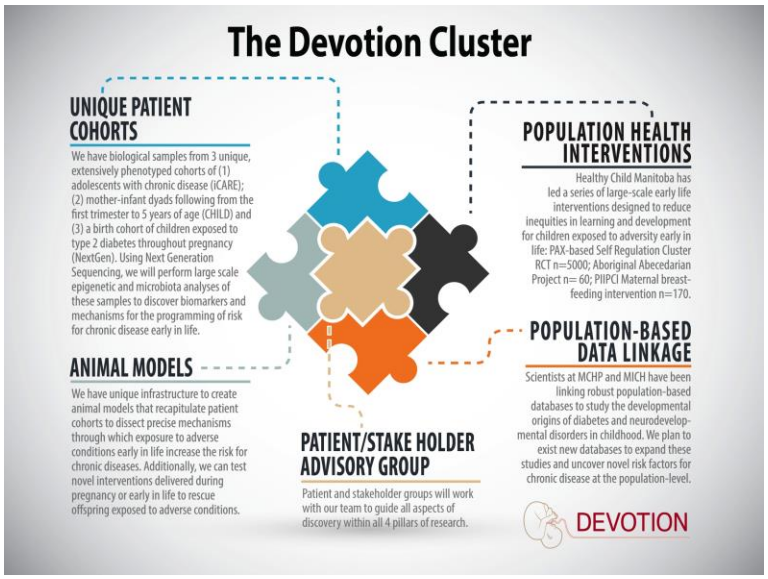
Currently, the executive committee of this budding chapter consists of four graduate students at the M.Sc. and the Ph.D. levels across the programs of Pharmacology & Therapeutics, Applied Health Sciences, and Human Anatomy & Cell Science. Faculty advisors are Pr Jonathan McGavock (Pediatrics & Child Health) and Pr Vernon Dolinsky (Pharmacology & Therapeutics); close Faculty collaborators include Pr Joseph Gordon (Human Anatomy & Cell Science), Pr Christine Doucette (Physiology & Pathophysiology), and Pr Meghan Azad (Pediatrics & Child Health). The short-term goal is to constitute an executive of at least seven members in the positions of Chair, Co-Chair, Vice-President Communications, Vice-President Finance, Secretary, Graduate Liaison, and Events Coordinator, before September 2016. An optional position for Undergraduate Liaison is also open but is not expected to be filled before next September.

Trainees played a major role in Child Health Research Day, taking home ~60% of awards and nominations to the Goodbears Den. Trainees will be highlighted at this year’s DREAM symposium, where over 20 will be presenting their work in poster and oral presentations.

RESEARCH MANITOBA CLUSTER



In 2014, Research Manitoba launched its first call for novel research teams that could make an impact at the national level in particular areas of health. Following the DREAM retreat in the spring of 2014, our group decided that we would apply for one of the inaugural cluster awards in the area of "Developmental Origins of Chronic Diseases in Youth". The rationale for this theme was based on observations by DREAM researchers dating back to 2002 that exposure to gestational diabetes, particularly pre-gestational diabetes was a powerful risk factor for type 2 diabetes in children. Subsequently, members of the team established a pregnancy cohort of young men and women who were diagnosed with type 2 diabetes in adolescence and were having children in their early adult years. The Next generation cohort, is unique in Canada as it is the largest cohort of children exposed to type 2 diabetes throughout gestation. Dr. Vern Dolinsky developed a unique animal model to recapitulate the Next Generation cohort, receiving a 3 year award from CIHR to study the cardiometabolic consequences of exposure to gestational diabetes.



The DEVOTION cluster was designed to build on these discoveries and bring in other nationally recognized researchers in the area of developmental origins of disease, particularly within the Biology of Breathing research group. The cluster was the first time both themes within CHRIM came together on a research proposal. Novel aspects of this application that had not been formalized in either theme included (1) the development of a patient/advisory stakeholder group to guide the research cluster and (2) a distinct link to Healthy Child Manitoba, a group scientists and policy makers in the Province of Manitoba that advocate for investment in child health. Our application was ranked 1st in the province and we were awarded $2.5M over 5 years (2015-2020) to accomplish a series of shovel ready projects across four pillars of research: (1) basic science; (2) clinical science; (2) population health and (4) policy. Additionally we proposed the development of 2 legacy projects, an early life intervention and a provincial Aboriginal Birth Cohort that we would develop towards the end of the grant.

In addition to the $2.5M awarded from Research Manitoba, we were fortunate to receive $1.2 M in matching funding over the same 5 year period from the Lawson Foundation to establish a network of Indigenous community-based research coordinators. Working with our stakeholder group, we will determine the needs and priorities of Indigenous communities in the area of maternal child health and invest in community-based staff to gather information from communities and translate knowledge from our scientific group to enhance care for Indigenous women and children in the province. A key component to this investment from the Lawson Foundation is the creation of an Indigenous Scholar position within CHRIM. Collectively, this investment in our research team will enhance the translation of science from "bench to backyard" and provide the framework for integrating the two themes within CHRIM and the NGS platform in tangible research endeavours.

CURRENT MEMBERSHIP

Dr. Grant Hatch	Co-Director, DREAM, Professor Pharmacology and Therapeutics, Biochemistry and Medical Genetics
Dr. Jon McGavock	Co-Director, DREAM, Associate Professor, Department of Pediatrics and Child Health

Dr. Meghan Azad	Assistant Professor, Pediatrics and Child Health
Dr. Alison Dart	Assistant Professor, Pediatric Nephrologist
Dr. Jim Davie	Professor, Scientific Director, MICB
Dr. Vern Dolinsky	Assistant Professor, Department of Pharmacology and Therapeutics
Dr. Christine Doucette	Assistant Professor, Department of Physiology
Dr. Paul Fernyhough	Professor, Pharmacology / Neurodegenerative Diseases
Dr. Joe Gordon	Assistant Professor, Faculty of Nursing
Dr. Elizabeth Sellers	Associate Professor, Pediatric Endocrinologist
Dr. Geert tJong	Clinical Pharmacologist, Medical Leader, CRU
Dr. Brandy Wicklow	Assistant Professor, Pediatric Endocrinologist
Dr. Kristy Wittmeier	Physiotherapist, KT Lead Centre for Healthcare Innovation
Non Faculty Members	
Jana Slaght	Research Coordinator
Taralyn Stierman	Research Nurse
Eileen Bouw	Research Nurse

INFRASTRUCTURE

Each member of DREAM has his/her independent research program and is expected to secure extramural funding and other infrastructural support to conduct his/her research studies. DREAM is designed to support core staff, facilities and equipment for research related to type 2 diabetes carried out by core members. DREAM also serves as a communal resource to support the research activities of ancillary members, the University of Manitoba and other institutions. The various scientific programs of DREAM also serve as catalysts to facilitate research collaboration and exchange of expertise between members internal and external to the University.

True North Foundation purchased with matching funds from the Heart and Stroke Foundation of Manitoba a Seahorse XF24 analyzer for mitochondrial function analysis. This unique piece of equipment was highlighted by CTV “Small Wonders” and in the interview it was described how this new piece of equipment will be used in CHRIM for research into type 2 diabetes. The Seahorse machine is a communal resource to support the research activities of members of the DREAM theme as well as other CHRIM researchers. Core support for operation of the Seahorse machine is provided yearly by the DREAM Theme.

The DREAM Theme also houses two parallel and complimentary imaging units. The clinical imaging core consists of:

(1) A Corneal Confocal Microscope used to quantify pre-clinical neuropathy and is currently used to accomplish research projects related to the program of Dr. Elizabeth Sellers.
(2) A non-invasive, portable ultrasound unit used to assess cardiac and vascular structure and function as well as renal volumes and mass. It is currently being used to study complications related to type 2 diabetes within the research programs of Drs Dart, Wicklow and McGavock.
(3) A Sphymocor non-invasive tonometer to assess pulse wave analysis/velocity, two key indirect measures of vascular stiffness. These measures are associated with renal outcomes in adults and are currently used to study the pathophysiology of renal disease in youth living with diabetes, studies led by Drs Dart, Wicklow and McGavock.

MANAGEMENT OF DREAM AND BUSINESS MEETINGS

The DREAM Theme conducts monthly scientific and business meetings with all core members. The Management Committee of the DREAM, consisting of Dr. Hatch and Dr. McGavock, and sub theme leaders are responsible for the general operation of DREAM. The day-to-day operation of DREAM is currently carried out by the theme co-directors and the DREAM coordinator, Jana Slaght.

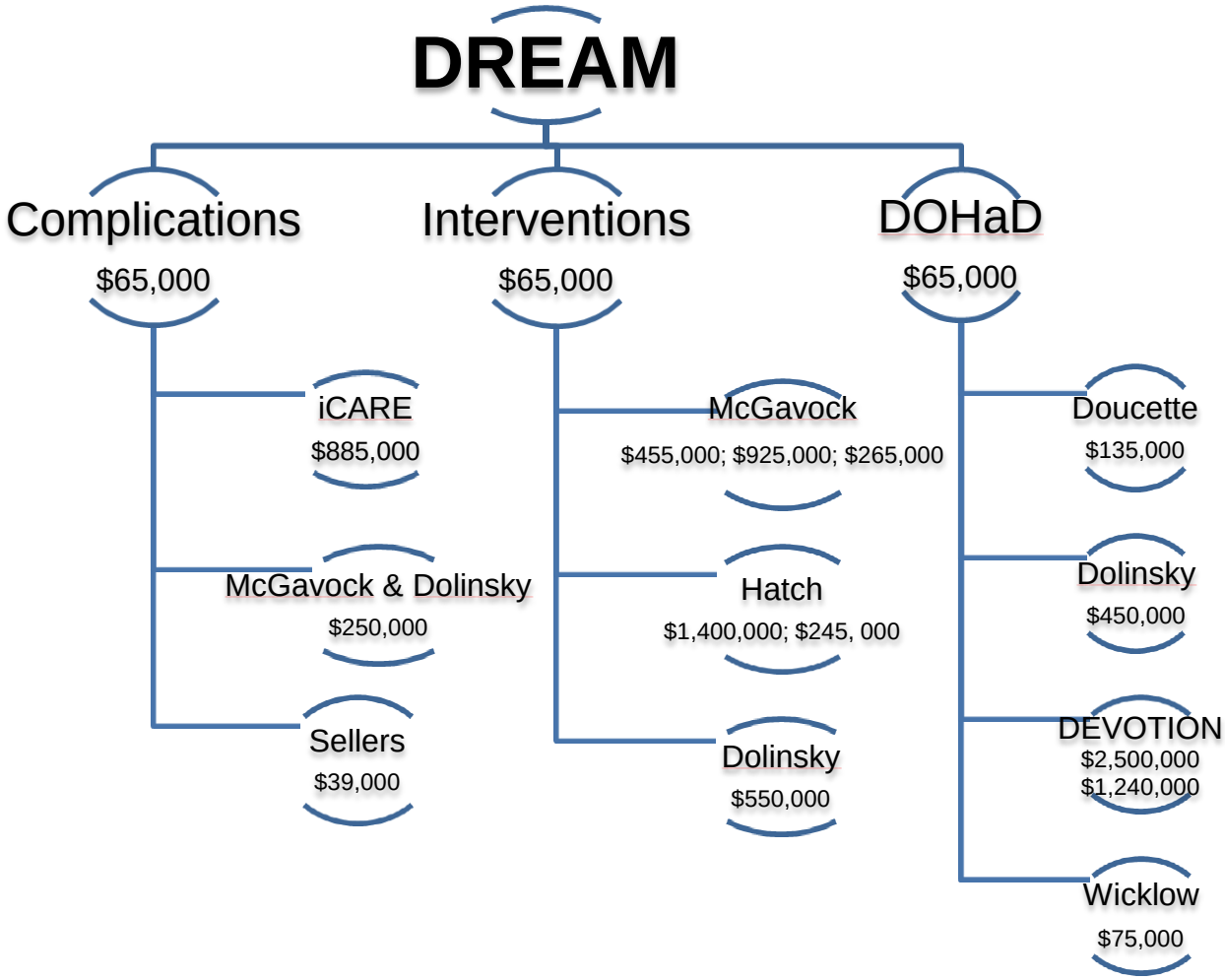
KNOWLEDGE TRANSLATION

This year the DREAM Theme published of a special issue dedicated to Type 2 Diabetes in youth in the Canadian journal “Biochemistry and Cell Biology”. DREAM team members contributed 7 papers to this issue and recruited 4 authors outside our group to contribute to the topic. We will provide updates over the next 3-5 years on the number of times these papers are cited by authors inside and outside our research group.

DREAM launched its first twitter handle this year (@DREAM_Theme). As of the date of this submission, we have 40 followers, 97 tweets and 22 likes. We will provide updates on the spread of this handle over the next few years. To date, 8 members of DREAM are active on twitter. Collectively we have 1875 followers and produced 11,000 tweets to date.

In 2016, we plan to increase our brand and network by launching a new webpage and branding the DREAM social media more extensively.

PROGRESS OF SUB-THEMES



DoHad:

Support from the DREAM has allowed the DOHaD subtheme of dream to build its research program capacity to address the clinical problem of how diabetes during pregnancy influences the development of obesity, T2D and heart disease in the offspring, utilizing both mechanistic and translational approaches.

DREAM has previously funded research to characterize a rodent model for gestational diabetes and the development of obesity, fatty liver disease and insulin resistance offspring. This data was recently published in the Journal of Physiology (Pereira et al. *J. Physiol.* **593**:3181-3197 (2015)) and merited being highlighted on the cover for this issue of the journal. Moreover, mechanisms contributing to skeletal muscle insulin resistance in the offspring were recently characterized and published (Mughal et al *Cell Death and Disease* **6**:e1944 (2015)). These works involved the collaboration between four DOHaD team members and their trainees (Dolinsky, Doucette, Gordon and Hatch). Data from this research has been used to leverage funding from CIHR (Dolinsky/Doucette), from CHRIM (Dolinsky/Doucette) and from Research Manitoba (Doucette and Gordon).

Another major advance for the DOHaD subtheme research team this year was the widening of the research team to include scientists from other institutions and apply for a large CIHR Programmatic Team Grant (Environments, Genes and Chronic Disease initiative, $2million over 5yrs). This grant proposes an investigation of the epigenetic mechanisms involved in the effects of diabetes during pregnancy on the gestational transmission of disease risk for obesity and its associated complications in the offspring, including hepatic steatosis, insulin resistance, pancreatic islet dysfunction and type 2 diabetes. After peer review, the LOI was accepted (1 of 20 LOIs), the full application was submitted and funding results (7 grants will be funded) will be released in 2016. Ongoing support from DREAM is funding the creation of a "knock-in" mouse with the HNF-1aG319S polymorphism in order to investigate how the HNF1a polymorphism contributes to the development of youth onset type 2 diabetes (Jonasson et al *Biochem Cell Biol.* In press (2015)). The preliminary work has been used as the basis for an application for funding to the Canadian Diabetes Association in 2015 by Dr. Wicklow and Doucette (results released in 2016). Therefore, the support of DREAM has been pivotal in the development of DOHaD research focused on metabolic disease in youth within CHRIM.

iCARE:

The iCARE (improving renal Complications in Adolescents with type 2 diabetes through Research) was designed to address the extremely high rates of early kidney damage in youth with type 2 diabetes in Manitoba. Between 2011 and 2014, our group created Canada's largest cohort of youth with T2D (n=139; 97% Indigenous). Preliminary data suggests that traditional biological factors most relevant in adult populations only explain a portion of the risk in youth, and that psychological factors play an equally important, but underappreciated role. We have therefore designed an expanded, ***multi-ethnic national cohort*** to 1. Characterize the primary Bio-Psycho-Social (BPS) risk factors associated with prevalent and progressive albuminuria**.** 2. Determine individual, family and community level factors that *influence* biological and psychological risk factors and behaviors (adherence) that could be modified to protect against prevalent and progressive albuminuria. 3. Determine if systemic and renal inflammation is the common pathway through which BPS risk factors lead to albuminuria in youth with T2D.
DREAM funding has been critical to the success of the national cohort in the following ways.
1. Bridge funding for RA's to continue data collection between grants. 2. Catalyst grant funding to run pilot cytokine studies for the CIHR grant application. 3. Opportunity for the creation of new translational collaborations between clinical and basic scientists in the group.

Successes this year:

1. Development of a national network of pediatric endocrinologists, nephrologists and psychologists caring for youth with type 2 diabetes across 9 centres, and 6 provinces in Canada to initiate the national cohort.
2. Sustainable funding from CIHR to fund the national cohort – $881,609 over 5 years (2015-2020).
3. Development of a collaboration with the AdDIT study investigators in Toronto (an intervention cohort study of youth with type 1 diabetes) to explore novel biomarker signatures that predict increased risk of progressive chronic kidney disease in youth with diabetes utilizing bio-banked samples from the cohorts.
4. Application to CIHR to fund this collaborative project as part of a chronic kidney disease SPOR – The Canadians Seeking Solutions and Innovations to Overcome Chronic Kidney Disease (Can-SOLVE CKD) Network. The LOI was ranked 1st out of 19 successful applications.

5. New partnerships with DREAM basic scientists to expand the scope of the study to epigenetic analyses of stored samples. Our stored samples allowed for pilot data to be analyzed for a team grant application to CIHR, led by Dr. Vern Dolinsky.
6. Development of a patient/parent advisory group - which consists of youth with T2D, including recent graduates and caregivers. They will help our group to set research priorities that are patient oriented. This group will play a main role in the oversight of specific iCARE study aims and provide input regarding interpretation of results and knowledge translation activities to ensure they are relevant to the needs of patients. This group is highly engaged, and committed to the project and the importance of addressing psychological factors as determinants of physical health.

The Next Generation (NextGen) Birth Cohort:

The Next Generation Cohort is a unique prospective birth cohort designed to examine metabolic and anthropometric outcomes of offspring born to mothers or fathers diagnosed in childhood with T2D. Currently no other birth cohort exists to examine the effects of T2D on pre and peri-conceptual programming of childhood metabolic disease. Since 2013 we have recruited 15 pregnant women with T2D, collected 13 infant cord blood samples, and consented an additional 46 graduates from the DER-CA clinical program for future pregnancies. We currently have infrastructure in place in 5 regional Health Authorities in Manitoba to identify, recruit, and collect data from mothers, fathers and offspring through community clinics, nursing stations, health centres and birthing centers.

Our aim is to explore potential innovative projects and feasibility of further characterization of the cohort including epigenetics under the umbrella of our new research theme and platform for studies of T2D in children at the Manitoba Institute of Child Health.

As part of the DREAM (Diabetes Research Envisioned and Accomplished in Manitoba) theme at the Children's Hospital Research Institute of Manitoba (formerly MICH), a developmental origins subtheme arose with its foundations in the strong clinical cohort (Next Generation) and the strong basic science researchers who have mouse models of diabetes in pregnancy and are currently developing an HNF1a mouse model. In 2015 2 separate translational research grants were submitted with pilot data from the Next Generation birth cohort (including feasibility data of cord blood collection from mother infant dyads who often live in remote northern areas), and mouse and cell data from the basic scientists within DREAM.

In September 2015 an operating grant was submitted to Canadian Diabetes Association (PI: B Wicklow, Total Funds $300,000/3years) to look at the epigenetic markings on candidate genes of infants in the NextGen study. The study was designed to answer the following research questions: 1) What is the impact of maternal T2D exposure on the DNA methylation profiles of *HNF-1α* and other genes important for β cell function and growth in infant cord blood samples? To determine how maternal T2D exposure influences the methylation status of target genes involved in β cell function we will examine differential methylation patterns at the designated loci in a sample of cord blood collected at birth from infants enrolled in the Next Generation birth cohort study (n=20) and control cord blood samples from infants of women with normal glucose tolerance during pregnancy (n=20).
In September 2015 a programmatic grant was submitted to the Canadian Institutes of Health Research (CIHR) (PI: V. Dolinsky, Total Funds $25000000/5 years)

Aim #1: Determine how diabetes during pregnancy affects DNA methylation of genetic loci associated with obesity and obesity-related complications in children. Using the NGS platform, we will perform large-scale biomarker discovery (i.e. epigenetic DNA methylation profiling) and

validation using biological samples from the NextGen and iCARE cohorts. Results will identify candidate epigenetic biomarkers for increased risk of childhood obesity and obesity-related complications that will be examined in the general population-based Gen3G, CHILD and IDEA cohorts to determine associations between methylation profiles of these genes and phenotyping of obesity/T2D risk as well as prioritize loci analysis in subsequent aims.
Aim #2: Determine tissue-level mechanisms that explain programming of metabolic disease. In rodent offspring exposed to diabetes during pregnancy, we will perform an unbiased screen of DNA methylation patterns in metabolic tissues and perform a detailed phenotypic analysis using NGS, imaging and metabolic core facilities. Using tissues and cells from male and female rodent offspring, we will perform functional studies to examine the direct impact of altered DNA methylation on the function of tissues.
Aim #3: Develop novel early-life interventions that prevent obesity and obesity-related diseases in children. We will test whether interventions delivered in early life (i.e.- maternal exercise, breastfeeding etc.) modify epigenetic biomarkers and reduce the risk of pediatric obesity and its complications due to the early life environmental exposure to maternal diabetes during pregnancy.
Significance: This program of research will address the major clinical problem of obesity and obesity-related complications in children, through the translational identification of novel epigenetic signatures. Ultimately this research aims to achieve a shift in clinical practice that leads to better treatments for overweight and obese children and pregnant women.

Novel discoveries regarding DREAM from members:

Meghan Azad
Research from the CHILD study has shown that artificial sweeteners are widely consumed, including among pregnant women, yet the effect of prenatal exposure to artificial sweeteners on infant body composition has never been studied in humans. We provide the first human evidence that maternal consumption of artificially sweetened beverages during pregnancy is associated with infant body composition. Compared with no artificially sweetened beverage consumption in pregnancy, daily consumption was associated with a 2-fold higher risk of overweight at 1 year of age (odds ratio 2.30, 95%CI 1.04, 5.11). Associations were dose-dependent and persisted after adjusting for maternal BMI and other obesity risk factors. Preliminary findings were presented at the Canadian Nutrition Society annual meeting (May 2015). Dr. Dolinsky and myself have now secured a CHRIM grant to study this association at 3 and 5 years of age in the CHILD cohort, and to develop a rodent model to study the biological mechanisms.

Joe Gordon
My research program is focused on genetic pathways that regulate programmed cell death and differentiation in all three muscle lineages; skeletal, cardiac, and smooth muscle. Recently we discovered a genetic pathway connecting the transcriptional regulation of microRNA-133a in muscle cells, to the expression of a programmed cell death gene, named Nix (Cell Death and Disease, 2015). We demonstrated that this genetic pathway is disrupted in skeletal muscle and the heart of offspring exposed to gestational diabetes during development. Furthermore, therapeutic targeting of microRNA-133a using locked nucleic acid technology improved mitochondrial respiration and insulin-stimulated glucose uptake when muscle cells were exposed to a lipotoxic environment. These important proof-of-concept findings illustrate the important nature of this genetic pathway regulating mitochondrial function and insulin sensitivity in the muscle lineages, and identify the therapeutic potential of pharmacologically targeting this pathway. Current projects in my laboratory involve: 1) the regulation of this pathway by Myocardin, a transcriptional coactivator implicated in cardiac protection during pathological

remodeling; and 2) the evaluation of phosphodiesterase inhibitors to therapeutically circumvent Nix function in skeletal muscle of offspring exposed to gestational diabetes during pregnancy and fetal development.

Grant Hatch
The anti-diabetic effect of berberine was examined in a rat model of type 2 diabetes. We found that oral administration of berberine improved glucose and lipid metabolism in diabetic rats compared to metformin treatment. In fact, the plasma triglyceride lowering effect of berberine was much greater than that of metformin. In addition, we recently demonstrated that berberine reduces diacylglycerol levels in a cardiac myocyte cell model of insulin resistance. Elevation in diacylglycerol in diabetes is known to disrupt insulin signaling and result in insulin resistance. These findings continue to support the hypothesis that berberine may serve as a potential candidate drug for the treatment of type 2 diabetes.

SCIENTIFIC MEETINGS

For the past four years, DREAM has used DREAM funds to host an annual research symposium focused on cutting-edge research in the field of youth-onset Type 2 Diabetes. Typically, this symposium has been composed of keynote talks from local, national and international speakers, short-talks from local speakers to highlight DREAM research and a symposium dinner, which allows DREAM team members and invited speakers to have the opportunity to build relationships, network and collaborate. Last year, we added new elements to the symposium which resulted in increased attendance and attracting preeminent world-leaders in the diabetes research field to deliver highly-relevant and impactful keynote talks. The format of the symposium was also altered in order to provide greater networking opportunities and participation by our trainees.

The poster session and networking reception for the trainees has continued to be included in the symposium as this allows the trainees the opportunity to share their work with both the local diabetes research community as well as with the invited speakers and attendees. This creates opportunities for the trainees to network, build collaborative relationships as well as the opportunity to receive relevant feedback on their research projects. This opportunity is used not only to highlight the top-notch trainees and their research that is being performed by DREAM and the University of Manitoba, but also to give the students/trainees an opportunity to hone their oral presentation skills and share their research in a well-attended public forum. The growth of our symposium continues as it started out with ~30-40 attendees, and has grown to >90 registered guests this year, including guests from several different departments within the U of M, and attendees from other universities.

The 4th annual DREAM symposium took place on November 19th, 2015 and was a great success. Of the 111 guests that were pre-registered we had attendance from 101 and the vast majority attended the symposium for the entire day. Along with the invited speakers, both local and out of town, we had 4 trainees present their research. These trainees were selected based on their abstract submission for the poster competition with included a total of 21 submissions. These presentations were evaluated and the top presentation was awarded. The posters from all abstract submissions were on display for the duration of the symposium. This year a poster competition was incorporated and all participants had an opportunity to vote for their favorite posters. The additional components of the trainee presentations and the poster competition were a great success as it encouraged increased engagement from attendees. We were also fortunate to have 7 members from the iCARE patient advisory group not only attend but also present at the symposium. This was deemed a highlight of the day by many that attended.

The 4th Annual Symposium is scheduled for November 19, 2015 (see agenda below). This the focus will be on patient oriented research and beta-cell biology. The keynote speakers include:

- Dr. Kelly Moore, University of Colorado (Denver)
- Dr. Elizabeth Cox, University of Wisconsin
- Dr. Patrick MacDonald, University of Alberta

Local speakers include:

- Dr. Kristy Wittmeier/Carolyn Shimmin
- Dr. Sayma Malik
- Dr. Christine Doucette & Dr. Elizabeth Sellers
- Dr. Joseph Gordon

2015 Symposium Agenda:

4th Annual DREAM Diabetes Symposium

Thursday, November 19, 2015
8pm – 5pm
Fredrick Gaspard Theatre (Theatre A)

Diabetes Research Envisioned and Accomplished in Manitoba

8:00am-9:00am	**Pediatric Grand Rounds: *2nd Annual Dr. Heather Dean Lecture*** **Dr. Kelly Moore, University of Colorado (Denver)** ***A Message of Hope for Future Generations*** Learning objectives for this session: 1) Describe at least two diabetes-related disparities among American Indians and Alaska Natives. 2) Demonstrate knowledge of disparities in health risk related to obesity and diabetes for American Indians and Alaska Natives. 3) Identify key strategies for working with Native American communities on obesity and diabetes prevention.
9:00am-9:20am	Coffee, light breakfast, registration, poster set-up - *Joe Doupe Concourse*
9:20am-9:30am	Drum Ceremony and Opening Prayer
MINI-SYMPOSIUM #1: Patient-Centred Research & Patient-Engagement in Diabetes *Chair: Dr. Kristy Wittmeier*	
9:30am - 10:30am	**Dr. Elizabeth Cox, University of Wisconsin** ***What if families designed pediatric diabetes self-management resources?***
10:30am – 10:35 am	**Dr. Kristy Wittmeier** *What is the Centre for Health Innovation (CHI)?*
10:35am – 10:55am	**Carolyn Shimmin** *Title: TBD*
10:55am – 11:10am	**Dr. Sayma Malik** ***Building a Patient Advisory Group for iCARE***
11:10am -11:30am	**Youth and Parent Patient Experiences** *Short talks/ short videos*
11:30am - 12:00pm	Lunch - *Joe Doupe Concourse*
MINI-SYMPOSIUM #2: β-cell Dysfunction and Insulin Resistance in Diabetes *Chair: Dr. Vern Dolinsky*	
12:00-1:00	**CHRIM Research Rounds** **Dr. Patrick MacDonald, University of Alberta** ***How does glucose amplify insulin secretion, and why do we care?***
1:00-1:30	**Dr. Christine Doucette & Dr. Elizabeth Sellers** ***Youth-onset type 2 diabetes in Manitoba and pancreatic β cell failure: A translational approach***
1:30-2:00	**Dr. Joseph Gordon** *Title: TBD (Topic: In utero exposure to type 2 diabetes and the development of insulin resistance in offspring)*
2:00-2:20	Coffee Break - *Joe Doupe Concourse*
TRAINEE PRESENTATIONS: *Chair: Dr. Geert 'tJong*	
2:20-2:40	**Altered fatty acid and mitochondrial metabolism in the liver of pregnant adiponectin-deficient mice contributes to insulin resistance and gestational diabetes mellitus**

Abstract Submission now open! Submit abstract (max. 300 words) to jslaght@chrim.ca
Register @ https://www.surveymonkey.com/r/JQQBXDY

COLLABORATIONS AND NETWORKING

DREAM has begun to develop active collaborations with other research groups within the Faculty of Medicine and colleagues elsewhere. Current collaborations with other institutions include:
Harvard University
University of Alberta
Ontario Public Health
SickKids
McMaster University
University of Toronto
University of Colorado Medical School
University of Calgary
Children's Hospital of Eastern Ontario

DREAM members continue to develop active collaborations with other researchers and research groups within the University of Manitoba and with colleagues elsewhere.

Examples of relevant national/international collaborations include:

- Dr. Hatch has established fruitful and productive published collaborations with Dr. Li Chen, (Jilin University, P.R. China) on the role of berberine in the treatment and management of type 2 diabetes.

- Winnipeg hosted the Canadian Nutrition Society meeting May 28-30, 2015 and Dr. Hatch served on the organizing committee for the development of a satellite meeting in association with the meeting. The satellite meeting was a workshop symposium the two days following the main meeting and took place from May 31-June 1, 2015. The topic of the workshop was "Saturated Fat Intake and Cardiovascular Risk". The workshop was focused on clinical aspects and also included basic science speakers. Members from Dr. Dolinsky's and Dr. Hatch's laboratories gave three oral presentations on DREAM research activities at the workshop. Dr. Eric Murphy, Executive Editor of the journal Lipids agreed to publication of the workshop papers in the journal "Lipids" as part of the journals 50th anniversary issue.

- As a result of the success of this conference the organizers have decided to now hold a yearly conference renamed the "Northern Great Plains Lipid Conference". The conference was supported by grants of $2,500 from the Faculty of Health Sciences, $2,500 from the Faculty of Agricultural and Food Sciences and a matching $5,000 grant from Research Manitoba.

DREAM RECOGNITIONS

Dr. Heather Dean – Canadian Diabetes Association Keynote Lecture
Dr. Vern Dolinsky – Canadian Lipoprotein Congress New Investigator Award
Dr. Jim Davie – Elected a Fellow to the Canadian Academy of Health Sciences
Dr. Jon McGavock – Awarded a CIHR Applied Public Health Chair

DREAM PRODUCTIVITY

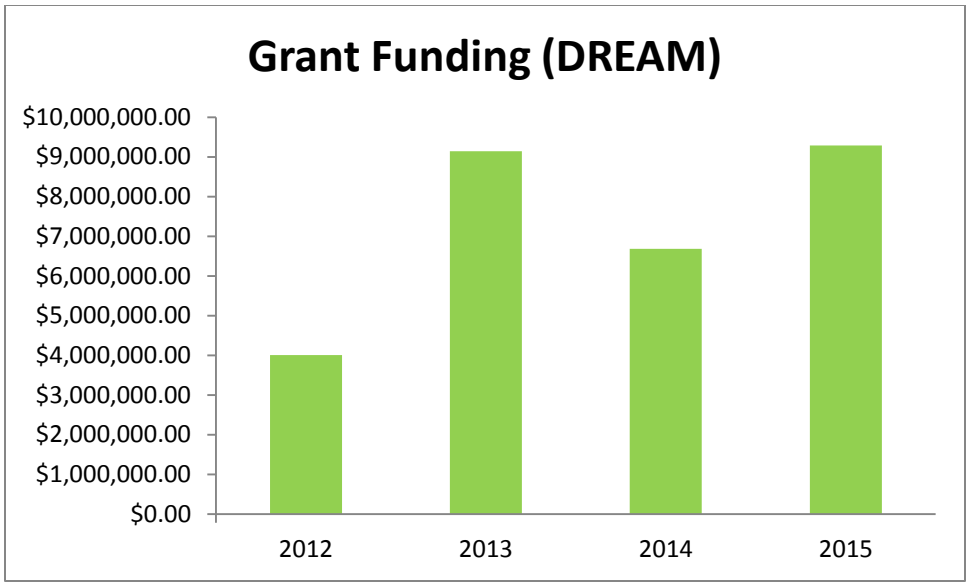
Support for development of DREAM was based initially on a $675,000 investment (2012-2014) provided by the Manitoba Institute of Child Health (MICH). Although MICH has had a change in name, now the Children's Hospital Research Institution of Manitoba (CHRIM), they have continued to support DREAM.

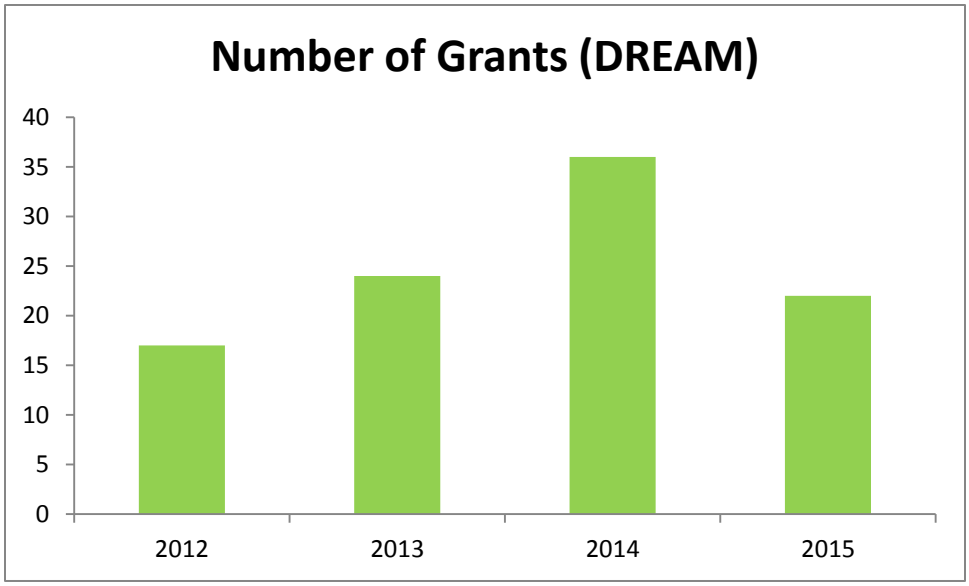
$175,000 in 2012
$250,000 in 2013
$250,000 in 2014
$250,000 in 2015

Each member of DREAM has his/her own departmental affiliation, research laboratory, research grants and research personnel to support his/her research program. Research support currently held by members of DREAM includes grants from:

- Canadian Institutes of Health Research (CIHR)
- Canadian Cancer Society
- Heart and Stroke Foundation of Canada
- Canadian Foundation for Innovation (CFI)
- Canadian Diabetes Association (CDA)
- MHRC
- The Lawson Foundation
- NSERC
- Thorlakson

Collectively, theme members secured over 20 operating, equipment and salary wards totalling over $9 million in research funding in 2015 (see attached table below). Although the number of grants earned has actually decreased, the total amount awarded has increased, and many of these grants have been successful based on the work of multiple DREAM team members working together on these projects. Highlights for this year included: Dr. Vern Dolinsky and Dr. Christine Doucette ($503,599/5yrs), and Drs. Allison Dart and Brandy Wicklow ($881,609/5yrs) all secured funding from CIHR. Another accomplishment achieved this year was the funding that was achieved for DEVOTION. The DEVOTION cluster was designed to build on these discoveries and bring in other nationally recognized researchers in the area of developmental origins of disease, particularly within the Biology of Breathing and DREAM research groups. This team has received funding for the next five years from both Research Manitoba ($2,500,000/5yrs) and the Lawson Foundation ($1,200,000/5yrs). Both publication and grant funding within this group continue to impress with 91 publications, and over 9 million dollars in funding.


Grant Funding (DREAM)
$10,000,000.00
$9,000,000.00
$8,000,000.00
$7,000,000.00
$6,000,000.00
$5,000,000.00
$4,000,000.00
$3,000,000.00
$2,000,000.00
$1,000,000.00
$0.00
2012
2013
2014
2015


Number of Grants (DREAM)
40
35
30
25
20
15
10
5
0
2012
2013
2014
2015

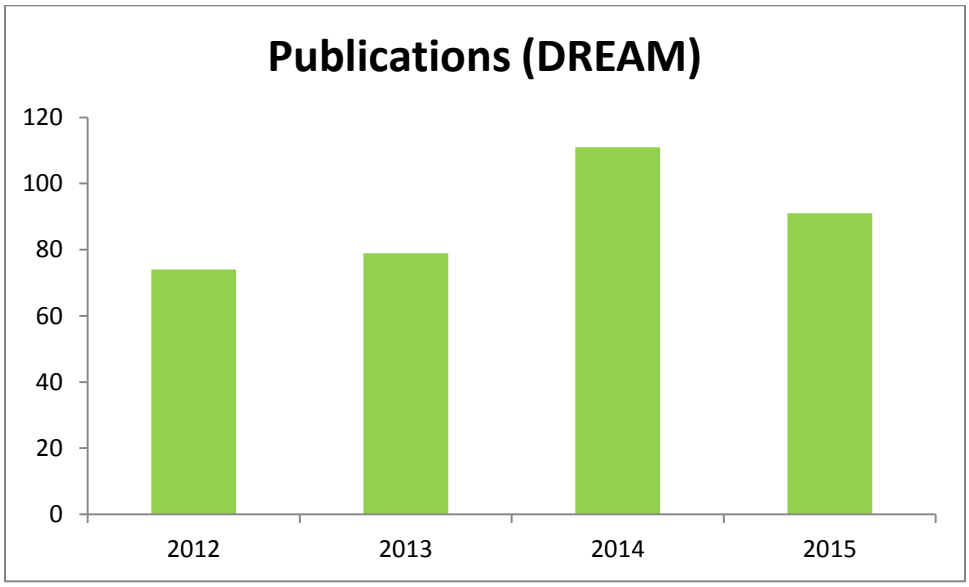
Grants Awarded in 2015 to DREAM members

Member	Agency	Amount	Duration	Funding/yr	Type
Azad, Co-I	CIHR	$1,000,000	2015-2020	$200,000	Operational
Azad, PI Dolinsky, Co-I	CHRIM	$40,000	2015-2016	$40,000	Operational
Azad, PI	Heart and Stroke	$150,000	2015-2018	$50,000	Operational
Azad, PI	MMSF & CHRIM	$21,500	2015-2016	$21,500	Operational
Azad, Co-I	Research Manitoba	$1,000,000	2015-2019	$250,000	Team Grant
Dart/Wicklow, PI Sellers, Co-I McGavock, Co-I	CIHR	$881,609	2015-2020	$176,321	Operational
Dart, Co-I	CIHR	$541,900	2015-2020	$108,380	Operational
Davie, PI	CSR	$120,000	2015-2017	$60,000	Operational
Doucette, PI	NSERC	$140,000	2015-2020	$28,000	Discovery Grant
Doucette/Dolinsky	CIHR	$503,599	2015-2020	$100,719	Operational
Doucette, PI	MHRC	$225,000	2015-2018	$75,000	Operational
Doucette, PI Dolinsky, Co-I	CHRIM	$40,000	2015-2016	$40,000	Operational
Gordon, PI Dolinsky, Co-I	Thorlakson	$30,000	2015-2016	$30,000	Operational
Gordon, PI	MCNRH	$7,500	2015-2016	$7,500	Operational
Hatch/McGavock, Co-PI	CHRIM	$750,000	2015-2018	$250,000	Theme Funding
McGavock, PI	CIHR	$12,000	2015-2015	$12,000	Pathways team
Wicklow, PI	CHF	$40,000	2015-2016	$40,000	Operational
Wicklow, PI	CHRIM	$40,000	2015-2016	$40,000	Operational
Wittmeier, Co-I	U of M	$5,187	2015-2016	$5,187	Endowment Fund
Wittmeier, PI	MICH	$40,000	2015	$40,000	Operational
All DREAM Investigators	Research Manitoba	$2,500,000	2015-2020	$500,000	Collaborative Cluster
All DREAM Investigators	Lawson Fdn.	$1,200,000	2015-2020	$240,000	Team Grant
TOTAL	**22**	**$9,288,295**		**$2,314,607**	
TOTALS	**GRANTS**	**AMOUNT**		**AMOUNT/YR**	
2012	17	$4,007,320		$1,117,000	
2013	24	$9,138,770		$3,046,257	
2014	36	$6,683,487		$2,043,930	
2015	22	$9,288,295		$2,314,607	

Continuing Grants of DREAM members

Member	Agency	Amount	Duration	Funding/yr	Type
Azad/tJong	MICH	$37,910	2014-2016	$18,955	Operational
Davie, PI	CRC	$1,400,000	2011-2018	$200,000	Operational
Davie, PI	CIHR	$1,372,800	2014-2017	$457,600	Team Grant
Davie, PI	MICH	$300,000	2012-2017	$60,000	Operational
Davie, PI	U of M	$300,000	2012-2017	$60,000	Core platform
Davie, PI	CCSRI	$197,810	2014-2016	$98,905	Operational
Davie, PI	CCMB	$120,000	2014-2016	$60,000	Operational
Davie, PI	MHRC	$65,000	2014-2016	$32,500	Partnership prg
Dolinsky, PI	Diabetes Fdn.	$45,000	2014-2017	$15,000	Operational
Dolinsky, PI	MHRC	$100,000	2013-2016	$33,333	Establishment
Dolinsky, Co-I	HSFC	$227,668	2013-2016	$75,889	Grant in Aid
Doucette, PI	MICH	$60,000	2012-2017	$12,000	Establishment
Fernyhough, PI	CIHR	$943,639	2013-2018	$188,728	Operational
Fernyhough,Co- I	NIHR	$1,785,000	2013-2018	$357,000	Operational
Fernyhough, Co-I	CIHR	$611,905	2013-2018	$122,381	Operational
Gordon, PI	NSERC	$160,000	2013-2017	$40,000	Discovery Grant
Gordon, PI	MHRC	$140,000	2014-2016	$70,000	Operational
Hatch, PI	CRC	$1,400,000	2013-2020	$200,000	Operational
Hatch, PI	NSERC	$170,000	2014-2019	$34,000	Discovery Grant
Hatch, PI	HSFC	$266,795	2014-2017	$88,931	Operating
McGavock, PI	CIHR	$1,000,000	2014-2019	$200,000	Research Chair
McGavock, PI	AB Innovates	$3,200,000	2014-2019	$640,000	Operational
McGavock, PI	CIHR	$455,000	2014-2017	$151,667	Operational
McGavock, Co-I	CIHR	$834,361	2013-2016	$278,120	Operational
McGavock/Dolinsky	HSFC	$250,000	2013-2016	$83,333	Operational
Sellers, PI	MICH	$40,000	2013-2016	$13,333	Operational
Wicklow, Co-I	CIHR	$455,000	2014-2017	$151,666	Operating
Wittmeier, Co-I	CIHR	$20,000,000	2013-2018	$4,000,000	SUPPORT unit
Wittmeier, Co-I	MHRC	$100,000	2014-2016	$50,000	Operational
TOTAL	**26**	**$36,037,888**		**$7,793,341**	

PUBLICATIONS



Meghan Azad

Publications 2015 (4)

1. AZAD MB, Konya T, Guttman DS, Char RS, Field CJ, Sears MR, Mandhane PJ, Turvey SE, Subbarao P, Becker AB, Scott JA, Kozyrskyj AL, and the CHILD Study Investigators. (2015). Impact of maternal intrapartum antibiotics, mode of delivery and breastfeeding on infant gut microbiota during the first year of life. BJOG: An International Journal of Obstetrics and Gynaecology.
2. AZAD MB, Konya T, Guttman DS, Field CJ, Sears MR, HayGlass KT, Mandhane PJ, Turvey SE, Subbarao P, Becker AB, Scott JA, Kozyrskyj AL, and the CHILD Study Investigators. (2015). Infant gut microbiota and food sensitization: associations in the first year of life. Clinical and Experimental Allergy. 45(3): 632-43.
3. Bridgman SB, AZAD MB, Field CJ, Scott JA, Konya T, Guttman DS, Sears MR, Becker AB, Turvey SE, Mandhane PJ, Subbarao P, Kozyrskyj AL, and the CHILD Study Investigators. (2015). Infant gut immunity, breastfeeding and C. difficile: interactions with parity, siblings and pets. Journal of Developmental Origins of Health and Disease.
4. Chen Y, Henson E, Shome E, AZAD MB, Burton T, Queau M, Xiao W, Eisenstat D, Gibson S. Bcl-2 family member Mcl-1 expression is reduced under hypoxia by the E3 ligase FBW7 contributing to BNIP3 induced cell death in glioma cells. *Cancer Biology & Therapy* 2015

Dr. Allison Dart

Publications 2015 (3)

1. Shen,G; Shafer, L; Martens, PJ; Sellers,E; Torshizi,A; Ludwig,S; Phillips-Beck,W; Heaman, M; Prior, H; McGavock, J; Morris, M; Dart, AB; Campbell, R;Dean, HJ. Does First Nations Status Modify the Association between Gestational Diabetes and Subsequent Diabetes: A Historical Prospective Cohort Study Among Mothers in Manitoba, Canada. Diabetic Medicine.

2. Lavallee B, Chartrand C, McLeod L, Rigatto C, Tangri N, Dart A, Gordon A, Ophey S, Komenda P.(2015). Mass screening for chronic kidney disease inrural and remote Canadian first nations people: methodology and demographic characteristics. Canadian Journal of Kidney Health and Disease. 2(9).
3. Dart AB, Ruth CA, Sellers EA, Au Wendy, Dean HJ. (2015). Maternal Diabetes Mellitus and Congenital Anomalies of the Kidney and Urinary Tract (CAKUT) in the Child. American Journal of Kidney Diseases.1(1): 1-8.

Jim Davie

Publications 2015 (7):

1. *Jahan S, Davie JR.(2015). Protein arginine methyltransferases (PRMTs): Role in chromatin organization.Adv Biol Regul.57: 173-184.
2. *Liyanage, V.R.B., *Zachariah, R.M., Davie, J.R. and Rastegar, M.(2015). Ethanol deregulates MeCP2 viainterplay between 5-methylcytosine and 5-hydroxymethylcytosine at itsregulatory elements during neural stem cell differentiation. Exp Neurol. 265C: 102-117.
3. *Jahan S, Xu W, He, S, Gonzalez C, Delcuve GP and Davie JR. (2015). The chicken erythrocyte epigenome. Nature Communications.
4. Davie JR, Xu W and Delcuve GP. (2015). Histone H3K4 trimethylation: dynamic interplay with pre-mRNA splicing. Biochem. Cell. Biol.in press.
5. Warns JA, Davie JR and Dhasarathy A. (2015). Connecting the dots: chromatin and alternative splicing in EMT. Biochem. Cell. Biol.in press.
6. Gang H, Dhingra R, Lin J, Hai Y, Aviv Y, Margulets V, Hamedani M, Thanasupawat T, Leygue E, Klonisch T, Davie JR and Kirshenbaum LA. (2015). PDK2 mediated alternative splicing switches Bnip3 from cell death to cell survival. J. Cell Biol.in press.

Book Chapters

1. Delcuve GP, *Khan DH, *liyanage VRB, *Jahan S, Rastegar M, Kirshenbaum LA and Davie JR. (2015). Epigenetics: chromatin organization and function. Epigenetics in Cardiac Disease.

Heather Dean

Publications 2015 (6)

1. Shen,G; Shafer, L; Martens, PJ; Sellers,E; Torshizi,A; Ludwig,S; Phillips-Beck,W; Heaman, M; Prior, H; McGavock, J; Morris, M;Dart, AB; Campbell, R;Dean, HJ. Does First Nations Status Modify the Association between Gestational Diabetes and Subsequent Diabetes: A Historical Prospective Cohort Study Among Mothers in Manitoba, Canada. Diabetic Medicine.
2. Dart AB, Ruth CA, Sellers EA, Au Wendy, Dean HJ. (2015). Maternal Diabetes Mellitus and Congenital Anomalies of the Kidney and Urinary Tract (CAKUT) in the Child. American Journal of Kidney Diseases.1(1): 1-8.
3. Hay J, Wittmeier K, Wicklow B, MacIntosh A, Dean H, Sellers E, Duhamel T, Ready E, Gardiner P, Berard L, Shen G, McGavock J. (2015). Physical activity intensity and diabetes risk factors in overweight youth. The POWER Trial. International Journal of Obesity.
4. Schaffer L, Dean H, Sellers E, Prior H, Ludwig S, Wittmeier K, Martens P, Heaman M, Phillips-Beck W, Dart A, McGavock J, Shen GX.(2015). 'Does First Nations Status Modify the Association between Gestational Diabetes and Subsequent Diabetes: A

Historical Prospective Cohort Study Among Mothers in Manitoba, Canada'. Diabetic Medicine. In Press: In Press.
5. Dean HJ, Sellers EAC. Children have type 2 diabetes too: an historical perspective. Journal of Biochemistry and Cell Biology.
6. Dart AB, Ruth CA, Sellers EAC, AU W, Dean HJ.(2015). Pre-gestational and gestational diabetes are associated with congential anomalies of the kidney and urinary tract. American Journal of Kidney Disease. 65: 684-91.

Vern Dolinsky

Publications 2015 (8)

1. Guo J, Breen DM, Pereira TJ, Dalvi PS, Zhang H, Mori Y, Ghanim H, Tumiati L, Fantus IG, Bendeck MP, Dandona P, Rao V, DOLINSKY VW, Heximer SP, Giacca A. (2015). The Vasculo-protective effects of insulin are endothelial nitric oxide synthase-dependent. Atherosclerosis. 241: 111-120.
2. Gordon JW, DOLINSKY VW, Mughal W, Gordon GR, McGavock J. (2015). Targeting skeletal muscle mitochondria to prevent type 2 diabetes in youth. Biochemistry and Cell Biology. In press
3. Jonasson, M.E., Wicklow, B.A., Sellers, E.A., DOLINSKY V.W., and Doucette, C.A.(2015). Exploring the role of the HNF-1aG319S polymorphism in beta cell failure and youth-onset type 2 diabetes: Lessons from MODY and HNF-1a-deficient animal models. Biochemistry and Cell Biology. In Press
4. Pereira, T.J., Fonseca, M.A., Campbell, K.E., Moyce, B.L., Cole, L.K., Hatch, G.M., Doucette, C.A., Klein, J., Aliani, M., DOLINSKY, V.W.(2015). Maternal obesity characterized by gestational diabetes increases the susceptibility of rat offspring to hepatic steatosis viaa disrupted liver metabolome. Journal of Physiology. 593(14): 3181-3197.
5. DOLINSKY, V.W., Soltys, C.L., Rogan, K.J., Chan, A.Y.M., Nagendran, J., Wang, S., Dyck, J.R.(2015). Resveratrol prevents pathological but not physiological cardiac hypertrophy. J. Mol. Med.93: 413-425.
6. Cheung, K., Cole, L.K., Xiang, B., Chen, K., Ma, X., Myal, Y., Hatch, G.M., Tong, Q., DOLINSKY, V.W. (2015). SIRT3 attenuates doxorubicin-induced oxidative stress and improves mitochondrial respiration in H9c2 cardiomyocytes. J. Biol. Chem.290(17): 10981-10993.
7. Mughal, W., Nguyen, L., Pustynik, S., Piotrowski, S., Chapman, D., Du, M., Ali, N., Grigull, J., Halayko, A.J., Aliani, M., Pereira, T.J., Kereliuk, S., DOLINSKY, V.W., Rampitsch, C., McDermott, J.C., Gordon, J.W.(2015). A conserved MADS-box phosphorylation motif regulates differentiation and mitochondrial function in skeletal, cardiac and smooth muscle cells. Cell Death and Differentiation.
8. Pereira, T.J., Moyce, B.L., Kereliuk, S.M., DOLINSKY, V.W. (2015). Influence of Maternal Overnutrition and Gestational Diabetes on the Programming of Metabolic Health Outcomes in the Offspring: Experimental Evidence. Biochemistry and Cell Biology.

Christine Doucette

Publications 2015 (2)

1. Troy J Pereira, Mario A Fonseca, Kristyn E Campbell, Brittany L Moyce, Laura K Cole, Grant M Hatch, Christine A Doucette, Julianne Klein, Michel Aliani, Vernon W Dolinsky. (2015). Maternal obesity characterized by gestational diabetes increases the

susceptibility of rat offspring to hepatic steatosis via a disrupted liver metabolome. The Journal of Physiology. 594(14): 3181-97.

2. Jonasson ME, Wicklow BA, Sellers EC, Dolinsky VW, Doucette CA. (2015). Exploring the role of the HNF-1αG319S polymorphism in β cell failure and youth-onset type 2 diabetes: Lessons from MODY and HNF-1α-deficient animal models. Biochemistry and Cell Biology. epub

Paul Fernyhough

Publications 2015 (3)

1. Kammouni, W., Wood, H., Saleh, A., Appolinario, C.M., Fernyhough, P. and A.C. Jackson (2015). Rabies virus phosphoprotein interacts with mitochondrial complex I and induces mitochondrial dysfunction and oxidative stress. *Journal of NeuroVirology*. 21, 370-382.
2. Habash, T., Saleh, A., Roy Chowdhury, S.K. and P. Fernyhough (2015). The proinflammatory cytokine, interleukin-17A, augments mitochondrial function and axonal plasticity of cultured adult sensory neurons derived from normal and diabetic rats. *Experimental Neurology*. 273, 177-189 (if, 4.6)
3. Fernyhough, P. (2015). Mitochondrial dysfunction in diabetic neuropathy: A series of unfortunate metabolic events. *Current Diabetes Reports.* In Press.

Joe Gordon

Publications 2015 (5)

1. Mughal W., Nguyen L., Pustylnik S., da Silva Rosa, S., Piotrowski S., Chapman C., Du M., Ali N., Grigull J., Halayko A.J., Aliani M., Pereira T., Kereliuk, S., McDermott J.C., Rampitsch C., Dolinsky V.W., Gordon J.W.(2015). A conserved MADS-box phosphorylation motif regulates differentiation and mitochondrial function in skeletal, cardiac, and smooth muscle cells. Cell Death and Disease.
2. Ehyai S., Dionyssiou M.G., Williams D., Gordon J.W., Siu K.W.M., McDermott J.C. A p38MAPK regulated MEF2:β-catenin interaction enhances canonical Wnt signalling. Molecular and Cellular Biology.
3. Diehl-Jones, W., Archibald, A., Gordon, J.W., Mughal W., Hossain, Z., & Friel, J.(2015). Human Milk Fortifier Increases Bnip3 Expression In Vitro. Journal of Pediatric Gastroenterology and Nutrition.
4. Masisi, K., Diehl-Jones, W., Gordon, J.W., Chapman, D., Moghadasian, M., & Beta, T.(2015). Carotenoids of Aleurone, Germ, and Endosperm Fractions of Barley, Corn and Wheat Differentially Inhibit Oxidative Stress. Journal of Agricultural and Food Chemistry.
5. Gordon, J.W., Mughal, W., Dolinsky, V.W., & McGavock, J.(2015). Targeting Skeletal Muscle Mitochondria to Prevent Type 2 Diabetes in Youth. Biochemistry and Cell Biology.

Jon McGavock

Publications (20)

1. Setayeshgar S, Ekwaru JP, Maximova K, Majumdar S, Storey K, Veugelers P, McGavock J (2015). Dietary intake and prospective changes in cardiometabolic risk factors in adolescence: a longitudinal study. BMC Public Health. Submitted October 2015

2. Majumdar S, Carson V, Setayeshgar S, Veugelers P, McGavock J (2015). Multifactorial lifestyle behaviour targets and the risk of hypertension in adolescents. Circulation. Submitted November 2015.
3. MacIntosh A, Mollard R, Rinaldi R, Torrance B, Ball GD, Majumdar S, Plotnikoff R, Veugelers P, Boule N, Wozny P, McCargar L, Downs S, Lewanczuk R, McGavock JM. (2015). Is physical activity associated with remission to healthy weight status in obese youth? Pediatric Obesity. Submitted October 2015
4. Zuo F, Comte M, So J, Rosella L, McGavock J. (2015). Trajectories of Objectively Measured Sedentary Time among Secondary Students in Manitoba, Canada in the Context of a Province-Wide Physical Education Policy: A Longitudinal Analysis. Canadian Journal of Public Health. In Press
5. McLean L, Russell K, Tenenbein M, Warda L, McGavock J (2015). Age and the risk of All-Terrain Vehicle (ATV)-related injuries in children and adolescents: Injury patterns and legislative impact assessment through the Canadian Hospitals Injury Reporting and Prevention Program CHIRPP database. BMC Pediatrics. Submitted November 2015.
6. McGavock J, Hatch G. (2015). Stemming the tide of type 2 diabetes in youth: DREAMing big, one sandbag at a time. Biochem Cell Biol. Epub(Sep 28:): 1-2.
7. Vander Ploeg K, Maximova K, McGavock J, Veugelers P. (2015). Does school-based health promotion affect physical activity on weekends? And, does it reach those students most in need of health promotion? Plos One. Oct 21;10(10):e0137987.
8. Saad V, Wicklow B, Wittmeier K, Hay J, MacIntosh A, Ryner L, Berard L, McGavock J. (2015). A practical algorithm to predict hepatic steatosis in obese youth. BMC Pediatrics. Oct 8;15:151. doi: 10.1186/s12887-015-0465-x.
9. Huynh E, Rand D, McNeill C, Brown S, Senechal M, Wicklow B, Dart A, Sellers E, Dean H, Blydt-Hansen T, McGavock J. (2015). Beating Diabetes Together: A mixed methods analysis of a feasibility trial of intensive lifestyle intervention for youth with type 2 diabetes. Canadian Journal of Diabetes. 39(6) 484-490.
10. Hay J, Wittmeier K, Wicklow B, MacIntosh A, Dean H, Sellers E, Duhamel T, Ready E, Gardiner P, Berard L, Shen G, McGavock J. (2015). Physical activity intensity and diabetes risk factors in overweight youth. The POWER Trial. International Journal of Obesity. In Press 2015
11. Wicklow B, Wittmeier K, T' Jong GW, McGavock J, Robert M, Duhamel T, Dolinsky VW. (2015). Proposed trial: safety and efficacy of resveratrol for the treatment of non-alcoholic fatty liver disease (NAFLD) and associated insulin resistance in adolescents who are overweight or obese adolescents - rationale and protocol. Biochem Cell Biol.E-Pub(Jul 10): 1-9.
12. Shen GX, Shafer L, Martens P, Sellers E, Torshizi A, Ludwig S, Phillips-Beck W, Heaman M, Prior H, McGavock J, Morris M, Dart A, Head HJ.(2015). Long Term Impact of Gestational Diabetes and Breastfeeding Initiation on Subsequent Diabetes in Mothers and Offspring. Diabetic Medicine. Sep 11. doi: 10.1111/dme.12962. [Epub ahead of print]
13. Schaffer L, Dean H, Sellers E, Prior H, Ludwig S, Wittmeier K, Martens P, Heaman M, Phillips-Beck W, Dart A, McGavock J, Shen GX.(2015). 'Does First Nations Status Modify the Association between Gestational Diabetes and Subsequent Diabetes: A Historical Prospective Cohort Study Among Mothers in Manitoba, Canada'. Diabetic Medicine. Diabetic Medicine. Sep 11. doi: 10.1111/dme.12962. [Epub ahead of print]
14. Gordon JW, Dolinsky VW, Mughal W, Gordon GR, McGavock J.(2015). Targeting skeletal muscle mitochondria to prevent type 2 diabetes in youth. Biochem Cell Biol. 2015 May 27:1-14. [Epub ahead of print]

15. Senechal M, Rempel M, MacIntosh A, Hay J, Wicklow B, Wittmeier K, Shen G, Duhamel T, McGavock J.(2015). Cardiorespiratory fitness is a determinant of the metabolic response to training in overweight adolescents. Obesity. 23(4): 823-32.
16. Wicklow B, Griffith A, Dumontet J, Venopaul N, McGavock J. (2015). Pancreatic triglyceride content is not associated with beta cell dysfunction in youth-onset type 2 diabetes. Canadian Journal of Diabetes. 15: 1499-1525.
17. McGavock J, Dart A, Wicklow B. (2015). Lifestyle therapy for the treatment of youth with type 2 diabetes. Current Diabetes Reports. 15(1): 568.
18. Durksen A, Downs S, Mollard R, Forbes L, Ball GD, McGavock J (2015). The association between time spent in vigorous physical activity and dietary patterns in adolescents: a cross-sectional study. J Phys Act Health. 2015 Feb;12(2):208-15.
19. Yardley JE, MacMillan F, Hay J, Wittmeier K, Wicklow B, MacIntosh AC, McGavock J. The blood pressure response to exercise in youth with impaired glucose tolerance and type 2 diabetes. Pediatr Exerc Sci. 2015 Feb;27(1):120-7.
20. Comte M, Hobin E, Manske S, Casey C, Griffith J, Leggett C, Veugelers P, Murnaghan D, McGavock J. Is the Provision of Physical Education to Senior-Years Students Associated With Greater Physical Activity Levels? Insight Into a Province-Wide Policy. J Phys Act Health. 2015 May;12(5):649-54.

Grant Hatch

Publications 2015 (12):

1. Cheung, K., Cole, L.C., Xiang, B., Chen, K., Ma, X., Myal, Y., HATCH, G.M., Tong, Q. and Dolinsky, V.W. (2015) SIRT3 attenuates doxorubicin-induced oxidative stress and improves mitochondrial respiration in H9c2 cardiomyocytes. J. Biol. Chem. 290, 10981-10993.
2. Dalvi, D., Nguyen, H., Mitchel, R.W., On, N., Aukema, H.M, Miller, D.W. and HATCH, G.M. (2015) Exogenous arachidonic acid mediates permeability of human brain microvessel endothelial cells. J. Neurochem. (*in press*) *Preselected for an Editorial Highlight*. Apr 11. doi: 10.1111/jnc.13117 [Epub ahead of print].
3. Pereira, T.J., Fonseca, M.A., Campbell, K.E., Moyce, B.L., Cole, L.K., HATCH, G.M., Doucette, C.A., Klein, J., Aliani, M. and Dolinsky, V.W. (2015) Maternal gestational diabetes mellitus increases the susceptibility of young rat offspring to diet-induced metabolic syndrome. J. Physiol. (London) 593, 3181-3197.
4. Mejia, E., Ibdah, J.A., Sparagna, G. and HATCH, G.M. (2015) Differential reduction in cardiac and liver tetralinoleoyl-cardiolipin and monolysocardiolipin acyl transferase-1 in the alpha subunit of trifunctional protein heterozygous knockout mice. Biochem. J. 471, 123-129.
5. Laure, P., Jarnouen, K., Pinault, M., Coulouarn, C., Guimaraes, C., Pais-de-Barros, J.-P., Chevalier, S., Dumas, J-F., Maillot, F., HATCH, G.M., Pascal, L. Servais, S. (2015) Regulation of hepatic cardiolipin metabolism by TNFα: implication in cancer cachexia. Biochem. Biophys. Acta. (Mol. Cell Biol. Lipids) 1851, 1490-1500.
6. Lautt, W.W., Ming, Z., Legare, D.L., Chowdhury, K.K., HATCH, G.M., and Wang, H. (2015) Fatty Liver and Fatty Heart -Where do They Stand in the AMIS Syndrome? Healthcare 3, 666-682, doi: 10.3390/healthcare3030666
7. Aukema, H.M., Winter, T., Ravandi, A., Dalvi, S., Miller, D.W. and HATCH, G.M. (2015) Generation of bioactive oxylipins from exogenously added arachidonic, eicosapentaenoic and docosahexaenoic acid in primary human brain microvessel endothelial cells. Lipids (*in press*). DOI 10.1007/s11745-015-4074-0
8. Mughal, W., Nguyen, L., Pustylnik, S., Piotrowski, S., Chapman, D., Du, M., Ali, N., Grigull, J., Halayko, A.J., Aliani, M., Topham, M.K., Epand, R.M., HATCH, G.M., Pereira,

T.J., Kereliuk, S., Dolinsky, V.W., Rampitsch, C., McDermott, J.C. and Gordon, J.W. (2015) A conserved MADS-box phosphorylation motif regulates differentiation and mitochondrial function in skeletal, cardiac, and smooth muscle cells. Cell Death Dis. (*in press*). Oct 29;6:e1944. doi: 10.1038/cddis.2015.306.

9. Mejia, E.M. and HATCH, G.M. (2015) Mitochondrial Phospholipids: Role in Mitochondrial Function. J. Bioenerg. Biomembr. (*In press*) DOI 10.1007/s10863-015-9601-4. Erratum published in 47, Issue 3, 279-280.
10. McGavock, J. and HATCH, G.M. (2015) Stemming the tide of type 2 diabetes in youth: DREAMing big, one sandbag at a time. Biochem Cell Biol. 2015 Sep 28:1-2. [Epub ahead of print].
11. Chang, W., Zhang, M., Meng, Z., Yu, Y., Yao, F., HATCH, G.M. and Chen, L. (2015) Berberine treatment prevents cardiac dysfunction and remodeling through activation of 5'-adenosine monophosphate-activated protein kinase in type 2 diabetic rats and in palmitate-induced hypertrophic H9c2 cells. Eur. J. Pharmacol. Oct 29. pii: S0014-2999(15)30324-1. doi: 10.1016/j.ejphar.2015.10.043. [Epub ahead of print].
12. Chang, W., Chen, L. and HATCH, G.M. (2015) Berberine as a therapy for type 2 diabetes and its complications: From mechanism of action to clinical studies. Biochem. Cell Biol. 93, 479-486.
13.

<u>Elizabeth Sellers</u>

Publications 2015 (10)

1. Wicklow B, Sellers EAC. *Maternal health issues and cardio-metabolic outcomes in the offspring: a focus on Indigenous populations*. Best Pract Res Clin Obstet Gynaecol 2015 ; 29: 43-53 (PMID 25238683).
2. Dart A, Ruth C, Sellers EAC, Dean H. *Pre-gestational and Gestation Diabetes are Associated with Congenital Anomalies of the Kidney and Urinary Tract.* AJKD 2015; 65: 684-91. (PMID 25595566).
3. Dean HJ, Sellers EAC. *Children have type 2 diabetes too: a historical perspective*. Biochem Cell Biol 2015 5:1-5 [epub ahead of print] (PMID 2591671).
4. Wicklow BA, Becker A, Chateau D, Palmer K, Kozyrskij A, Sellers EAC. *Comparison of anthropometric measurements in children to predict metabolic syndrome in adolescence: analysis of prospective cohort data*. Int J Obes 2015 Apr 14. Doi: 10.1038/ijo.2015.55. [epub ahead of print] (PMID 25869598).
5. Jonasson ME, Wicklow BA, Sellers EAC, Dolinsky VW, Doucette CA. *Exploring the role of the HNF-1 G319S polymorphism in b cell failure and youth-onset type 2 diabetes: lessons from MODY and HNF-1a-deficiennt models*. Biochem Cell Biol 2015 (Accepted).
6. Shen GX, Shafer LA, Martens PJ, Sellers EAC, Torshizi AA, Ludwig S, Phillips-Beck W, Heaman M, Prior HJ, McGavock J, Morris M, Dart AB, Campbell R, Dean HJ. Does First Nations Status Modify the Association between Gestational Diabetes and Subsequent Diabetes: A Historical Prospective Cohort Study Among Mothers in Manitoba, Canada. Diabetic Med. Accepted (August 4, 2015).
7. Hansen G, Beer DL, Vallance JK, Clark I, Sellers EAC. Optic Nerve Sheath Diameter Ultrasonography in Pediatric Patients with Diabetic Ketoacidosis. Can J Diabetes (Accepted July, 2015).
8. Hay J, Wittmeier K, MacIntosh A, Wicklow B, Duhamel T, Sellers EAC, Dean HJ, Ready E, Berard L, Kriellaars D, Shen GX, Gardiner P, McGavock J. Physical Activity Intensity and Type 2 Diabetes Risk in Overweight Youth: A randomized trial. Int J Obesity (accepted Aug 2015).

9. Sellers EAC, Hadjiyannakis S, Amed S, Dart AB, Dyck RF, Hamilton J, Langlois V, Panagiotopoulos C, Dean HJ. Persistent Albuminuria in Children with Type 2 Diabetes: A Canadian Paediatric Surveillance Program Study. J Pediatr. 2015 Oct 12 [epub ahead of print].
10. Charison J, Wicklow BA, Dean HJ, Sellers EAC. The Metabolic Phenotype of Youth Onset Type 2 Diabetes: the role of pregestational diabetes exposure and the hepatic nuclear factor 1α G319S polymorphism. Can J Diabetes (accepted Oct. 2015).

Geert 't Jong

Publications 2015 (1)

1. Warlé-van Herwaarden, M. F., Koffeman, A. R., Valkhoff, V. E., t Jong, G. W., Kramers, C., Sturkenboom, M. C., & De Smet, P. A. (2015). Time-trends in the prescribing of gastroprotective agents to primary care patients initiating low-dose aspirin or non-steroidal anti-inflammatory drugs: a population-based cohort study. *British journal of clinical pharmacology*.

Brandy Wicklow

Publications 2015 (6)

1. Jonasson ME, Wicklow BA, Sellers EAC, Dolinsky VW, Doucette CA.Exploring the role of the HNF-1aG319S polymorphism in b cell failure in youth-onset type 2 diabetes: lessons from MODY and the HNF-1a-deficient animal models. Journal of Biochemistry and Cell Biology.
2. Brandy Wicklow, Angella Griffith, Jacqueline, Dumontet Niranjan Venugopal, Lawrence Ryner, Jonathon McGavock. (2015). Pancreatic triglyceride content is not associated with youth onset type 2 diabetes. Canadian Journal of Diabetes.
3. Senechal M, Remple M, Duhamel TA, MacIntosh A, Hay J, Wicklow B, Wittemeier K, Shen G, McGavock J.(2015). Fitness is a determinant of the metabolic response to endurance training in adolescents at risk of Type 2 Diabetes. Obesity (Silver Spring). 23(4): 823-832.
4. B. Wicklow, A. Becker, D. Chateau, K. Palmer, A. Kozyrskij, E. Sellers. (2015). Comparison of Anthropometric Measurements in Children to Predict Metabolic Syndrome in Adolescence: Analysis of Prospective Cohort Data. International Journal of Obesity.
1. Wicklow B, Sellers E. (2015). Maternal health issues and cardio-metabolic outcomes in the offspring: A focus on Indigenous populations. Best Pract Res Clin Obstet Gynaecol. 29(1): 43-53.
2. J. McGavock, A.Dart, B.Wicklow. (2015). Lifestyle Therapy for the Treatment of Type 2 Diabetes in Youth. Current Diabetes Reports. 15: 568-579.

Kristi Wittmeier

Publications 2015 (4)

1. Brandy Wicklow Kristy Wittmeier Geert 't Jong Jonathon McGavock Marni Robert Todd Duhamel Vernon Dolinsky. (2015). Proposed trial: safety and efficacy of resveratrol for the treatment of non-alcoholic fatty liver disease (NAFLD) and associated insulin resistance in adolescents who are overweight or obese - rational and protocol. Biochemistry and Cell Biology. 93: 1-9.
2. Wittmeier K, Klassen T, Sibley K. (2015). Implementation Science in Pediatric Health Care: Advances and Opportunities. JAMA Pediatrics. 169(4307-309).

3. Sénéchal M, Rempel M, Duhamel T, MacIntosh A, Hay J, Wicklow B, Wittmeier K, McGavock J. (2015). Fitness is a Determinant of the Metabolic Response to Endurance Training in Adolescents at Risk of Type 2 Diabetes Mellitus. Obesity. Epub (March 2015).
4. Bohm E, Loucks L, Lix L, Wittmeier K, Oppenheimer L. (2015). Reduced Time to Surgery Improves Mortality and Length of Stay Following Hip Fracture: Results from a Intervention Study in a Canadian Health Authority. Canadian Journal of Surgery. 58(4): 257-263.

FINANCIAL PROGRESS REPORT

The $250,000 allocation for 2015 provided grant funding for each of the three themes as well as support for the Research Coordinator and Research Nurse. In addition, support of the November 19, 2015 DREAM symposium was provided through the allocation.

Budget Proposal for DREAM for 2016

Expenditure	Unit Cost	#/year	Total
1. Operating			
SHARED			
Coordinator	$65,000.00	1	$65,000.00
Analyst	$10,000.00	1	$10,000.00
Pathing Exercise/Writing Retreat	$1,250.00	4	$5,000.00
Advisory Group & Patient Advisory Group	$625.00	4	$2,500.00
Guest Speakers	$1,250.00	2	$2,500.00
Grant Reviews	$250.00	8	$2,000.00
CLINICAL			
Clinical Research Nurse	$70,000.00	0.3	$21,000.00
Obesity Sub-Theme	$25,000.00	1	$25,000.00
Next Gen Support	$55,000.00	0.4	$22,000.00
BASIC			
Seahorse Support	$65,000.00	0.54	$35,000.00
Pilot Grants	$20,000.00	2	$40,000.00
Sub-Total			$230,000.00
2. MEETINGS			
Annual Symposium	$10,000.00	1	$10,000.00
Sub-Total			$10,000.00
3. ADMINISTRATION			
Group Leader Stipends	$5,000.00	2	$10,000.00
Sub-Total			$10,000.00
OPERATING			$230,000.00
MEETINGS			$10,000.00
ADMINISTRATION			$10,000.00
TOTAL ANNUAL REQUESET			**$250,000.00**