

Muscle Health Research Centre Annual Report 2018-2019

1. Contact Information

Director:	David A. Hood
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2. Charter Dates

July 1, 2008, re-charted in 2014.

3. Mandate – 150 words maximum

The MHRC is an organized research unit within the Faculty of Health dedicated to Biomedical Sciences. Its mandate is to provide a centralized and focused research emphasis on the importance of “muscle health” for the overall health and well-being of Canadians. The MHRC consists of a strong cohort of well-funded and highly productive scholars (including two Tier I Canada Research Chairs, one Tier I York Research Chair, and one McLaughlin Research Chair) and graduate students from the Faculty of Health and the Faculty of Science. The vision statement of the MHRC is “*to be Canada’s leading research centre for the study of muscle health and disease*”. We are achieving this through 1) innovative research, 2) the education of qualified trainees, and 3) the translation of our findings for the benefit of all Canadians.

4. Annual Activities in Fulfilling Mandate – 750 words maximum

The MHRC continues to hold its educational activities every year, consistent with the goal of uniting faculty and trainees in the areas of muscle and heart health, with collaboration and interaction in mind. Our programs provide a platform that continues to increase the visibility of York University, and the MHRC, in Canada and around the world. Our accomplishments are listed in Appendix 1, including the funding obtained, awards received and most significant publications in peer-reviewed journals. This appendix contains an abbreviated version of the vast list of accomplishments of our faculty members (a complete list called *Appendix 3* is provided on the MHRC website). It is clear from this Appendix that the MHRC is fulfilling its mandate in promoting muscle / heart research for the health and well-being of Canadians. We continue to be successful at obtaining NSERC, CIHR, CFI and Heart and Stroke Research Foundation of Canada research funding, and at publishing our findings.

- a) Funding proposals: Several collaborations exist among MHRC faculty members, and among faculty at other institutions. These include MitoNET, a Canada-wide initiative to create a Network centre of Excellence.
- b) Events organized: We normally hold 3 types of events throughout the year:
 - 1) Colloquia, featuring internal speakers discussing their work in an informal interactive research presentation. Normally this involves 3 graduate students who presented their research, or it highlights the work of new faculty members. This year we were able to schedule this event with 2 graduate students. We also had 1 new faculty member highlight his work.
 - 2) Seminars, in which external speakers from other Universities were invited to present their work and to interact with faculty members and graduate students. This year we had 5 external speakers from the University of Southern Denmark, McGill University (2), Liverpool John Moores University, Washington University School of Medicine. One of the speakers from McGill University was an MHRC student-organized Seminar;
 - 3) The 9th Annual Muscle Health Awareness Day (MHAD), which attracted 8 external speakers, 28 other faculty members and 104 students. A total of 52 posters were presented by trainees (total registration: 132 people).
- c) Knowledge Mobilization / Outreach: All MHRC faculty members are involved in promoting knowledge mobilization of their research via the MHRC website, and MHRC social media outlets (Twitter and Facebook). Newly published papers-of-the-month are summarized in easy to read language for public dissemination. In addition, many members have had their work featured in Y-file, and some members spend considerable time promoting muscle health, metabolism and diabetes education to the public. Several MHRC members have had media interviews in the past year to promote muscle health in their field;
- d) Mentorship: MHRC faculty members are extremely active in the training and development of graduate students, undergraduate students, and post-doctoral fellows. One of the reasons that MHRC members are so successful individually with NSERC is that we are very active in the training of Highly Qualified Personnel (HQP), a major criterion for success with NSERC. MHRC faculty members directly mentored >100 trainees over the past year;
- e) Continuing Education: We have established the course curriculum to offer our Advanced Certificate in Exercise and Muscle Health for recent graduates or Allied Health professionals. Time will be required to move some of these courses online, along with support from Faculty of Health staff involved in the Health Leadership and Learning network (HLLN). We are also endeavouring to establish a similar Certificate at the undergraduate level for Kinesiology and Health Science majors. Our discussions at the moment revolve around required courses.
- f) Other leadership activities: The MHRC sponsored two \$1000 MHRC Student Fellowships directed against the Graduate Student's fees;
- g) Industry partners: The MHRC has developed relationships with industry on several fronts, including Aurora Scientific, a manufacturing company for muscle testing equipment (Hood), Zucara Therapeutics (Riddell) and Stealth Biotechnologies (Perry), both drug development companies.
- h) Student-based activities: The MHRC continues to significantly involve our graduate student and post-doctoral trainees in our activities. The MHRC Student Committee provides input into our programming and direction, particularly with regard to student interests in the MHRC Seminars and the Muscle Health Awareness Day program. Every year we have a student-invited Seminar speaker. On February 22, 2019, the MHRC Student Committee hosted its bi-annual

Career Day. Attendees were delighted to hear from a wide range of professionals who have graduate level training in the life sciences. The morning got off to a great start with intriguing talks from Dr Ariella Mandel-Shorser (Professor and program coordinator - Humber College), Dr. Brennan Smith (Account manager - CTC Communications), Dr. Adam Bujak (intellectual property manager – Exerkine) and Dr. Kaitlin Roke (Associate manager - Canadian Sugar Institute). Following a brief networking break, Mr. Michael Midmer (CEO - Zucara Therapeutics) kicked things off for the late morning session, followed by great presentations by Dr. Christine Romano (Research Associate - University of Toronto Biozone), Dr. Andrew Foster (Medical Science Liaison - Novartis) and Dr. Andrew Levy (Program Consultant - Ontario Ministry of Health and Long-term Care). Students then had the opportunity to network over lunch, which as always is a great opportunity. This year’s turnout was enthusiastic and engaged, and the speakers were ready to share helpful advice. Many quality questions followed each of the talks, sparking great discussions. We look forward to hosting our next Career Day in 2021.

5. Challenges and Areas for Improvement – 500 words maximum

We have two major challenges, and both are related to funding:

- a) Funding for large scale collaborative initiatives related to 1) student training and 2) infrastructure. CREATE and CFI applications have been written in the past, but have not yet been successful. We have re-formulated a CFI application, and are awaiting internal reviews of the document;
- b) Funding of the MHRC itself, either through donor contributions, industry support, or Continuing Education initiatives. Industry support may be forthcoming if the CFI grant is successful. Continuing Education using on-line courses is currently in development, and the curriculum is set. The pursuit of donors is in the hands of the Faculty Development Office;
- c) We have successfully won the bid to host the International Biochemistry of Exercise Conference in 2021. This truly international event has a 50 year history, and is held only every three years, with recent previous locations in Beijing (2018), Sao Paulo (2015) and Stockholm (2012). The faculty of Health is fully supportive of this initiative, which will bring visibility and repute to the Faculty and the University as a whole.

6. PIER Responses

Theme	Actions	Status
1. Growing a Culture of Scholarly Inquiry	Seminars, Colloquia, Muscle Health Awareness Day, Trainee involvement	These activities and initiatives are ongoing, every year.
2. Investing & Promoting People	We promote our achievements using the website, Twitter and Facebook; We support each other through collaboration and cooperation to foster success. The renovation of the 3 rd floor of Farquharson is helping us achieve this	
3. Supporting Research Growth & Development		

	renewed growth and development.	
4. Leadership in Research and Research Advocacy	Our members are extremely active in promoting our research and the MHRC through university department seminars, scientific meetings, and the training of HQP.	
5. Building Research for the Future	We are building research infrastructure on a yearly basis, and employing our newly renovated Farquharson 3 rd floor to construct a Core Equipment facility, as well as a Human Exercise and Muscle assessment facility. We also have an active voice in complement planning, and our devoted membership grows almost every year.	

7. Financial Position - Please see the spreadsheet attached

8. Non-Degree Activities Provide a list of all non-credit, non-degree activities that are revenue generating over incidental costs, offered by the ORU.

The annual Muscle Health Awareness Day organized by the MHRC is a modest, revenue-generating event.

9. Space Utilization – Please use template provided

Office Space

Room #	Name of Occupant	Occupant Affiliation ¹	Type of Workspace ²	Length and frequency of Occupancy ³	Notes ⁴
307 Farq	Avi Erlich	Coordinator	Office	May 1, 2018-Aug. 31, 2018	Hood lab during Farq renovations
332 Farq	Janice D’Silva	Coordinator	Office	Sept. 1, 2018, ongoing, 3d/week	
333 Farq	Dr. David Hood	Director	Office	Unspecified, 5d/week	

¹ Choose from the following: faculty, staff, graduate student, undergraduate student, visiting scholar, post-doctoral fellow, volunteer, other (please specify)
*If known please indicate whether faculty also has another office in faculty space

² Choose either open workspace or closed office

³ Choose either unspecified or list a time period (starting and ending) and how often this room gets used; 5 days a week, 4 days a week etc.

⁴ Explain if there is an agreement in place and how this room is being utilized

Shared space/equipment

Room # ⁵	Type of Space ⁶	Access ⁷	Length and frequency of Occupancy ⁸	Notes ⁹
043 Farq	Lab, vivarium	MHRC members, key	Unspecified, key access, 5d/week	Shared lab space, agreement in place
320 Farq	Lab, equipment room	MHRC members, key	Unspecified, key access, 5d/week	Shared lab space, agreement in place
322 Farq	Lab, biopsy space	MHRC members, key	Unspecified, key access, 5d/week	Shared lab space, agreement in place
330 Farq	Meeting room	MHRC members, key	Unspecified, key access, 5d/week	Shared meeting room, agreement in place
204 Farq	Lab	MHRC members, key	7 months, 5 d/week	Shared lab space, agreement in place
331 Farq	Storage	MHRC members, key	Unspecified, key access, 5d/week	MHRC storage space
335 Farq	Storage	MHRC members, key	Unspecified, key access, 5d/week	MHRC storage space

⁵ If no room number, indicate where it is located

⁶ Choose the type of space; meeting rooms, cubicles, reception, open space, resource centre, supply rooms, storage, coat closets, kitchen, photocopier room, break room, lab

⁷ Choose type of access; open access, key badge, key

⁸ Choose either unspecified or list a time period (starting and ending) and how often this room gets used; 5 days a week, 4 days a week etc.

⁹ Explain if there is an agreement in place and how this room is being utilized

⁵ If no room number, indicate where it is located

⁶ Choose the type of space; meeting rooms, cubicles, reception, open space, resource centre, supply rooms, storage, coat closets, kitchen, photocopier room, break room, lab

⁷ Choose type of access; open access, key badge, key
⁸ Choose either unspecified or list a time period (starting and ending) and how often this room gets used; 5 days a week, 4 days a week etc.
⁹ Explain if there is an agreement in place and how this room is being utilized

10. Objectives for Upcoming Year (e.g. events, membership, grants, space needs) - 750 words maximum

a) Funding proposals anticipated for submission:

We have reformulated a CFI proposal entitled “Bioenergetic Laboratory for Aging metabolism (BLAM) and submitted it for internal evaluation. This application has 10 Principle Users and many Other Users involved. We always organize submissions for group infrastructure grants from using the NSERC RTI opportunity on a yearly basis. Individual faculty members always submit NSERC Discovery and CIHR or HSF grant renewals;

b) Conferences, workshops or other events:

We organize MHAD every year, as described above. Every second year, we host a Career Day for MHRC trainees. The next one will be held in Winter 2021. We also organize occasional Industry Workshops for the demonstration of sophisticated equipment, with the intent of potential purchase. We will be hosting a major international meeting in 2021, the International Biochemistry of Exercise Conference (IBEC). The MHRC will host a first class, high level conference that will certainly bring excellent visibility to York University in this field.

c) Knowledge mobilization and educational initiatives:

We will continue to develop Continuing Education courses, in the form of the Advanced Certificate in Exercise and Muscle Health (3 on-line courses) for Kinesiology graduates and graduate students, for knowledge dissemination and for revenue to support the MHRC. We are also in discussions regarding the formulation of a KHS undergraduate Certificate of the same name. We continue to update the Website and increase our social media exposure, via Twitter and Facebook. In addition, we will continue to develop student-led initiatives and encourage and advertise the enrollment of graduate students in FGS, Mitacs and Innovation York Seminars / Workshops to promote educational broadening for MHRC PhD students.

d) Visitors:

In 2019-20 we anticipate having 6 Official Invited Guests for Seminars, 1-2 Student Colloquia featuring 3 graduate student presentations each, and one Muscle Health Awareness Day, involving 8 invited guests from universities and research institutes. We also host industry partners who demonstrate their equipment and provide “instructional / promotional seminars” on their products. In addition, there are always a number of un-official guest scientists who drop by the MHRC to visit and who often will present their data to specific labs or groups of interested trainees and faculty members.

e) Other (these are ongoing initiatives):

- Interact with our Development office within the University as needed to promote outreach and the visibility of the MHRC among members of the public, in an effort to seek interested financial contributions from potential benefactors.
- Continue to develop more relationships with industry to initiate contractual agreements which will bring in revenue for the MHRC. Discussions with colleagues in Innovation York will help us with this;
- Initiate more industry workshops, in concert with yearly group applications for NSERC-RTI as well as the CFI application.
- Develop more collaborations between laboratories within the MHRC as well as more educational initiatives for trainees, as described above.

11. Other relevant items the Director wishes to include in the annual report - 250 words maximum

No additional comments

12. Appendix 1 –Governance and Membership

Active members (York faculty): 24; a complete list of active and adjunct members of the MHRC and their departmental affiliations is provided below. We are delighted that we have added two new faculty members this year: Dr. Andrea Josse and Dr. Arthur Cheng.

Other members: Adjunct faculty members: 6; Graduate and UG student members (York): 100; Graduate and UG student members (non-York, other Universities): 40

Executive Committee members: Drs. David Hood (Director), Rolando Ceddia, Mike Connor, Mike Riddell, Peter Backx, and Ms. Meghan Hughes (Graduate Student Member)

Faculty Member	Rank	Research Area	Office Number/ E-Mail	Office Location
School of Kinesiology and Health Science				
Hood, David	Professor, Canada Research Chair, Director of the Muscle Health Research Center	Molecular basis of Mitochondrial Biogenesis in health and disease	dhood@yorku.ca (416)736-2100 x 66640	Farquharson Building, 302/333
Abdul-Sater, Ali	Assistant Professor	Exercise and immunology / inflammation	aasater@yorku.ca (416)736-2100 x 77226	Farquharson building 351
Adegoke, Olasunkanmi	Associate Professor	Protein and amino acid nutrition and metabolism	oadeoke@yorku.ca (416)736-2100 x 20887	Norman Bethune College, 362
Belcastro, Angelo	Professor, Chair, School of Kinesiology and Health Science	Muscle injury and damage in health and disease	anelcas@yorku.ca (416)736-2100 x 21088	Norman Bethune College, 333B

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Birot, Olivier	Associate Professor	Vascular plasticity in striated muscle (angiogenesis vs. capillary regression)	birot@yorku.ca (416)736-2100 x 44043	Norman Bethune College, 353
Ceddia, Rolando	Associate Professor	Glucose and fat metabolism in muscle and adipose tissue	roceddia@yorku.ca (416)736-2100 x 77204	Lumbers Building, 225A
Cheng, Arthur	Assistant Professor	Regulation of muscle contraction and fatigue	ajcheng@yorku.ca (416)736-2100 x 30030	Farquharson Building, 351
Connor, Michael	Associate Professor	Muscle Development and Cancer	mconnor@yorku.ca (416)736-2100 x 77206	Life Sciences Building, 423B
Drake, Janessa	Associate Professor	Biomechanics of the spine	jdrake@yorku.ca 416-736-2100 Ext. 33568	Sherman Health Science Research Centre, 2030
Edgell, Heather	Assistant Professor	Cardiovascular disease in women	edgell@yorku.ca (416) 736-2100 x 22927	Norman Bethune College, 355
Gage, William	Associate Professor, Associate Vice-President, Teaching and Learning	Biomechanics of postural control and of joint stability	whgage@yorku.ca (416)736-2100 x 33027 (416)736-2100 x 20774	Sherman Health Science Research Centre, 2022 Kaneff Tower, 906
Haas, Tara	Associate Professor	Angiogenesis in Muscle	thaas@yorku.ca (416)736-2100 x 77313	LSB, 341
Hamadeh, Mazen	Associate Professor Master of Stong College	Human Nutrition and Exercise Physiology, Diabetes and ALS	hamadeh@yorku.ca (416)736-2100 x 33552 (416)736-2100 x 66176	Norman Bethune College, 365 Stong College, 314
Hynes, Loriann	Assistant Professor & Athletic Therapy Coordinator	Sports-related injuries and rehabilitation	lyhnes@yorku.ca (416)736-2100 x 22734	Stong College, 326
Josse, Andrea	Assistant Professor	Nutritional control of muscle and bone	ajosse@yorku.ca (416)736-2100 x 30038	Norman Bethune College, 344
Kuk, Jennifer	Associate Professor	Obesity, CVD, Type 2 diabetes and exercise interventions	jennkuk@yorku.ca (416)736-2100 x 20080	Sherman Health Science Research Centre, 2002
Perry, Christopher	Assistant Professor	Redox Metabolism, Skeletal Muscle, Diet and Exercise	cperry@yorku.ca (416)736-2100 x33232	Norman Bethune College, 344 and Farq 351
Riddell, Michael	Professor KAHS Graduate Program Director	Exercise Physiology, Stress and Diabetes Metabolism	mriddell@yorku.ca (416)736-2100 x 40493	Norman Bethune College, 347
Roudier, Emilie	Assistant Professor	Cardiovascular Physiology, angiogenesis	eroudier@yorku.ca (416) 736-2100 x 44312	Norman Bethune College, 365
Scimè, Anthony	Associate Professor	Stem Cell Biology; Muscle Regeneration; Adipose Differentiation	ascime@yorku.ca (416) 736-2100 x33559	Norman Bethune College, 327C

Department of Biology				
Backx, Peter	Professor, Canada Research Chair	Cardiac Muscle Physiology and Disease	pbackx@yorku.ca (416)736-2100 x 33858	Farquharson Building, 354
McDermott, John	Professor	Muscle Development	jmcderm@yorku.ca (416)736-2100 x 30344	Life Sciences Building, 427B
Sweeney, Gary	Professor	Obesity and insulin resistance	gsweeney@yorku.ca (416)736-2100 x 66635	Farquharson Building, 231
Tsushima, Robert	Associate Professor,	Cardiac Muscle Physiology and Disease	tsushima@yorku.ca (416)736-2100 x 20996	Farquharson Building, 344
Adjunct Members				
Biggard, Xavier			xbiggard@gmail.com	
Coe, Imogen	Professor, Dean, Faculty of Science	Cardiac Muscle Biochemistry	imogen.coe@ryerson.ca	Ryerson University
Hawke, Thomas	Associate Professor	Muscle Development and Regeneration	hawke@mcmaster.ca	McMaster University
Jacobs, Ira	Dean, Faculty of Physical Education	Muscle Metabolism, Applied Physiology and Pharmacology	ira.jacobs@utoronto.ca	University of Toronto
Laham, Robert	Physician	Muscle physiology	robertlaham@aim.com	York Lanes Appletree Medical Centre
Wharton, Sean	Physician	Obesity and exercise	wharton.sean@gmail.com	Wharton Medical Clinic
MHRC Coordinator				
D'Silva, Janice			mhrc@yorku.ca	Farquharson Bldg, 332 X 77832 Fax: 416-650-8483

Five notable contributions for each active member above

(A full and more complete list of MHRC contributions is labelled *Appendix 3*, and is not included here, but found on the MHRC website).

Abdul-Sater, Ali A.

Funding Received:

Canadian Institutes of Health Research (CIHR) – Project Grant

Dissecting the role of TRAF1 in regulating linear ubiquitination and the impact on inflammatory diseases

2019/4 – 2024/4, Total Funding - \$803,250

Arthritis Foundation – Stars Career Development Award

A mouse model to design therapies targeting TRAF1 in rheumatoid arthritis

2019/1 – 2022/1, Total Funding - \$375,000

Awards Received:

Bhagirath Singh Early Career Award in Infection and Immunity (\$16,667). Awarded by CIHR for the top scoring project grant in the panel throughout the competition.

Peer-reviewed publications:

Ardavan Jafari[#], David M. Ojcius, Laxmi Yeruva, Christian Schindler and **Ali A. Abdul-Sater***. Dicer controls the activation of NLRP3 inflammasomes. *PLoS One* April 2019 (*Accepted*)

Edilova MI, **Abdul-Sater AA**, Watts TH. TRAF1 Signaling in Human Health and Disease. *Frontiers in Immunology*, 2018 Dec 18;9:2969. doi: 10.3389/fimmu.2018.02969.

Cheng, Arthur

Funding Received:

Canadian Foundation for Innovation – John R. Evans Leaders Fund

Investigating the role of intracellular calcium dynamics on skeletal muscle function in aged muscle. April 2019, Total funding - \$150,000

Junior Faculty Funds & Minor Research Grant

Investigating the role of intracellular acidosis on fatigue-induced power loss in skeletal muscle. November 2018, Total funding - \$5,000

Peer-reviewed publications:

Cheng, A.J., Allodi, I., Chaillou, T., Ivarsson, N., Schlittler, M., Lanner, J.T., Thams, S., Hedlund, E., Andersson, D.C. (2019). Intact single fibres from SOD1^{G93A} ALS mice display preserved specific force, fatigue resistance, and training-like adaptations. *The Journal of Physiology*. Accepted Apr 2019.

Chaillou, T., **Cheng, A.J.** (2019). Mechanisms of prolonged low-frequency force depression: in vivo studies get us closer to the truth. *American Journal of Physiology – Regulatory, Integrative, and Comprehensive Physiology*. Accepted Mar 2019. doi: 10.1152/ajpregu.00063.2019

Invited Presentations:

MHRC Seminar Series – Invited Speaker, March 22, 2019

Drake, Janessa D. M.

Funding Received:

Ministry of Labour (MOL): Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD)

Functional implications of dynamic and fixed chairs and keyboard systems on musculoskeletal responses during a prolonged seating exposure.

March 2018- August 2019

\$9,800 (Co-Researcher; Lead Research is my MSc Mario Simone, Co-Researcher is my PhD Heather Johnston)

NSERC Discovery Grant

Thoracic and Lumbar Spine Biomechanics

May 2019- April 2024 (Notified April 2019)

\$40,000/year (\$200,000 total)

Peer-reviewed publications:

Schinkel-Ivy, A., **Drake, J.D.M.** (2018) The influence of thoracic movement on lumbar spine muscle activation patterns in young adults asymptomatic for low back pain: A cross-sectional study' *Journal of Manipulative and Physiological Therapeutics*, (JMPT_2017_1_R1, Accepted 28th Nov 2018).

Peer Reviewed Conference Proceedings:

DiMonte, S., Desroches, D., Simone, M.S., **Drake, J.D.M.** Motion and muscle activation patterns during extreme conditioning protocol. Proceedings of the Twentieth Biennial Conference and Symposia of the Canadian Society for Biomechanics. Halifax Nova Scotia, Canada, August 2018, Poster.

Johnston, H., Wanninayake, S., **Drake, J.D.M.** Differences in back muscle co-contraction during prolonged standing due to breast size. Proceedings of the Twentieth Biennial Conference and Symposia of the Canadian Society for Biomechanics. Halifax Nova Scotia, Canada, August 2018, Poster.

Edgell, Heather

Funding Received:

Stand up to POTS

Postural orthostatic tachycardia syndrome – autonomic testing through the menstrual cycle and a proposed intervention (Q-collar)

2018-2020, Total funding \$16,250USD = ~\$20,000CAD

NSERC Discovery Grant

Cerebrovascular and ventilatory responses to autonomic reflex stimulation in supine and upright postures in women throughout the menstrual cycle and men

2016-2021, Total funding \$120,000 over 5 years

Peer-reviewed publications:

Joshi H and **Edgell H.** (2019) Ventilatory and cardiovascular response to supine and tilted metaboreflex activation. *Physiological Reports* 7(6): e14041

Fouladi B, Joshi H, and **Edgell H** (2018) Cardiovascular responses to passive limb movement in men and women. *Eur J Appl Physiol* 119(2): 551-559

Edgell H, Grinberg A, Beavers K, Gagne N, and Hughson R (2018). Efficacy of fluid-loading as a countermeasure to the hemodynamic and hormonal changes of 28-hour head down bed rest. *Physiol Rep* 6(19): e13874

Haas, Tara L.

Funding Received:

Heart and Stroke Research Foundation of Canada

\$266,211 total funding (3 years);

“Regulators of angiogenesis in peripheral limb ischemia”

PI – Tara Haas; Co-applicants: C. Ellis (UWO) and O. Birot

2015-2018

NSERC Discovery Grant (renewal);

“Regulation of capillary sprouting and stabilization in skeletal muscle”

\$165,000 total funding (5 years)

2013-2018

Peer-reviewed publications:

Rudnicki M, Abdifarkosh G, Nwadozi E, Ramos SV, Makki A, Sepa-Kishi DM, Ceddia RB, Perry CGR, Roudier E, Haas TL. Endothelial-specific FoxO1 depletion prevents obesity-related disorders by increasing vascular metabolism and growth. *Elife*. 2018 Dec 4;7. pii: e39780. doi: 10.7554/eLife.39780.

Rudnicki M, Abdifarkosh G, Rezvan O, Nwadozi E, Roudier E, Haas TL. Female mice have higher angiogenesis in perigonadal adipose tissue than males in response to high-fat diet. *Front Physiol* 2018;doi:<https://doi.org/10.3389/fphys.2018.01452>

Nwadozi, E., A. Ng, A. Stromberg, H. Liu, K. Olsson, T. Gustafsson* and T.L. Haas*. Leptin is a physiological regulator of skeletal muscle angiogenesis and is locally produced by PDGFR α and PDGFR β expressing perivascular cells. *Angiogenesis* 2018 Aug 18. DOI: 10.1007/s10456-018-9641-6(*shared senior author)

Hood, David A.

Funding Received:

Canadian Institutes for Health Research (CIHR) Research Grant

Mitophagy and lysosomal biogenesis in aging muscle
2018-23, Total Funding - \$722,925 (144,585 per year).

Natural Science and Engineering Research Council of Canada Discovery Grant

Mitochondrial Biogenesis in Skeletal Muscle

\$65,000 per year
2016-20

Peer-reviewed publications:

Hood, D.A., J.M. Memme, A.N. Oliveira and M. Triolo. Maintenance of skeletal muscle mitochondria in health, exercise, and aging. *Ann. Rev. Physiol.* 81:19-41, 2019.

Carter, H.N., Y. Kim, A. T. Erlich, D. Zarrin-Khat and D. A. Hood. Autophagy and mitophagy flux in young and aged skeletal muscle following chronic contractile activity. *J. Physiol. (Lond.)* 596(16):3567-3584, 2018.

Parousis, A., H. N. Carter, C. Tran, A. T. Erlich, Z. S. Mesbah-Moosavi, M. Pauly and D.A. Hood. Contractile activity attenuates autophagy suppression and reverses mitochondrial defects in skeletal muscle cells. *Autophagy*, 4:1-12, 2018.

Hynes, Loriann

Funding Received:

Distinguished Athletic Therapy Educator Award
\$1500
2018

Awards Received:

2018 Distinguished Athletic Therapy Educator Award

UHN Traumatic Brain Injury Conference: Winner – Best Poster, 2018 Sandeep Gill, MSc Student
Details:

Gill S, Sem M, Edgell H, Hynes L "A Comparison of Techniques in Predicting Brain Blood Flow from the Neck" 2018 National Traumatic Brain Injury Conference (UHN), Toronto Rehabilitation Institute, ON, February 2, 2018.

Peer-reviewed publications:

Miller, MB, Macpherson AK, Hynes LM. Athletic Therapy Students' Perceptions of High-Fidelity Manikin Simulation: A Pilot Study. *Athletic Training Education Journal*, 2018;13(2):158-167.

Invited Presentations:

Sergio LE, Hynes LM. "Integrated Approaches to Assessing Function and Recovery Following Concussion" [Conference Opening Lecture] Canadian Athletic Therapists Association 52nd National Conference, Quebec City, QC, June 1, 2018.

McDermott, John C.

Funding Received:

NSERC Discovery Grant

Role of AP-1 in skeletal myogenesis

\$170,000 for 5 years

2018-2023

CIHR program grant

Protein: Protein Networks in Regulation of Cardiomyocyte Gene Expression

Total funding - \$661,000 (per year \$132,200)

Oct 2018-2023

Peer-reviewed publications:

FMRP recruitment of β -catenin to the translation pre-initiation complex represses translation. Ehyai, S., Miyake, T., Williams, D., Vinayak, J., Bayfield, M.A., and McDermott, J.C. *EMBO Rep*. 2018 Oct 25. e45536. doi: 10.15252/embr.201745536.

Invited Presentations:

"Heart failure associated transcriptome dynamics in response to b blockers" International Academy of Cardiovascular Sciences, N. American Section. Havana, Cuba, June 8th, 2018.

“Strawberry Notch 1 forms a repressor complex with MEF2 to inhibit Myogenesis”.
International MADS Box Conference. Lake Placid, USA July 9th, 2018.

Riddell, Michael C.

Funding Received:

NSERC Operating Grant:

“Role of somatostatin signaling on pancreatic islet function and energy homeostasis”.
\$40,000/year for 5 years (May 1, 2018-April 2023)

JDRF Strategic Research Agreement (SRA) –

“Additional Signals for Next Generation AP Systems RFA: Improving the Daily Lives of People with Type 1 Diabetes by Meeting the Challenges of Glucose Control through the Development of a Next-Generation Closed-Loop System”.

D O’Neal (Principle Investigator) Co-PIs: A Jenkins, S McAuley, E Botvinivk, A LaGerche, C Smart, B King, G Goodwin, A Medioli, P Colman, R Maclsaac, G Ward, N Cohen, M Riddell.
\$898,123. USD (2018-2020).

Peer-reviewed publications:

Teich T, Zaharieva DP, Riddell MC. Advances in Exercise, Physical Activity, and Diabetes Mellitus. *Diabetes Technol Ther.* 2019 Feb;21(S1):S112-S122. doi: 10.1089/dia.2019.2509. PubMed PMID: 30785316

Aronson R, Brown RE, Li A, Riddell MC. Optimal Insulin Correction Factor in Post-High-Intensity Exercise Hyperglycemia in Adults With Type 1 Diabetes: The FIT Study. *Diabetes Care.* 2018 Nov 19. pii: dc181475. doi: 10.2337/dc18-1475. [Epub ahead of print] PubMed PMID: 30455336.

Rickels MR, DuBose SN, Toschi E, Beck RW, Verdejo AS, Wolpert H, Cummins MJ, Newswanger B, Riddell MC; T1D Exchange Mini-Dose Glucagon Exercise Study Group. Mini-Dose Glucagon as a Novel Approach to Prevent Exercise-Induced Hypoglycemia in Type 1 Diabetes. *Diabetes Care.* 2018 Sep;41(9):1909-1916. doi:10.2337/dc18-0051. Epub 2018 May 18. PubMed PMID: 29776987.

Perry, Christopher G. R.

Funding Received:

PI, Operating: NSERC Discovery Grant

Title: Regulation of mitochondrial bioenergetics in striated muscle

Total: \$200,000

2019-2024

Peer-reviewed publications:

Hughes MC*, **Ramos SV***, **Turnbull PC**, Edgett BA, Huber JS, Polidovitch N, Schlattner U, Backx PH, Simpson JA, Perry CGR. Impairments in left ventricular mitochondrial bioenergetics precede overt cardiac dysfunction and remodeling in Duchenne muscular dystrophy. *J Physiol*, 2019 Jan 22 (Accepted).

Hughes MC*, **Ramos SV***, **Turnbull PC**, Rebalka IA, Cao A, Monaco CMF, Varah NE, Edgett BA, Huber JS, **Tadi P**, **Delfinis LJ**, Schlattner U, Simpson JA, Hawke TJ, Perry CGR. Early myopathy in Duchenne muscular dystrophy is associated with elevated mitochondrial H₂O₂ emission during impaired oxidative phosphorylation. *Journal of Cachexia, Sarcopenia and Muscle*. 2019 Jan 9 (Accepted).

Ramos SV*, **Hughes MC***, Perry CGR. Altered skeletal muscle microtubule-mitochondrial VDAC2 binding is related to bioenergetic impairments after paclitaxel but not vinblastine chemotherapies. *Am J Physiol: Cell Physiol*. 2019 Mar 1; 216(3): C449-C455.

Monaco CMF*, **Hughes MC***, **Ramos SV**, Varah NE, Lambertz C, Rahman FA, McGlory C, Tarnopolsky MA, Krause MP, Laham R, Hawke TJ*, Perry CGR*. Altered mitochondrial bioenergetics and ultrastructure in the skeletal muscle of young adults with type 1 diabetes. *Diabetologia*. 2018 June; 61(6): 1411-1423

Backx, Peter H.

Peer-reviewed publications:

Zhao Y, Rafatian N, Wang EY, Feric NT, Lai BFL, Knee-Walden EJ, Backx PH, Radisic M. (2019) Engineering microenvironment for human cardiac tissue assembly in heart-on-a-chip platform. *Matrix Biol*. 2019 Apr 11. pii: S0945-053X(18)30483-9. doi: 10.1016/j.matbio.2019.04.001. [Epub ahead of print]

Lakin R, Polidovitch N, Yang S, Guzman C, Gao X, Wauchop M, Burns J, Izaddoustdar F, Backx PH. (2019) Inhibition of soluble TNF α prevents adverse atrial remodeling and atrial arrhythmia susceptibility induced in mice by endurance exercise. *J Mol Cell Cardiol*. 2019 Apr;129:165-173. doi: 10.1016/j.yjmcc.2019.01.012.

Zhao Y, Rafatian N, Feric NT, Cox BJ, Aschar-Sobbi R, Wang EY, Aggarwal P, Zhang B, Conant G, Ronaldson-Bouchard K, Pahnke A, Protze S, Lee JH, Davenport Huyer L, Jekic D, Wickeler A, Naguib HE, Keller GM, Vunjak-Novakovic G, Broeckel U, Backx PH, Radisic M. (2019) A

Platform for Generation of Chamber-Specific Cardiac Tissues and Disease Modeling. *Cell*. 2019 Feb 7;176(4):913-927.e18. doi: 10.1016/j.cell.2018.11.042.

Lakin R, Guzman C, Izaddoustdar F, Polidovitch N, Goodman JM, Backx PH. (2019) Changes in Heart Rate and Its Regulation by the Autonomic Nervous System Do Not Differ Between Forced and Voluntary Exercise in Mice. *Front Physiol*. 2018 Jul 16;9:841. doi: 10.3389/fphys.2018.00841.

Liu J, Bayer JD, Aschar-Sobbi R, Wauchop M, Spears D, Gollob M, Vigmond EJ, Tsushima R, Backx PH, Chauhan VS. (2019) Complex interactions in a novel SCN5A compound mutation associated with long QT and Brugada syndrome: Implications for Na⁺ channel blocking pharmacotherapy for de novo conduction disease. *PLoS One*. 2018 May 23;13(5):e0197273. doi: 10.1371/journal.pone.0197273.

Birot, Olivier

Peer-reviewed publications:

Aiken J, Mandel ER, Riddell MC, Birot O. Hyperglycaemia correlates with skeletal muscle capillary regression and is associated with alterations in the murine double minute-2/forkhead box O1/thrombospondin-1 pathway in type 1 diabetic BioBreeding rats. *Diab Vasc Dis Res*. 2019 Jan;16(1):28-37. doi: 10.1177/1479164118805928. Epub 2018 Oct 26.

Ceddia, Rolando B.

Peer-reviewed publications:

Sepa-Kishi DM, Jani S, Da Eira D, Ceddia RB. Cold acclimation enhances UCP1 content, lipolysis, and triacylglycerol resynthesis, but not mitochondrial uncoupling and fat oxidation, in rat white adipocytes. *Am J Physiol Cell Physiol*. 2019 Mar 1;316(3):C365-C376.

Sepa-Kishi DM, Ceddia RB. Circulating fibroblast growth factor 21 is reduced, whereas its production is increased in a fat depot-specific manner in cold-acclimated rats. *Adipocyte*. 2018;7(4):238-247.

Rudnicki M, Abdifarkosh G, Nwadozi E, Ramos SV, Makki A, Sepa-Kishi DM, Ceddia RB, Perry CG, Roudier E, Haas TL. Endothelial-specific FoxO1 depletion prevents obesity-related disorders by increasing vascular metabolism and growth. *Elife*. 2018 Dec 4;7.

Invited Presentations:

Mechanisms of energy dissipation in beige and brown adipocytes. Symposium entitled Adipose Tissue Biology in Exercise and Disease. Canadian Society for Exercise Physiology Annual General Meeting – Niagara Falls, Canada, Oct 31st – Nov 3rd – 6th, 2018.

Gage, William H.

Peer-reviewed publications:

Street BD, Gage W. (2019) Younger Total Knee Replacement Patients Do Not Demonstrate Gait Asymmetry for Heel Strike Transient or Knee Joint Moments That Are Observed in Older Patients. *J Appl Biomech.* 35(2):140-148.

Kuk, Jennifer L.

Peer-reviewed publications:

Deldin A, **Kuk J**, Lee S: Influence of sex on the changes in regional fat and skeletal muscle mass in response to exercise training in adolescents with obesity (*Childhood Obesity* – 2019 Jan 29. doi: 10.1089/chi.2018.0329)

Raiber L, Christensen R, Randhawa AK, Jamnik VK, **Kuk JL**: Do Moderate to Vigorous Intensity Accelerometer Count Thresholds Correspond to Relative Moderate to Vigorous Intensity Physical Activity? (*APNM* – 2018 Sep 24. doi: 10.1139/apnm-2017-0643)

Alkhalidi, B, Kimball, SM, **Kuk JL** and Ardern CI. Lifetime risk of cardiometabolic mortality according to vitamin D status of middle and older-aged adults: NHANES III mortality follow-up (*Journal of Steroid Biochemistry and Molecular Biology* – 2018 Sep 13. pii: S0960-0760(18)30262-0. doi: 10.1016/j.jsbmb.2018.09.007.)

Parikh JS, Randhawa AK, Wharton S, Edgell H, **Kuk JL**: The association between antihypertensive use and blood pressure is influenced by obesity (*J of Obesity* 2018 Oct 1;2018:4573258. doi: 10.1155/2018/4573258. eCollection 2018.).

Kuk JL, Rotondi M, Sui X, Blair SN and Ardern CI. Individuals with obesity but no other metabolic risk factors are not at significantly elevated all-cause mortality risk in men and women (*Clinical Obesity* – <http://dx.doi.org/10.1111/cob.12263>)

Roudier, Emilie

Peer-reviewed publications:

Martina Rudnicki, Ghoncheh Abdifarkosh, Emmanuel Nwadozi, Sofhia V. Ramos, Armin Makki, Diane M. Sepa-Kishi, Rolando B. Ceddia, Christopher G.R. Perry, Emilie Roudier, Tara L. Haas. (2018). Endothelial-specific Foxo1 depletion prevents obesity-related disorders by increasing vascular metabolism and growth. *Elife*. 2018 Dec 4;7. pii: e39780. doi: 10.7554/eLife.39780.

Invited Presentations:

Roudier E. Impact de maladies chroniques et du mouvement sur le phénotype endothélial du lit microvasculaire. Differential impacts of chronic diseases and movement on the endothelial phenotype on the micro-vascular bed. Research talk _ Sciences and techniques of Sport and Physical activities: Section: cardiovascular health, exercise and nutrition, Avignon, France, May 14th, 2018

Roudier E. Plasticité microvasculaire et adaptabilité au mouvement. Microvascular plasticity and adaptability to movement. Research talk _ Sciences and techniques of Sport and Physical activities: Section exercise physiology, Marseille, France, May 15th, 2018

Tsushima, Robert G.

Peer-reviewed publications:

Liu J, Bayer JD, Aschar-Sobbi R, Wauchop M, Spears D, Gollob M, Vigmond EJ, Tsushima R, Backx PH, Chauhan VS. Complex interactions in a novel SCN5A compound mutation associated with long QT and Brugada syndrome: Implications for Na⁺ channel blocking pharmacotherapy for de novo conduction disease. *PLoS One*. 2018 May 23;13(5):e0197273. doi: 10.1371/journal.pone.0197273

Invited Presentations:

“Dual Regulation of the Cholesterol Synthesis Pathway in Insulin Secretion” September 13, 2018. Department of Physiology. University of Alberta

Adegoke, Olasunkanmi

Published Abstracts and Conference Proceedings:

Olasunkanmi Adegoke and Gagandeep Mann. (2018). Effects of Inflammation and Ketoisocaproic Acid on Glucose Metabolism in Muscle Cells. *Current Developments in Nutrition*. Nutrition 2018 (American Society for Nutrition), Boston, United States. June 2018

Stephen Mora and Olasunkanmi Adegoke. A Chemotherapy Drug Cocktail Negatively Regulates Myotube Morphology and Protein Metabolism. Canadian Society for Exercise Physiology, Niagara Falls, Ontario Canada. October 2018.

Abstracts/Poster Presentation

Stephen Mora* and Olasunkanmi Adegoke (2019). Myotube Morphology and Protein Metabolism are Negatively Regulated by Chemotherapy Drugs. Experimental Biology 2019, Orlando, United States, April 2019.

Gagandeep Mann* and Olasunkanmi Adegoke. (2018). Effect of ketoisocaproic acid on insulin stimulated glucose transport in muscle cells is modulated by inflammation. Muscle Health Awareness Day 9. Muscle Health Awareness Day 9, 2018, Toronto, Canada. May 2018.

Stephen Mora* and Olasunkanmi Adegoke. (2018). Effect of a chemotherapy drug cocktail on myotube morphology and protein metabolism. Muscle Health Awareness Day 9. Muscle Health Awareness Day 9 (2018), York University, Toronto, Canada. May 2018.

Scimè, Anthony

Published Abstracts and Conference Proceedings:

Till & McCulloch Stem Cell Network meeting November 11, 2018. Debasmita Bhattacharya and Anthony Scimè. “A metabolic control mechanism that regulates myogenic stem cell fates”, Ottawa, Canada

Invited Presentations:

International Conference on Biotechnology & Biological Sciences, Biospectrum 2018, Kolkata, India, July 27, 2018.

Symposia Session Chair

International Conference on Biotechnology & Biological Sciences, Biospectrum 2018, Kolkata, India

Conference Activities

- i) Judge for poster presentations (6) International Conference on Biotechnology & Biological Sciences, Biospectrum July 2018, Kolkata, India.
- ii) Judge for poster presentations (12) 2018 Till & McCulloch Stem Cell Network meeting, November 11, 2018, Ottawa, Canada

Sweeney G.

Peer-reviewed publications:

Sung HK, Song E, Jahng JWS, Pantopoulos K, **Sweeney G.** (2019) Iron induces insulin resistance in cardiomyocytes via regulation of oxidative stress. *Sci Rep.* 2019 Mar 15;9(1):4668. doi: 10.1038/s41598-019-41111-6.

Botta A, Liu Y, Wannaiampikul S, Tungtrongchitr R, Dadson K, Park TS, **Sweeney G.** (2019) An adiponectin-S1P axis protects against lipid induced insulin resistance and cardiomyocyte cell death via reduction of oxidative stress. *Nutr Metab (Lond).* 2019 Feb 21;16:14. doi: 10.1186/s12986-019-0342-y. eCollection 2019.

Awards Received:

York Research Chair in Mechanisms of Cardiometabolic Diseases

Hamadeh, Mazen J.

Funding Received:

Minor Research Grant, Faculty of Health, York University, \$3,000 (PI)

“May 2018 Molecular mechanisms in the central nervous system following high dose vitamin D supplementation in amyotrophic lateral sclerosis”

13. Appendix 2 – Additional Information about Progress in Fulfilling Mandate

A total of 20 visitors were hosted by the MHRC in 2017-18:

Name	Institution	Position	Date of Visit	Purpose of Visit
Dr. Keir Menzies	University of Ottawa	Assistant Professor	May 25, 2018	MHAD Conference Seminar
Dr. Daniel Moore	University of Toronto	Assistant Professor	May 25, 2018	MHAD Conference Seminar
Dr. Charles Thornton	University of Rochester	Professor	May 25, 2018	MHAD Conference Seminar
Dr. Tessa Gordon	The Hospital for Sick Children	Scientist	May 25, 2018	MHAD Conference Seminar
Dr. Audrey Hicks	McMaster University	Professor	May 25, 2018	MHAD Conference Seminar
Dr. Bobby Yanagawa	St. Michael's Hospital	Assistant Professor	May 25, 2018	MHAD Conference Seminar
Dr. Christopher Ellis	Western University	Professor	May 25, 2018	MHAD Conference Seminar
Dr. Niels Ortenblad	University of Southern Denmark	Professor	Sept 28, 2018	Invited Seminar
Dr. Colin Crist	McGill University	Associate Professor	November 9, 2018	Invited Seminar
Dr. Matthew Cocks	Liverpool John Moores University	Lecturer	Nov 17, 2018	Invited Seminar
Dr. Rajan Sah	Washington University School of Medicine	Associate Professor	November 23, 2018	Invited Seminar
Dr. Brennan Smith	CCT Communications	Employee	Feb 22, 2019	Career Day
Dr. Adam Bujak	Exerkine	Employee	Feb 22, 2019	Career Day
Dr. Ariella Mandel-Shorser	Humber College	Employee	Feb 22, 2019	Career Day
Mr. Michael Midmer	Zucara Therapeutics	CEO	Feb 22, 2019	Career Day
Dr. Andrew Levy	Ontario Ministry of Health and Long-term Care	Employee	Feb 22, 2019	Career Day
Dr. Christine Romano	University of Toronto Biozone	Employee	Feb 22, 2019	Career Day
Dr. Kaitlin Roke	Canadian Sugar Institute	Employee	Feb 22, 2019	Career Day
Dr. Andrew Foster	Novartis	Employee	Feb 22, 2019	Career Day
Dr. Lawrence Kazak	McGill University	Assistant Professor	April 5, 2019	MHRC Student Committee Invited Speaker

Cumulative Financial Statement

ORU: Muscle Health Research Centre							
Cost Centre: 157001							
Account Description	2016-17 Actuals	2017-18 Actuals	2018-19 Actuals	Comments	3 Year Rolling Budget		
					2019-20	2020-21	2021-22
Revenue:							
Base Allocation from Central			N/A				
VPRI support (CR, stipend, operating)			N/A				
Faculty support			\$34,094.76	Year end allocation to balance. Support in 19-20 and beyond is placeholder; not yet committed	\$ 40,000.00	\$ 40,000.00	\$ 40,000.00
Endowment Revenue			N/A				
Indirect Costs (Overhead)			\$0.00		\$ -	\$ -	\$ -
Support from Grants and Contracts			N/A				
Other Internal Revenue			\$1,500.00	Total internal support for Muscle Health Awareness Day	\$ 1,500.00	\$ 1,500.00	\$ 1,500.00
Other External Revenue			\$8,970.00	External Muscle Health Awareness Day Conference support, including registration fees and sponsorships from external sources	\$ 7,000.00	\$ 7,000.00	\$ 7,000.00
TOTAL REVENUE			\$44,564.76		\$48,500.00	\$48,500.00	\$48,500.00
Expenses:							
Total Faculty Admin. Sal & Ben			\$7,622.19	Director Stipend + Benefits	\$ 7,825.78	\$ 7,943.17	\$ 8,062.32
Total Research Staff Sal & Ben			N/A				
Total Support Staff Sal & Ben			\$26,094.51	Centre Coordinator Salary+ Benefits	\$ 23,036.46	\$ 23,382.01	\$ 23,732.74
Total Other Salaries & Ben			\$3,524.20	Honoraria, housing, food and travels costs for guests/invited speakers and associated costs for their seminar presentations at York University (excluding MHAD guests)	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00
Total Equipment			\$1,327.73	Equipment purchases, machine shop services & Core facility Upkeep	\$ 4,000.00	\$ 4,000.00	\$ 5,000.00
Total Other Expense			\$3,101.73	All related MHAD expenses-food, speaker travel, student poster awards, event program and miscellaneous supplies. Annual MHRC Graduate Student Fellowship awards (2 x \$1000) for two graduate students	\$ 9,000.00	\$ 9,000.00	\$ 9,000.00
Total Travel & Hospitality			\$2,637.40	Travel/housing costs related to MHRC member conference travel	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00
Total Supplies				Office supplies	\$ 500.00	\$ 500.00	\$ 500.00
Total Telephone & Power			\$257.00	Telephone costs	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00
TOTAL EXPENSES			\$44,564.76		\$52,562.24	\$53,025.18	\$54,495.06
Total Revenue Less Total Expenses			\$0.00				
Carryforward from Previous Year							
Balance (cwfd to next year)							
Notes:							
				The highlighted fields indicate increases from previous years due to 1) a need for office supplies, and 2) the acquisition of core equipment that requires routine maintenance. Additional costs will be covered by user fees.			
Actuals must match bottom line in ereports - that is TR-TE, Cwfd and Balance must be the same as in ereports							
A separate spreadsheet for each cost centre (no roll up).							