Charter Application

Office of the Vice-President Research & Innovation

Application for ORU Charter 2020-21

1. ORU Name:

Muscle Health Research Centre (MHRC).

2. Plain Language Abstract (75 words):

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 Canada Research Chairs, a York Research Chair and a Mclaughlin Research Chair) and graduate students from the Faculty of Health and the Faculty of Science. The current 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.

3. Category (check one):

☐ Institutional

X ☐ Faculty Based

4. Principal Applicant and Institutional Sponsors:

	Name	Title & Affiliation	Signature
Principal Applicant	David A. Hood	MHRC Director	
Department Chair/Unit Head	Angelo Belcastro	Chair, Kinesiology and Health Science (KHS)	
Sponsoring (lead) Faculty	Health	Dean Paul McDonald	
Participating Faculty 1	Science	Dean Rui Wang	

5. Co-applicant(s), if any (add rows if needed):

Name	Title & Affiliation	Signature
None		

6. Executive Committee

Current members (if applicable) (name/title/affiliation)
Dr. David Hood/Director, MHRC / Faculty Member, KHS
Dr. Michael Riddell / Faculty Member, KHS
Dr. Rolando Ceddia / Faculty Member, KHS
Dr. Michael Connor / Faculty Member, KHS
Dr. Peter Backx / Faculty Member, Biology
Dr. Christopher Perry / Faculty Member, KHS
Mr. Matthew Triolo, PhD Student Representative

7. Board

Current members (if applicable) (name/title/affiliation)	Suggested members (name/title/affiliation)
Celia Haig Brown / VPRI Office	None
Maz Fallah / Associate Dean	
Paul McDonald / Dean of Health	
Rui Wang / Dean of Science	(Proposed)

*add rows as needed

8. Advisory Committee

None currently

9. Proposed and Current Membership

The first table is the list of current regular members, their research area contributions to the MHRC, their rank and affiliation. It shows membership in both KHS and Biology. At the end of the table is a list of Adjunct (non-regular) members. A second table is a short form of the Template table, indicating expectations of Regular membership. The third table is presented with proposed Regular and Adjunct members.

Faculty Member	Rank	Research Area contribution to the MHRC	Office Location
Yellow highlight indicates new members since the last Charter application			
Hood, David	Professor, Tier I Canada Research Chair, Director of the Muscle Health Research Center	Molecular basis of Mitochondrial Turnover in health and disease	Farquharson Building, 302
Abdul-Sater, Ali	Assistant Professor, York Research Chair	Exercise and immunology / inflammation	Farquharson Building, 353
Adegoke, Olasunkanmi	Associate Professor	Protein and amino acid nutrition and metabolism	Norman Bethune College, 362
Belcastro, Angelo	Professor, Chair, School of Kinesiology and Health Science	Muscle injury and damage in health and disease	Norman Bethune College, 333B
Birot, Olivier	Associate Professor	Vascular plasticity in striated muscle (angiogenesis vs. capillary regression)	Norman Bethune College, 353
Ceddia, Rolando	Associate Professor	Glucose and fat metabolism in muscle and adipose tissue	Lumbers Building, 225A
Cheng, Arthur	Assistant Professor	Regulation of muscle contraction and fatigue	Farquharson Building, 351
Connor, Michael	Associate Professor, KHS UG Program Director	Muscle Development and Cancer	Life Sciences Building, 423B
Drake, Janessa	Associate Professor	Biomechanics of the spine	Sherman Health Science Research Centre, 2030
Edgell, Heather	Assistant Professor	Cardiovascular disease in women	Norman Bethune College, 355
Gage, William	Associate Professor, Associate Vice-President, Teaching and Learning	Biomechanics of postural control and of joint stability	Sherman Health Science Research Centre, 2022 Kaneff Tower, 906
Haas, Tara	Professor	Angiogenesis in Muscle	Life Science Building, 427A
Hamadeh, Mazen	Associate Professor Master of Stong College	Human Nutrition and Exercise Physiology, Diabetes and ALS	Norman Bethune College, 365 Stong College, 314
Hynes, Loriann	Assistant Professor & Athletic Therapy Coordinator	Sports-related injuries and rehabilitation	Stong College, 326
Josse, Andrea	Assistant Professor	Nutritional control of muscle and bone	Norman Bethune College, 344
Kuk, Jennifer	Associate Professor	Obesity, CVD, Type 2 diabetes and exercise interventions	Sherman Health Science Research Centre, 2002
Perry, Christopher	Associate Professor	Redox Metabolism, Skeletal Muscle, Diet and Exercise	Farquharson Building, 352
Roudier, Emilie	Assistant Professor	Obesity, molecular and cellular angiogenesis	Life Sciences Building, 429D
Riddell, Michael	Professor	Exercise Physiology, Stress and Diabetes Metabolism	Norman Bethune College, 347
Scimè, Anthony	Associate Professor	Stem Cell Biology; Muscle Regeneration; Adipose Differentiation	Norman Bethune College, 327C

Department of Biology			
Backx, Peter	Professor, Tier I Canada Research Chair	Cardiac Muscle Physiology and Disease	Farquharson Building, 354
McDermott, John	Professor, McLaughlin Research Chair	Muscle Development	Life Sciences Building, 427B
Sweeney, Gary	Professor	Obesity and insulin resistance	Farquharson Building, 110
Tsushima, Robert	Associate Professor, Chair of the Biology Department	Cardiac Muscle Physiology and Disease	Farquharson Building, 344
Adjunct Members			
Biggard, Xavier	Medical Director	Union Cycliste Internationale (UCI)	Paris, France
Coe, Imogen	Professor, Dean, Faculty of Science	Cardiac Muscle Biochemistry	Ryerson University
Grace, Sherry	Professor, School of KHS	Cardiac Rehabilitation	York University
Hawke, Thomas	Associate Professor	Muscle Development and Regeneration	McMaster University
Jacobs, Ira	Dean, Faculty of Physical Education	Muscle Metabolism, Applied Physiology and Pharmacology	University of Toronto
Laham, Robert	Physician	Clinical Muscle physiology	York Lanes Appletree Medical Centre
Wharton, Sean	Physician	Clinic on Obesity and exercise	Wharton Medical Clinic
MHRC Coordinator			
Louise Solomon			Farqhuarson Bldg, 332

Table describing Regular member expectations:

Name, title, affiliation of full-time faculty member	**Will direct research grants to this ORU**	**Will join a committee or sub-committee of the ORU**	**Will join in ORU-supported research projects or clusters**	**Will help design or deliver programs offered by ORU**	**Will encourage grad or undergrad students to be involved**	**Will obtain research admin support at ORU for grant applicants, events or other**	**Will have external research funding administered by ORU**	**Would like office or other space at the ORU if available**	**Will be actively involved in other ways (please specify)**
All regular members	Yes, or via the Faculty of Health	Yes, see table below of proposed internal Committee structure	Some, variable every year	Some	All promote active grad student participation	Available to all	Rarely, usually via Faculty of Health support	Lab space available upon reasonable request in MHRC Core Facility	See table below of proposed internal Committee structure

Proposed Membership additions

We propose the following new members, with the idea of increasing our support for clinically-based studies, spreading the influence of the MHRC across southern Ontario, and promoting interaction among Universities. This is in line with York University Senate Guidelines, which suggest that ORUs should "develop extensive relationships within the region", and "actively engage in knowledge transfer and knowledge mobilization activities".

Name	Affiliation	Role	Comments
Assistant Professor in Cardiovascular Physiology	KHS	Full Member	New hire being planned for hiring in 2021-22
Faculty members from Universities across southern Ontario not yet represented as Adjunct members of the MHRC	Queen's, Western, Waterloo, Wilfrid Laurier, Laurentian, Brock, Ottawa, Guelph, Windsor	Adjunct Members	Contacts within each University to maintain communication among "Muscle Health" researchers
York Biomedical Engineers	Engineering	Full or Adjunct	Increase interdisciplinarity

10. Describe the ORU's progress toward fulfilling its mandate or meeting charter expectations during its current term (for existing ORUs only; 5 pages max).

Since its foundation in 2009, the MHRC has grown considerably and continues to fulfill its mandate to be "to be Canada's leading research centre for the study of muscle health and disease". It easily comprises the most comprehensive research and education consortium devoted to skeletal, cardiac and smooth muscle health in Canada. Indeed, it compares very favourably with those research institutions of a similar theme around the world (see list at the end of this Charter application).

MHRC members are very active in individual grant submissions, and where applicable, collaborative equipment and infrastructure opportunities. Its membership grows steadily every year, with an attempt to broaden the multi-disciplinary nature of the Centre from the theoretical, fundamental science of muscle biology from which it originated, to include more applied translational research programs and perspectives. In addition, the MHRC continues to hold its very popular 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 specific accomplishments are listed yearly in the Annual Report, and the two most recent Reports are appended to this application. Below are listed the types of activities that we organize on a yearly basis, or when the opportunity presents itself.

a) Funding proposals: Over the last 5 years we have submitted two large group CFI applications for infrastructure support, as well as two CREATE grants for student and trainee support. Unfortunately, these were not successful, but good lessons were learned that would be applied to future applications, should the opportunity arise. We have had greater success with collaborative NSERC RTI applications to build our MHRC Core facility, and we have benefitted as a group from the Farquharson refresh funding that has supplied us with additional high level instrumentation that is critical for our research growth. New hires over the last 5 years have cemented further research collaborations, and the use of our Core facility has increased to include at least 6-7 laboratories currently, with more welcome. This has really become a value-added component of MHRC membership, along with our Vivarium animal behavior unit. In addition, the MHRC is part of a larger network involving other institutions within 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 present their research, or it highlights the work of new faculty members.
   2) Seminars, in which external speakers from other Universities are invited to present their work and to interact with faculty members and graduate students.
   3) The Annual Muscle Health Awareness Day (MHAD), which typically attract 130 attendees yearly (165 via Zoom in 2020), featuring 8 external speakers and student poster presentations (usually around 50-60 posters per year).

      Between the Seminar, Colloquia and MHAD events, we have hosted 85 external speakers and 8 internal speakers since 2015. Indeed, these MHRC events represent the only "health / life-science" seminar series and conferences at York University, apart from those specifically related to vision science. This makes these events extremely valuable to the York Community.

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 are regularly involved in media interviews every year to promote muscle health and metabolism and to educate the public on the value of exercise 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 >120 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).

f) Other leadership activities: The MHRC sponsors two $1000 MHRC Student Fellowships directed against the Graduate Student's fees every year. Competition for these fellowships is high. The awards are intended for MSc students in second year who do not have Tri-Council external funding sources;

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), Stealth Biotechnologies and F2C Nutrition (Perry), both drug development companies.

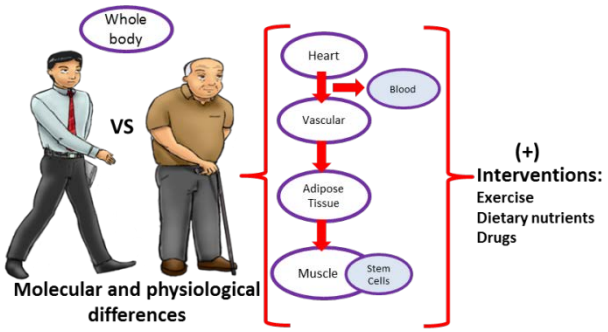
h) Student-based activities: The MHRC continues to significantly involve our graduate student and post-doctoral trainees in our activities. The MHRC Student Committee provides input into our programming and direction, particularly with regard to student interests in the MHRC Seminars and the Muscle Health Awareness Day program. Every year we have a student-invited Seminar speaker. Every two years we host a "Career Day" which brings in outside speakers to provide advice on careers outside of academia. This is a popular and well-attended event, and we look forward to hosting the next Career Day in February, 2021.

11. Charter Proposal

(a) Describe the most promising research opportunities for the ORU over the term of the proposed charter (5 pages max):

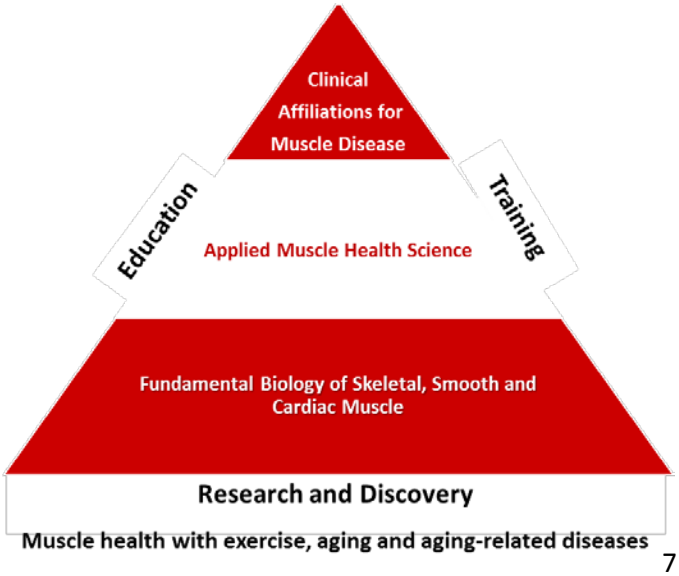
The general nature of the research programs to be pursued: The current vision statement of the MHRC is to be the *"leading research centre in Canada for the study of muscle health and disease"*. This has been revised below. Research is focused on skeletal muscle, used for locomotion, movements and exercise, cardiac muscle, which circulates the blood, and smooth muscle, which determines the diameter of the blood vessels in which the blood is circulated.

The MHRC and the Research Program Challenge ahead: *Skeletal muscle*, 40 per cent of a human's body mass, is a unique and large tissue that significantly contributes to an individual's metabolism, locomotion, and overall quality of life. Skeletal muscle health is vital for powering the movements of daily activities so that we can enjoy life and be gainfully employed, *Cardiac muscle* (the heart) circulates blood and nutrients to supply all tissues in the body, while *smooth muscle* controls blood flow distribution to muscle and all other vital organ systems. **These physiological functions are well known to decline with age, and when combined with a predominantly inactive population, lead to a high susceptibility to age-related metabolic conditions such as obesity and type 2 diabetes, and even cancer.** These conditions have *profound economic and quality of life implications* that affect millions of Canadians, but the underlying molecular causes of this synergy between aging and inactivity leading to disease processes remain largely unknown.



At the MHRC we have the research talent and exceptional capabilities that allow us to investigate these major age-related decrements in physiological functions, and we can investigate treatment solutions related to exercise, therapy, and nutrient interventions that intervene at various levels of organization (see diagram above). MHRC faculty members and their trainees use *multidisciplinary cellular, molecular and whole body approaches* to study muscle biology in the broadest terms, including muscle and heart development, disease, metabolism, blood supply, injury and regeneration, and adaptation to acute and chronic exercise. These studies allow for an understanding of the **integration of physiological systems** that determine metabolism, locomotion, heart health and quality of life.

To embrace the challenge of forging a greater understanding of muscle health in aging and aging-related diseases, the MHRC Executive as well as senior MHRC faculty members have met to discuss a revitalized path forward in which a broadened mandate would be proposed. The goals of this mandate are to increase faculty and trainee engagement in an expanded array of research and education initiatives to expand MHRC prominence in this field both nationally and internationally.



Our revised vision is to be: *"Canada's leader in exercise and muscle health research, training and education"*, and this vision is encapsulated in a newly revised visual (left). We believe that this newly refined vision serves **to integrate** the three main priorities of the MHRC: research, education and training of highly qualified personnel (HQP).

In addition, this vision spans the spectrum from the fundamental biology of muscle health, to its applied and clinical implications for the health of Canadians. This takes full advantage of the breadth of talent within our membership, with the hope of broad engagement in research, education and training of HQP.

Alignment of the MHRC with York University and Faculty of Health Academic and Research Priorities: The mission of York University is the pursuit, preservation, and dissemination of knowledge, with a promise to pursue excellence in research and teaching in pure, applied and professional fields. The **UAP 2015-2020 o**utlines seven priorities and initiatives that guide strategic actions and initiatives. Among these, the top three priorities are: **1)** Innovative, Quality Programs for Academic Excellence, **2)** Advancing Exploration, Innovation and Achievement in Scholarship and Research, and **3)** Enhanced Quality in Teaching and Student Learning. Similar, but more focused priorities exist within the Faculty of Health (IRP 2019-20, Priority 2), to advance exploration, innovation and achievement in scholarship and research, in part by building on existing strengths to enhance current, and create new research partnerships from local to global levels, increasing the breadth of engagement in research, and climbing the national and international rankings for research intensity by enhancing undergraduate, graduate student and post-doctoral fellow education and training.

The MHRC is a research unit that is committed to achieving these priorities at York University. *First.* the MHRC has an extremely strong culture of research intensity. It consists of a group of well-funded scientists that publishes its work and that strongly promotes and supports graduate student education. *Second,* the MHRC is the only ORU within the University that is devoted to biomedical sciences at the cellular and molecular level. Its existence puts York University "on the map" in this area, promotes its visibility, and is a model of research excellence for the entire institution. *Third,* the MHRC and its programs offer invaluable educational experiences for its large number of trainees and faculty members. In short, it provides a well-attended physiology-based Seminar / Colloquium series, multiple opportunities for trainee-guest scientist interactions, a Career Day for trainee employment opportunities, and a Muscle Health Awareness Day, an immensely popular event which is the highlight of our yearly calendar. This educational program encourages and fosters interaction among all of our members, promoting discussion and collaboration. By doing so, it also facilitates group discussion for the formulation of group research grants, such as those provided by the NSERC RTI program, as well as the NSERC CREATE and CFI opportunities. The MHRC is the only formal mechanism available to help focus and align the common interests of our faculty members and their students, thereby facilitating collaboration amongst ourselves. In addition, faculty members commonly use our connections within the MHRC to share grant funding applications for internal review. This serves as an informal mentorship program which is vital for the success funding of junior faculty members.

In view of the breadth of our research programs, spanning skeletal muscle, the heart and smooth muscle regulation of blood flow, work within the MHRC exemplifies <u>interdisciplinarity</u>, a hallmark and priority of the York Strategic Research Plan. In particular, research within the MHRC fully conforms with one of the top research priorities for York University in the area of "Healthy Individuals, Healthy Communities and Global Health". Within the Faculty of Health, for example, aging research has been identified as a priority area with new academic programs, research collaborations and faculty hires. As described below, muscle health research in the field of *aging and aging-associated diseases* is a key component of the MHRC platform, thereby positioning York University as a centre of excellence in the field of muscle health research in Canada.

<u>Proposal to grow the MHRC Mandate: Expansion of existing initiatives and plan for new ones</u>

Presented below is a revised mandate of activities for the next 5 years (2021-2026) designed to accept the challenge of furthering research and education in investigating muscle health, and its decline, in aging and aging-related diseases. It includes current programming and activities, as well as new initiatives. The **purpose is to drive innovation in muscle health research and development, as well as trainee education, and to elevate the MHRC toward greater international visibility**. The

mandate was re-designed to foster greater involvement of those dedicated to the vision (above) of the MHRC as the leading research centre in Canada for the study of exercise, muscle health and disease. Initiatives are proposed below that further incentivize involvement for faculty members and their trainees, and thus there are resource implications for the Faculty of Health. In addition, new leadership roles are suggested within the membership to guide these initiatives forward.

We believe that the MHRC brings considerable added-value to the academic reputation of the Faculty of Health, and to York University, through its educational programs, outstanding research and mentors, and knowledge translation. This revised mandate will take this reputation to a new, heightened level.

The table of activities below includes a brief description of the following categories, as well as the resources implications, and a brief statement of the "value-added" nature of the activity. Expanded rationale for each can also be provided.

1) Local and international conferences sponsorship;
2) Faculty support initiatives;
3) Student-based initiatives – designed to help students and support faculty supervisors;
4) Initiatives for external visibility and possible revenue generation;
5) Structural and Membership initiatives;
6) Summary of faculty and student incentives for regular members;
7) Requirements for faculty and student membership
8) Current MHRC Members and Organization (along with proposed new Committee structures)
9) Research groups within the MHRC

	Initiative	**Existing Or New**	**Action** (these can be phased in progressively over 2021-26, or initiated immediately)	**Cost ?**	**Added value of this Initiative**
Local and International Conferences					
1	International Biochemistry of Exercise Conference (IBEC 2022)	New	Successfully host this important international meeting, now re-scheduled from 2021 to 2022 so that it can be held in person	Yes	Serves as an expansion point for the MHRC in spreading our reputation to an international level, and acts as a microcosm for the MHRC in meeting the grand challenge of muscle health in an aging society
2	Muscle Health Awareness Day (MHAD)	Existing	Continue hosting this yearly, popular and well-attended local meeting of muscle scientists	No	This is a modest revenue-generating event that brings together scientists and trainees (~ 130) mainly from Ontario, Quebec, NY and Michigan to promote muscle health and further expand our reputation within the country on a yearly basis

Faculty Support Initiatives					
3	Faculty Visiting Scientist Fund	New	Develop a yearly fund of $3000 to invite guest scientists for collaboration for 1 week	Yes	Develop international visibility and collaborations
4	Faculty seed research grant for new initiative	New	Develop a $5000 per year grant for new research initiatives with priority to 1) those without Tri-council funding, or 2) with a clinical or industry collaboration; could cooperate with MITACS to increase funding of clinical research	Yes	Monetary incentive for faculty membership and participation; Initiates new research collaborations with industry or clinics; fits with the revised priorities of the MHRC (see visual)

Student-based Initiatives - designed to help students and support faculty supervisors					
5	MHRC foreign student scholarship	New	$20,000 for 3 years, offered every 2 years	Yes	Brings in qualified PhD students from other countries, in the absence of any Graduate Program VISA student funds; increases internationalization
6	TA buyout (alternative to above, or in addition)	New	$15,000 per year to devote to research full-time	Yes	Allows qualified, exceptional graduate student to devote entire year to research, no teaching
7	MHRC student committee	Existing	Expand to more members from all or most MHRC labs	No	Increases student involvement
8	MHRC Student Fellowship	Existing	Expand to 2 x 1000 and 2 x 2000 for MSc and PhD students, respectively	Yes	Increases the value of being a student MHRC member. They must be registered as MHRC members to qualify
9	Career Day	Existing	Continue with this event every 2 years	Yes	Low cost educational initiative for trainees to understand alternative career paths; last 2 events have been highly valued by attendees

Initiatives for external visibility and revenue generation					
10	Student Education	New	Certificates or micro-certificates in exercise and muscle health for UG and Graduate students; cooperate with CSEP on this	Time	Aligns with FoH IRP; Possible revenue generation and increased visibility among graduates and UGs
11	Social media outreach expansion	Existing and growing	Regularize Facebook, Twitter postings; expand the Youtube channel for Seminars and videos; be aware of new faculty publications and awards for posting	No	International visibility and recognition of FoH, York, and MHRC
12	Seminar Series (aligns with IRP 2.1.7)	Existing	Continue to emphasize quality speakers rather than increasing the number of speakers: 3-4 per semester maximum	Yes	Increase visibility and collaborations; bring in other “Muscle Centre” directors for discussion
13	Fee for analytical services	New	Provide analyses sought after by other Universities using 1) Seahorse, 2) HPLC, 3)High throughput content analyzer, 4) Confocal microscopy	Yes	Quarter-time salary for post-doctoral fellow to supervise, monitor and carry out experiments for inside York (non-MHRC faculty) and outside faculty

14	Public Lecture Series	New	Develop Public Lecture Series for lay audiences in Toronto or in Markham Community Centres – enroll willing faculty members; investigate FoSc and York Circle procedures	Time Cost?	Public dissemination of MHRC work for visibility and fund-raising
15	Ontario Science Center demonstration / display	New	Investigated previously, this opportunity could be revisited	Time	Visibility in Southern Ontario and public education
16	High School recruitment events	New	"Muscle Health and Exercise Day", or Hackathon for HS students	time	Recruitment tool for HS students to the FoH
MHRC Structural and Membership Initiatives					
17	Vision Statement	Existing	Broaden to better represent leadership in research, training and education	No	More visibility for York and the FoH in valuable priorities related to the York Academic Plan
18	York MHRC membership renewal and re-classification	New	Provide a list of membership requirements and ask for participation or withdrawal	No	Adjusts the "active" membership to willing and active faculty members; others can remain as associate members if desired; numbers will represent "real" active participation
19	MHRC Grant mentorship program (aligns with IRP 2.1.9)	Formalize	Identify CIHR and NSERC Grant mentors to read and offer feedback prior to grant submission	Time	Improves the likelihood of grant funding, which helps the PI and FoH
20	Adjunct scientist members	Existing	Increase local and international members	No	Invite them to give a Seminar in exchange for Adjunct membership; They gain knowledge of MHRC initiatives to increase international visibility
21	Clinical affiliations	Limited	Expand to Sick Kids, SMH, York region, New MacKenzie Health	No	Opens up clinical research and internship possibilities
22	Complement plan input	New	Provide a more official voice to FoH and KHS hiring to fit MHRC growth	No	Expand the MHRC and FoH in critically needed areas: (eg. molecular biology, bioinformatics, proteomics)
23	Develop the "Ontario Muscle Health Network", regionally at first, then with more Canadian membership (aligns with IRP action 2.1.7)	Limited	Enlist interested faculty members at different universities with like-minded interests and shared methodologies;	No	■ Share equipment / infrastructure ■ Participate in student exchange or research visits. ■ Provides a pool of participants for Grad Student Exam Committees ■ Receive invitation to all MHRC events. ■ Should Consist of a mix of clinical and basic scientists to broaden possible research aims ■ Provides list of equipment resources for HQP training. <u>Long term goals:</u> groups grants (CREATE), Centre of Excellence in Muscle Health.

Summary of MHRC Faculty and Student *Incentives* for regular members

	Incentives	Details
1	Infrastructure availability	For nominal user fees, have access to the Vivarium 043, the core facility (Seahorse, ultracentrifuge, HPLC, research space) and the training/exercise facility (2 ergometers, treadmill, DEXA and biopsy space), as well as room booking (Farq. 330) for lab meetings
2	Eligibility to nominate visitors or speakers	For MHRC Seminars or visiting scientists
3	Trainees are eligible for MHRC fellowships	MSc (existing) and PhD (proposed)
4	Eligibility for new funding initiatives	Visiting scientist fund, research fund (both proposed)
5	Mentorship program	Increased likelihood of a successful grant application
6	Opportunity to be part of an ORU with increasing national and international visibility	

Proposed new MHRC Sub-Committee structure

Director: Dr. David A. Hood

Executive Committee: Dr. Peter Backx, Dr. Rolando Ceddia, Dr. Michael Connor, Dr. David A. Hood, Dr. Michael Riddell, Mr. Matthew Triolo

MHRC Coordinator: Louise Solomon

Industry Partner Liaisons: Dr. Michael Riddell, Dr. Chris Perry

CSEP Liaison (esp. linking to educational initiatives): Dr. Chris Perry

Graduate and UG education initiatives Committee: Dr. Mike Connor (Chair), Dr. Ola Adegoke, TBD

Clinical Partner Liaison: Dr. Heather Edgell, TBD

Social Media Consultants: Dr. Rolando Ceddia, MHRC Coordinator Louise Solomon

Graduate Student Committee (8): Matt Triolo (Chair), Catherine Bellissimo, Sarah McGaugh, Shailee Jani, Simona Yakobov, Mayoorey Murugathasan, Daniel Daeira

Adjunct Faculty Members (and affiliations) (6): Dr. Ira Jacobs (Toronto), Dr. Imogen Coe (Ryerson), Dr. Thomas Hawke (McMaster), Dr. Xavier Bigard (France), Dr. Robert Laham (Clinical Advisor, York), Dr. Shawn Wharton (Obesity Clinic), Dr. Sherry Grace (York).

Research Groups in the MHRC could be clustered for grant applications, or lab meeting discussions

Metabolism Research Group		Cardiovascular Research Group		Applied Physiology Research Group		Molecular Basis of Disease Research Group	
Adegoke	Protein metabolism	Backx	Cardiac electrophysiology and exercise	Belcastro	Physical activity, muscle in children	Abdul-Sater	Immunology of exercise
Ceddia	Obesity and exercise	Birot	Angiogenesis in muscle	Drake	Spine biomechanics	Connor	Cancer and metabolism
Cheng	Muscle fatigue and calcium	Edgell	Cardiovascular physiology: sex differences	Gage	Mobility and arthritis with age	Josse	Exercise immune responses and nutrition
Hamadeh	Metabolism	Haas	Angiogenesis in muscle	Hynes	Neck injury, athletic therapy	McDermott	Molecular basis of muscle development
Hood	Mitochondria exercise and muscle	Roudier	Angiogenesis in muscle				
Kuk	Obesity and exercise	Sweeney	Autophagy and metabolism in the heart				
Perry	Bioenergetics in muscle	Tsushima	Cardiac metabolism				
Riddell	Diabetes and exercise						
Scime	Muscle and adipose tissue stem cells						

Overall Summary

Despite the national and international recognition that many of our MHRC faculty members have as individual scientists, we strongly believe that as an MHRC collective group, a greater international impact can be achieved, gaining further recognition for the individual, the Faculty of Health, and the University as a whole. This will be attained by a reformulation of our vision and mandate, and an investment in new initiatives designed to increase faculty member participation in all MHRC, Faculty of Health and University priorities. In this way, the MHRC can truly become a national and international leader in muscle health research, education and training.

(b) Define any other benefits of the ORU and its activities that have not been fully captured by the information in 10(a). (Optional – up to 1 page)

None.

(c) Define the expectations, projected deliverables, and evaluation metrics for the proposed charter period. (2 pages max)

We will continue to submit individual and group grants for funding, and to support trainees in increasing numbers. Research funding dollars and publications continue to be gold standard metrics, as well as the training of HQP, and where they end up. Please see above for details of our expanded expectations and plans.

12. Directorship

Dr. David Hood, Professor, Canada Research Chair

Possible successors: Members of the Executive Committee.

Appendices:

A. Lead Sponsoring and Participating Faculty Letters of Support

Please see the letter of support from the Faculty of Health (separate file).

B. Budget

Please see the attached 5 year budget proposal for the MHRC.

C. Other attachments

- List and brief description of Muscle Centres from around the world (below)
- The plan which formed the basis for the ORU's last charter application (2014 Charter application)
- Reports from the most recent Senate review or interim review (Reviewer report from the last Charter review, 2014)
- Annual reports for the ORU for its past two years (2018-19, 2019-20)

"Muscle" Research Centres around the world

The MHRC compares very favourably to other Research Centres around the world. There is considerable variability in terms of focus and membership.

Name	Location	University	# of members	Statement of Focus
Southern Denmark University muscle research cluster (SMRC)	Denmark	University of Southern Denmark	25 members + 25 PhD students	Through multidisciplinary collaborative research and implementation programs, the Center seeks to positively promote the benefits of lifelong healthy joints, muscles, and bones, thereby minimizing the substantial negative impacts of muscle and joint disease in Denmark.
Muscle Biology	London, UK	King's College London	13 Members	Represents one of the biggest concentrations of research groups studying muscle in Europe. This involves groups dispersed across King's College and Guy's, King's and St. Thomas' partner hospitals, with diverse interests in understanding muscle biology and disease. These include basic and applied research to understand muscle function, specification of muscle in the embryo and repair of muscle after injury or disease. Approaches used range from structural biology to regenerative medicine, from developmental cell biology to understanding and treating muscle diseases.
Queen Square Centre for Neuromuscular Diseases	London, UK	University College London	20 Members	Our research programs include basic discovery science to understand the biology of muscle and nerve function and translational research aimed at developing therapies to improve the lives of patients
Centre of Research Excellence in Neuromuscular Disorders	Parkville VIC, Australia	Murdoch Children's Research Institute	18 Members + 26 students	The Centre of Research Excellence in Neuromuscular Disorders is a collaboration of neuromuscular experts. It uses the latest approaches in medicine, science, nursing and allied health to improve diagnosis, facilitate prevention and transform treatment from compassionate management to effective therapy.
The Bone and Muscle Research Group (BMRG), at Monash University Department of Medicine	Victoria, Australia	Monash University	6 researchers, 3 staff, 8 students, 8 collaborators	Falls and fracture prevention; An advanced understanding of interactions between cardiovascular, metabolic and endocrine systems; Healthy ageing in our local and global communities; Better bone health for vulnerable patient populations; Better treatment for osteoporosis patients; Better detection of osteoporotic fractures; Better understanding of genetic causes of atypical femur fracture and early detection and intervention/prevention; Efficient and tailored exercise regimens for building and maintaining healthy bone; We offer a comprehensive platform for assessing bone and muscle health, physical performance and cardiovascular risk factors.
The Center for Muscle Biology	Lexington, KY	University of Kentucky	29 Members	Aging - Sepsis - Heart failure - Metabolic diseases - Arthritis - Cancer - Injury - Exercise
Musculoskeletal Research Centre	St. Louis, MO	Washington University in St. Louis	81 Members	To investigate the causes, prevention, diagnosis, and treatments for MSK conditions; to enhance movement, mobility, and participation in daily life; and to improve support systems and rehabilitation for a wide range of MSK conditions.
Pennsylvania Muscle Institute	Philadelphia, PA	University of Pennsylvania	72 Members	Our goal is to discover the mechanisms of muscle function, muscle disease and motile biological systems through innovative and cross-disciplinary research, and to apply these discoveries to new therapies.

Washington Center for Muscle Biology (WCMB)	Pullman, WA	Washington State University	40 Members	Muscle Dystrophy and Heart failure focus
Paul and Sheila Wellstone Muscular Dystrophy Center	Minneapolis MN	University of Minnesota	44 Members	Clinical research trials in the various muscular dystrophies, muscle function and heart muscle
Myology Institute	Gainesville, FL	University of Florida	27 Members	The focus of the Myology Institute will include basic research on skeletal, cardiac, and smooth muscle, translational work involving cellular and animal models of neuromuscular and cardiovascular diseases. The Institute will facilitate clinical studies and trials focused on neuromuscular diseases
Centre for Exercise Medicine	Birmingham AL	University of Alabama at Birmingham	123 Members	•Antihypertensives Combined with Exercise for Seniors with Hypertension •Precision High-Intensity Training Through Epigenetics •Resveratrol and Exercise to Treat Functional Limitations in Late Life •Molecular Transducers of Physical Activity in Humans •Overcoming TWEAK Signaling to Restore Muscle and Mobility after Joint Replacement •Metformin to Augment Strength Training Effective Response in Seniors
East Carolina Diabetes & Obesity Institute	East Carolina Greenville, NC	East Carolina University	10 Members	The ECDOI is well known for cutting-edge collaborative research in several fields related to disorders of metabolism, including bariatric surgery, muscle insulin signaling/glucose transport, bioenergetics/exercise physiology and pediatric healthy weight programs.
Department of Orthopedic Surgery	San Diego School of Medicine	University of California, San Diego School of Medicine	9 Members	Dedicated to inspiring students, residents, fellows and faculty to work towards discovery of the knowledge, attitudes, skills, and resources needed to deliver quality patient care that is responsive to the general needs of the local community as well as meeting the specialized needs of the world. Further, the Department is determined to provide comprehensive orthopedic medical and surgical care to a broad range of patients in both inpatient and outpatient settings.

Cumulative Financial Statement

ORU: Muscle Health Research Centre (MHRC)							
Cost Centre: 157001							
	5 Year Rolling Budget						
Account Description	**2020-21**	**Comments**	**2021-22**	**2022-23**	**2023-24**	**2024-25**	
Revenue:							
Base Allocation from Central							
VPRI support							
Faculty support	$ 63,914.00		65,105.73	66,327.25	67,548.77	68,770.29	
Endowment Revenue							
Indirect Costs (Overhead)							
Support from Grants and Contracts							
Other Internal Revenue	$ 1,000.00	ICR Donations and grants to support Muscle Health Awareness Day (MHAD)events	$ 1,000.00	$ 1,000.00	1,000.00	1,000.00	
Other External Revenue	$ 7,500.00	Conference registration fees	$ 7,500.00	$ 7,500.00	7,500.00	7,500.00	
TOTAL REVENUE	**$72,414.00**		**73,605.73**	**74,827.25**	**76,048.77**	**77,270.29**	
Expenses:							
Total Faculty Admin. Sal & Ben	$ 7,930.00	Director Stipend + Benefits	$ 8,128.25	$ 8,331.46	$8,539.74	$8,753.23	
Total Research Staff Sal & Ben							*Year over year increase by 2.5%*
Total Support Staff Sal & Ben	$ 39,739.00	MHRC Coordinator Salary + Benefits	$40,732.48	$41,750.79	42,794.56	43,864.42	
Total Other Salaries & Ben	$ 2,400.00	Honoraria, housing, food and travels costs for guests/invited speakers and associated costs for their seminar presentations at York University (excluding MHAD guests)	$ 2,400.00	$ 2,400.00	$ 2,400.00	$ 2,400.00	
Total Equipment	$ 3,000.00	Maintainance and Repairs, lab equipments	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00	
Total Other Expense	$ 2,620.00	Annual MHRC Graduate Student Fellowship awards (2 x $1000) for two graduate students, and Misc Expenses.	$ 2,620.00	$ 2,620.00	$ 2,620.00	$ 2,620.00	
Total Travel & Hospitality	$ 2,000.00	Travel, housing accomodations and food for MHRC speakers	$5,000	$12,000	$12,000	$12,000	
Total Supplies	$ 3,200.00	Office Supplies	$ 3,200.00	$ 3,200.00	$ 3,200.00	$ 3,200.00	
Total Telephone & Power	$ 300.00		$ 300.00	$ 300.00	$ 300.00	$ 300.00	
TOTAL EXPENSES	**$61,189.00**		**65,380.73**	**73,602.25**	**74,854.30**	**76,137.65**	
Total Revenue Less Total Expenses	$11,225.00		$0.00	$0.00	$0.00	$0.00	
Carryforward from Previous Year	$0.00		$0.00	$0.00	$1,225.00	$0.00	
Balance (cwfd to next year)	$11,225.00		$0.00	$1,225.00	$0.00	$0.00	

Charter Application Template
For Organized Research Units

Office of the Vice-President Research & Innovation

Please see the accompanying Guide for instructions on completing this template.

Application for ORU Charter 2013-14

1. ORU Name: **Muscle Health Research Centre (MHRC)**

2. Plain Language Abstract (75 words):

The MHRC consists of well-funded and highly productive scholars and graduate students from the Faculties of Health and Science. Our members perform leading edge research on muscle growth, development, metabolism, disease and adaptation to exercise. The vision statement of the MHRC is *"to be Canada's leading research centre for the study of muscle health and disease"*. We will achieve this through 1) innovative research, 2) the education of qualified trainees, and 3) the translation of our findings for the benefit of all Canadians.

3. Category (check one):

   ☐ Institutional

   ☐ X Faculty Based

4. Principal Applicant and Institutional Sponsors:

	Name	Title & Affiliation	Signature
Principal Applicant	David Hood	Professor, Canada Research Chair	
Department Chair/Unit Head	Angelo Belcastro	Chair, Kinesiology and Health Science	
Sponsoring (lead) Faculty	Health	Dean Harvey Skinner	
Participating Faculty 1	Science	Dean Don Hastie	
Participating Faculty 2			

5. Co-applicant(s), if any (add rows if needed):

Name	Title & Affiliation	Signature
None		

*add rows as needed

6. Executive Committee

Current members (name/title/affiliation)	Proposed members (name/title/affiliation)
Rolando Ceddia, Assoc. Prof., KHS	None
Olivier Birot, Assoc. Prof., KHS	
Robert Tsushima, Assoc. Prof., Assoc. Dean Science, Biology	
Michael Connor, Assoc. Prof. KHS	
Sobia Iqbal, PhD student, KHS	

*add rows as needed

7. Board

Current members (if applicable) (name/title/affiliation)	Suggested members (name/title/affiliation)
No Board currently.	Dr. Harvey Skinner, Dean, Faculty of Health (Chair) Dr. Robert Hache, VPRI (Vice-Chair) Dr. Don Hastie, Dean, Faculty of Science Shirley Freek, Office of Advancement, York University

8. Advisory Committee

Current members (if applicable) (name/title/affiliation	Proposed members (name/title/affiliation
No Advisory Committee currently	We will seek members from the Muscular Dystrophy Association, the Canadian Society for Exercise Physiology, CanFit Pro (Fitness Certification Organization), Quaker Oats (nutrition-performance based company), Goodlife Fitness, and the Canadian Centre for Physical Activity and Aging (Western University), the Faculty of Health Learning and Leadership Network (Tania Xerri) to help us with Continuing Education initiatives and the Faculty of Health Senior Development Officer (Janet Vukovic)

9. Proposed Membership:

We propose the following new members, with the idea of increasing our support for clinically-based studies, spreading the influence of the MHRC across southern Ontario, and promoting interaction among Universities. This is in line with York University Senate Guidelines, which suggest that ORUs should "develop extensive relationships within the region", and "actively engage in knowledge transfer and knowledge mobilization activities".

Name	**Affiliation**	**Role**	**Comments**
Assistant Professor in Cardiovascular Physiology	KAHS	Full Member	New hire being advertised in 2013-14
CRC Tier I or II Chair in Cardiovascular Biology	Biology	Full Member	New hire being advertised in 2013-14
Dr. Robert Laham	Physician, York Lanes Appletree Medical Centre	Adjunct Member	Medical advisor, consultant on clinical research studies
Dr. Sean Wharton	Physician	Adjunct Member	Medical advisor, consultant on clinical research studies
Faculty members from Universities across southern Ontario not yet represented as Adjunct members of the MHRC	Queen's, Western, Waterloo, Wilfrid Laurier, Laurentian, Brock, Ottawa, Guelph, Windsor	Adjunct Members	Contacts within each University to maintain communication among "Muscle Health" researchers

Our current membership consists of 15 Active members at York University, and 4 Adjunct members from other Universities. All York members are active in the events sponsored by the MHRC in the sense that they contribute to fulfilling the mandate of the MHRC by attending, promoting and participating in all MHRC programming. The list of current members is provided in the Table below:

Faculty Member	**Rank**	**Research Area**
School of Kinesiology and Health Science		
Hood, David, A.	Professor, Canada Research Chair, Director of the Muscle Health Research Center	Molecular basis of Mitochondrial Biogenesis in health and disease
Adegoke, Olasunkanmi	Associate Professor	Protein and amino acid nutrition and metabolism
Belcastro, Angelo	Professor, Chair, School of Kinesiology and Health Science	Muscle injury and damage in health and disease
Birot, Olivier	Associate Professor	Vascular plasticity in striated muscle (angiogenesis vs. capillary regression)
Ceddia, Rolando	Associate Professor	Glucose and fat metabolism in muscle and adipose tissue
Connor, Michael	Associate Professor	Muscle Development and Cancer

Gage, William	Associate Professor	Biomechanics of postural control and of joint stability
Haas, Tara	Associate Professor	Angiogenesis in Muscle
Hamadeh, Mazen	Associate Professor	Human Nutrition and Exercise Physiology, Diabetes and ALS
Kuk, Jennifer L.	Assistant Professor	Obesity, CVD, Type 2 diabetes and exercise interventions
Perry, Christopher G.	Assistant Professor	Redox Metabolism, Skeletal Muscle, Diet and Exercise
Riddell, Michael	Associate Professor, KAHS Graduate Program Director	Exercise Physiology, Stress and Diabetes Metabolism
Scime, Anthony	Assistant Professor	Stem Cell Biology; Muscle Regeneration; Adipose Differentiation
Department of Biology		
McDermott, John	Professor	Muscle Development
Tsushima, Robert	Associate Professor, Associate Dean of Science	Cardiac Muscle Physiology and Disease
Adjunct faculty		
Cafarelli, Enzo (Emeritus)	Professor Emeritus	Neuromuscular Physiology
Coe, Imogen	Professor, Dean, Faculty of Science, Ryerson University	Cardiac Muscle Biochemistry
Hawke, Thomas	Associate Professor , Kinesiology, McMaster University	Muscle Development and Regeneration
Jacobs, Ira	Dean, Faculty of Physical Education, University of Toronto	Muscle Metabolism, Applied Physiology and Pharmacology

10. Describe the ORU's progress toward fulfilling its mandate or meeting charter expectations during its current term (for existing ORUs only; 5 pages max).

10.

Introduction: The MHRC's first full year of operation was in 2009-10. The MHRC was modeled after the Copenhagen Muscle Research Centre, which was established in Denmark many years ago, and was the only other "Muscle Research Centre" in the world. Since that time, we have been striving to achieve National and International recognition. Our vision statement is ***"to be Canada's leading research centre for the study of muscle health and disease".*** As such, we are building around a specific focus, and serving as a synergistic hub for convergent programmatic activities. We will fulfill this vision through:

1) Our innovative research, high quality publications and the excellence of our grant funding acquisitions to help support our research and our graduate students;

2) Our programming initiatives, including invited Seminar speakers and Muscle Health Symposia, as well as student and faculty Colloquia. This provides a rich training environment for undergraduate and graduate students, as well as postdoctoral fellows;

3) The continued growth of our membership base, to include additional York University faculty members, as well as Adjunct faculty members and students from other institutions. This helps to develop extensive research relationships within the region, as well as nationally;

4) Educational outreach to Canadians via Continuing Education programs (see below), as promoted through our website and other social media networks.

These objectives are entirely consistent with the Senate Guidelines and Policies regarding the expectations for ORU activity at York University. Progress in these areas is documented below:

Publications and funding: A review of our most recent Annual Report will reveal that the MHRC is fulfilling its mandate in promoting muscle research for the health and well-being of Canadians. We are very successful at obtaining NSERC, CIHR, Heart and Stroke Foundation and Canadian Diabetes Association research funding. Some highlights of this funding include:

1) The acquisition of two CIHR grants valued at more than $1.1M over the next 5 years to study the regulation of gene expression in cardiac and skeletal muscle cells (McDermott);

2) A new 5 year CIHR grant ($580k) for the study of mitochondria in aging muscle (Hood);

3) New NSERC Discovery grants awarded to both Perry and Scime

4) CFI infrastructure funding award to Scime ($342k).

5) Heart and Stroke Foundation funding for the study of Race/ethnicity and the perception of Diabetes and cardiovascular disease risk factors (Kuk).

6) NIH grant for the development of an artificial pancreas (Riddell).

7) NSERC Research Tools and Instruments grants awarded to Haas and Birot for a "Multi-modal plate reader";

8) NSERC Research Tools and Instrument grant for an "Ultracentrifuge and Rotors" (Hood). This latter award, amounting to $143,000, will substantially ease the burden on the one existing system on the York campus, for the benefit of all MHRC members.

9) Funding from Panacea Global, a cancer screening company, in the form of equipment and resources for the development of a cancer screening service lab, which will foster research collaboration and provide income to support the MHRC.

We have also submitted an internal Notice of Intent for a Canada Foundation for Innovation (CFI) grant amounting to more than $1.5M. The purpose of this collaborative, group application is to provide infrastructure funding for the development of a centralized, novel, multi-disciplinary Core Research Facility devoted to the study of skeletal muscle. It is expected that this facility will serve as a catalyst for the growth of important collaborative research projects on muscle metabolism, development, disease and adaptation among members of the MHRC, and will help to situate the MHRC as an internationally renowned research facility, serving to attract both Canadian and international collaborators, and high quality trainees. The funds will be used, in part, for the renovation of the current animal care facility (i.e. rodent vivarium), as well as the re-organization of research laboratories for the incorporation of common infrastructure (i.e. core equipment). The facilities will be used for muscle physiological, biochemical and molecular biology assessments in cells, animals and humans. A clinical research unit will also be included for the acquisition and assessment of human blood and muscle samples.

Over the last year alone, our members published more than 80 articles as book chapters or in top-ranked physiology, biochemistry and molecular biology journals, including the Journal of Biological Chemistry (Hood), American Journal of Physiology (Ceddia), FASEB Journal (Birot), Canadian Journal of Physiology and Pharmacology (Belcastro), PLoS One (Adegoke, Haas, Hamadeh), Obesity (Kuk), Molecular and Cellular Biology (McDermott), Diabetes (Perry), Applied Physiology, Nutrition and metabolism (Adegoke), Journal of Molecular and Cellular Cardiology (Tsushima) and the Canadian Journal of Diabetes (Riddell), to name a few. Several of these journals are classified as "Open Access". MHRC graduate students are generally listed as first authors on these publications. Our most compelling and newsworthy publications are featured monthly on the MHRC website as the "Papers-of-the-Month", and are summarized in lay language to achieve a broader understanding of the significance for the health of Canadians.

Programming: The MHRC continues to expand its activities every year, consistent with the goal of uniting muscle health researchers and graduate students, and of providing a platform which will serve to increase the visibility of York University, and the MHRC, in Canada and around the world. Since 2009, we have featured 17 speakers from York University, and have invited 48 scientists from external institutions to speak within the events described below (see the list of Speakers in the Appendix).

We typically feature 3 types of educational events:

1) Colloquia, featuring internal speakers (faculty and/or graduate students) who discuss their work in an informal, interactive research presentation. This type of function helps us to interact amongst ourselves, and it fosters research collaboration. Attendance at the Colloquia usually averages about 50 graduate students and faculty members.

2) Seminars, in which external speakers from other Universities are invited to present their work, and to interact with faculty members and graduate students. Each seminar day consists of a) a meeting between the guest scientist and graduate students to discuss science in general, career options and a specific research paper chosen by the speaker, b) meetings with other interested MHRC faculty members, c) lunch with faculty members, and d) the research Seminar itself. Attendance at Seminars can range from 25-40 people.

3) The Annual Muscle Health Awareness Day (MHAD). This research day represents the highlight event of the year for our research centre. We have held four MHADs thus far, and it grows progressively every year. Typically 9-10 external speakers are invited, 40-50 posters are presented by graduate students, and most recently (MHAD4, 2013) the total registration was 120-130 people. All speakers present high level talks about their research. In addition, there are sufficient breaks throughout the day to permit interactions among graduate students and faculty members at the poster sessions. In 2013, we were able to attract some corporate sponsorship for the event, for the first time. The ratio of external-to-internal attendees has progressively increased, indicating more regional awareness of the event. By all metrics, MHAD has been extremely successful, and we will continue to develop this event on a yearly basis.

Continuing Education: For the first time this year, the MHRC will offer Continuing Education programs in Neuromuscular Physiology, Exercise and Sports Physiology, and Review of Muscle

Physiology, specifically targeted toward Massage Therapy professionals. The goal of this is to spread our knowledge of muscle health to the community at large, and for the generation of revenue to support the activities of the MHRC. We intend to expand this initiative (see below).

Membership: The MHRC has a critical mass of 15 Full, and 4 Adjunct faculty members. We anticipate further growth with two new hires that are currently being advertised. One advertisement is for a Cardiovascular Physiologist in the School of Kinesiology and Health Science. The other is directed toward hiring a Tier I or Tier II Canada Research Chair in Cardiovascular Biology in the Department of Biology. In addition, we currently have more than 100 trainee (PDFs, PhD, MSc and undergraduate students) members of the MHRC, mostly from within York University, but also from Universities throughout southern Ontario. This student membership is vital for our success as an organization. Students are eligible for the MHRC Student fellowship, and they participate in program decision-making through the Graduate Student Committee. Our intent is to continue to grow student involvement and participation within the MHRC (see below).

Our membership represents a unique strength of scientists in the area compared to anywhere else in Canada, indeed in North America. We will be the largest group of muscle health researchers spanning the spectrum of investigation from cells, to animal models, to human studies - the largest translational research facility for muscle health in Canada, with relevance to multiple muscle-related disorders. There is no comparable institution in the country.

11. Charter Proposal

(a) Describe the most promising research opportunities for the ORU over the term of the proposed charter. 5 pages max; see Guide for additional instructions on content)

Nature, themes and timeliness of the research undertaken within the MHRC: The MHRC is an Organized Research Unit with faculty members and their graduate students who study skeletal muscle, its blood supply, and its relationship to other important organs such as the heart and adipose tissue (fat), in health, in aging, and in disease (e.g. cancer, diabetes, neuromuscular disease, obesity). This research focus is both timely, and vitally important given our increasingly "aging" demographic, as well as our preponderant society characterized by physical inactivity, overweight/obesity and metabolic diseases such as Type 2 Diabetes. These are processes and conditions which largely affect skeletal muscle, denoted by atrophy and metabolic dysfunction. Of great interest to our research group is the fact that much of this dysfunction can be reversed or attenuated by appropriately styled programs of physical activity. Research within the MHRC delves deeply into mechanistic comparisons between health, disease, aging and the effects of exercise. Our research approaches are multi-disciplinary, involving the study of muscle at all levels of organization: from molecules and cells, to organ function and to whole body metabolism. The experimental models that are routinely employed include the use of muscle and fat cells in culture, along with animal and human subjects.

The necessity and added value of the MHRC: The MHRC and its programs offer an invaluable educational experience for its faculty members and students. In its absence, there would be no Seminar series, no student interactions with guest scientists, no Colloquia or

Symposia, no Graduate Student committee to organize events, and no Muscle Health Awareness Day, an immensely popular event which is the highlight of our yearly calendar. This educational program encourages and fosters interaction among all of our members, promoting discussion and collaboration. The MHRC is the only mechanism available to help focus and align the common interests of our 15 faculty members and their students, thereby facilitating collaboration amongst ourselves. In addition, faculty members commonly use our connections within the MHRC to share grant funding applications for internal review. This serves as an informal mentorship program which is vital for the success funding of junior faculty members.

From a research perspective, the MHRC provides a focus for initiating collaborative discussions. As its visibility and reputation increase, it serves as clear point of entry for scientists exterior to the University to connect with muscle health researchers. In addition, our developing MHRC Core Facility will house common resources and equipment to be shared among all members. We have the space allocation for this Facility, and we are now preparing to deploy it as we await approval of potential CFI funding. Although this initiative is in its infancy, we believe that the added-value of this Core Facility, combined with the educational programming provided by the MHRC, is large and immeasurable.

How the MHRC complements existing institutional strengths: York University is a large comprehensive institution which is constantly striving to increase its research intensity. The MHRC is an important component of achieving this goal at York, because the MHRC has an extremely strong culture of research intensity. All of our researchers are well-funded, they promote and support graduate student education, and they publish their work. In addition, the MHRC is the only Organized Research Unit within the University which is devoted to the Biomedical Sciences at the cellular and molecular level. Its existence puts York University "on the map" in this area, promotes its visibility, and is a model of research excellence for the entire institution.

Alignment with the University Strategic Research Plan: MHRC faculty members have diverse training, with expertise in cell and molecular biology, organ physiology, metabolism and whole body function, yet are all focused, at one level or another, on skeletal muscle health. In view of the breadth of our research programs, research within the MHRC exemplifies interdisciplinarity, a hallmark and priority of the York Strategic Research Plan. Our research is also nicely aligned with the themes of "Advancing fundamental discovery and critical knowledge" and "Exploring the frontiers of Science and Technology" – recognized strengths in the Strategic Research Plan. In particular, work within the MHRC fully conforms with one of the top research priorities for York University in the area of "Healthy Individuals, Healthy Communities and Global Health". Within the Faculty of Health, for example, aging research has been identified as a priority area with new academic programs, research collaborations and faculty hires. Muscle health research in the field of aging and aging-associated metabolic diseases is a key component of the MHRC research platform, thereby making York University a centre of excellence in the field of muscle health research.

Anticipated external funding to finance its activities: We have been fortunate until now to have been financially supported by the Faculties of Health and Science since our inception. We

are now actively seeking to support ourselves and become self-sufficient via a variety of mechanisms:

1) The development of Continuing Education programs for various groups, including Message Therapy professionals, Nurses, and Fitness Assessment and Counseling. In the future we will also offer physiology courses for Kinesiology graduates who seek to maintain accreditation with the Ontario College of Kinesiologists.
2) Collaboration with industry on several fronts. One of these is with Panacea Global, a cancer screening company with research interests that complement several of our members. We will supply the space, and Panacea will donate the supplies, equipment, and serum samples for analysis. We will provide a diagnostic service and receive income based on a fee per sample basis. This is a model that could be expanded to other areas if proven successful. Another company is OmniActive Health Technologies Canada, a Natural Health Product company with an interest in muscle health and obesity. They are seeking to evaluate the beneficial effects of their nutritional supplements on muscle strength, endurance and protein synthesis. These are analyses that we routinely perform, and income would be on a contract basis.
3) Continuous interaction with our Development office within the University 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. In seeking this, we appreciate that our research messages must be relevant to all Canadians, and easily marketable. We are working on the further development of our MHRC website, our Facebook page, Webinars and blogs on "Muscle Health", and the dissemination of our findings via publications.
4) Attraction of more industry sponsorship and augmentation of the registration fee for our yearly Muscle Health Awareness Day.

Collaborative grants: There are a number of possible collaborative grant opportunities that exist which the MHRC would qualify for. These include funding from 1) the NSERC-CIHR Collaborative Health Research Program (CHRP), 2) CIHR Catalyst grants, and 3) CREATE grants. We will seek funding from the CHRP in the Spring (2014), and we routinely submit internal Notices of Intent to apply for Research Tools and Instruments (RTI) funding from NSERC for shared equipment.

Knowledge mobilization: In addition to our increasing use of social media (see above), all MHRC faculty members are involved in promoting knowledge mobilization of their research via the MHRC website. Newly published papers-of-the-month are summarized in easy to read language for public dissemination. Many members have had their work featured in Y-file, and some members spend considerable time promoting muscle health, metabolism, obesity and diabetes education to the public. Several MHRC members have had media interviews in the past year to promote muscle health in their specific areas. We maintain an up-to-date website, and have student volunteers who monitor and maintain the Facebook page.

Training environment for students and PDFs: MHRC faculty members are extremely active in the training and development of graduate students. We directly trained and mentored 57 MSc and PhD students, 56 undergraduate students, and 4 post-doctoral fellows over the past year alone. Exposure to MHRC research Seminars and Colloquia provides the opportunity to realize

the potential for cross-training among research groups, to appreciate the work of others within, or outside the MHRC, to share equipment and facilities, and to collaborate. The visibility of the MHRC also provides the exposure needed for industry collaboration, and this opens the opportunity to apply for Mitacs funding, an initiative which we have begun to actively explore. Mitacs provides matching funds with industry to support graduate student stipend and partial research costs. At least one application has been submitted thus far.

Should the MHRC continue to be Faculty Based, or Institutional?
Our Faculty members are largely based within the School of Kinesiology and Health Science (13) with some in the Faculty of Science (2). This does not appear to represent enough Faculty diversity to warrant becoming an Institutionally-based ORU. The faculty of Health has provided most of the resources required for our success to this point, and is eager to continue supporting our activities. By the same token, MHRC members are content to remain closely affiliated administratively with the Faculty of Health.

How will the MHRC achieve greater National or International prominence? Our researchers will continue to publish at the high rate at which they are accustomed, and we will promote our activities electronically and via social media. We will also continue to invite outside speakers and guests to Seminars and to the Annual Muscle Health Awareness Day. Many of our faculty members are regularly invited to speak at international Symposia, Conferences and Seminars where we promote the activities of the MHRC. For example, Riddell was recently invited to Brazil, and Hood was invited to Korea to give lectures in our specialty areas. These are great opportunities to promote the science and scholarship of our MHRC. Hood will give seminars at the Universities of Florida, East Carolina, Missouri and Rochester, and Chair a Symposium at the Experimental Biology meeting in San Diego within the next 6 months, providing just one example of the number of opportunities that we have to promote MHRC-driven scientific achievements. Perry has active collaborations with members of the Karolinska Institute in Stockholm, Sweden, and such interactions naturally increase the prominence of the MHRC. We are full participants in a number of national organizations, such as the Canadian Society for Exercise Physiology, the American Physiological Society and the Canadian Nutrition Society, and when we attend those meetings with our students, we advertise and promote the reputation of the MHRC. Thus, we are very pro-active in the dissemination of our research findings and activities, and we increase the visibility of York University in the process.

(b) Describe any other benefits of the ORU and its activities that have not been fully captured by the information in 10(a) above (optional - up to 1 page)

None

(c) Define the expectations, projected deliverables, and evaluation metrics for the proposed charter period. (2 pages max)

We have an ambitious plan for growth over the next 5 years:

a) **Finances:** We will aggressively pursue industry liaisons to forge research collaboration and service agreements. We will also develop more Continuing Education programs for health professionals to improve our community outreach and for revenue purposes. Interactions with the Advancement Office will increase as we seek potential donors who are interested in our research and its potential relevance to the health of Canadians. These initiatives are a top priority as we seek to become self-sufficient financially;
b) **Knowledge mobilization:** Central to the acquisition of funding is an improvement in our "message" to Canadians, who we are, what our mission is, and what we do. We will endeavor to improve this with the guidance of the Knowledge Mobilization unit and the faculty of Health Communications experts at York;
c) **Programming:** Once greater financial stability is achieved, we aspire to grow our educational programs further, to include 1) more seminars per year, 2) an expansion of the Muscle Health Awareness Day, and 3) increased community-based interactions to help spread the muscle health message to the public;
d) **Student Fellowships and Faculty Awards:** Depending on the finances available, we hope to increase the amount of funding contributions to deserving MSc and PhD students. These fellowships are directly applied to student tuition fees, and this is greatly appreciated by graduate students at all levels. In addition, we would like to increase our yearly allocation of MHRC Faculty Research Grant to help the research programs of our productive faculty members;
e) **Collaborative group grants:** We currently have a CFI internal Notice of Intent submitted for an MHRC Core Facility. A number of other group grant initiatives are available, including the Collaborative Health Research Program (CHRP), Catalyst Grants (CIHR), NSERC Research Tools and Instruments (RTI) grants, and CREATE grants. The CHRP grants are also attainable at our current stage of unit development, and we will pursue this in the Spring, 2014. CREATE grants require more industry partners and collaborators, a process which will require more time to develop.
f) **MHRC student-based activities:** We will continue to improve the involvement of our student members. As a start, we have created an MHRC Student Committee to provide input into our programming and direction, particularly with regard to student interests. In particular, the mandate of this Committee is to provide more student input regarding MHRC Seminars and the Muscle Health Awareness Day program. Our students now manage the MHRC Facebook page, and we have a student-invited Seminar speaker for the first time this year. We are developing a Career Workshop for those interested in the industrial, hospital, college or pharmaceutical sectors. We are also sponsoring our first MHRC Student Colloquium, in which graduate students will present their work orally and respond to questions;
g) We will consider developing an **MHRC Summer School / Workshop** related to teaching the skills of cellular, animal and human muscle research to visiting students. This could serve to spread the word about the MHRC more nationally and internationally, and provide some income for the Centre;
h) The MHRC will try to promote more **collaborations** between laboratories both within, and outside of York University;
i) An ambition within the next 5 years is to develop a "Muscle Health Network" among like-minded researchers in southern Ontario, upstate New York and northern Michigan. This geographical area is densely populated with "muscle health" researchers, and it has

enormous potential for interaction, collaboration and the advancement of science. The long term goal would be the development of a **Research Centre of Excellence** in Muscle Health. As a first step, we will seek more involvement from our adjunct MHRC Faculty members at Ryerson University, the University of Toronto and McMaster University, and find ways to expand our membership to other universities with incentives for participation.

12. Directorship

The Director is **Dr. David Hood**, appointed for a second 5 year term (2013-2018)

Appendices:

A List of Invited Speakers and their research topics since 2009.

B Sponsoring and Participating Faculty Letters of Support **(to be attached).**

C 5 Year budget **(attached).**

D This is our first review process. The last 2 Annual Reports are **attached**.

List of MHRC Colloquia Speakers

	Speaker Name	University	Topic
1	Dr. Tara Haas	York	Angiogenesis, muscle
2	Dr. Rolando Ceddia	York	Obesity, muscle
3	Dr. William Gage	York	Biomechanics, gait
4	Dr. Imogen Coe	York	Cardiac transporters
5	Dr. Robert Tsushima	York	Ischemia, cardiac tissue
6	Dr. Mazen Hamadeh	York	ALS, Nutrition
7	Ms. Mandeep Gaidhu	York	Obesity, muscle
8	Dr. Jennifer Rose	York	Cardiac transporters
9	Dr. Michael Connor	York	Cancer, cytokines
10	Mr. Keir Menzies	York	Mitochondria, muscle
11	Dr. Angelo Belcastro	York	Protein degradation, exercise
12	Dr. Michael Riddell	York	Diabetes, muscle, glucocorticoids
13	Dr. Christopher Perry	York	Insulin sensitivity, redox signaling
14	Dr. Anthony Scime	York	Stem Cells
15	Dr. John McDermott	York	Muscle differentiation
16	Dr. Ola Adegoke	York	Muscle protein synthesis
17	Dr. Olivier Birot	York	Muscle angiogenesis

List of MHRC External Seminar Speakers

	Speaker Name	University / Affiliation	Topic
1	Dr. Bengt Saltin	Copenhagen Muscle Research Centre, University of Copenhagen	Exercise, fatigue, glycogen
2	Dr. Vicki Baracos	Alberta	Cancer cachexia
3	Dr. Patrick Seale	Pennsylvania, USA	Brown/beige fat
4	Dr. Jason Fish	Toronto	Angiogenesis, muscle
5	Dr. Sabah Hussain	McGill	Autophagy, muscle
6	Dr. Ilona Skerjanc	Ottawa	Cardiomyogenesis
7	Dr. Guillaume Grenier	Sherbrooke	Muscle trauma
8	Dr. Marius Locke	Toronto	NFkB, Muscle
9	Dr. Sandra Peters	Brock	PLIN, PKA, muscle
10	Dr. Scott Heximer	Toronto	Cardiac muscle
11	Dr. Gianni Parise	McMaster	Satellite cells, muscle
12	Dr. Ingrid Tein	Hospital for Sick Children	Mitochondrial disease
13	Dr. Graham Holloway	Guelph	Fatty Acids, Muscle
14	Dr. Greg Wells	Toronto	Exercise performance
15	Dr. Anthony Gramolini	Toronto	Sarcoplasmic reticulum function
16	Dr. James Rush	Waterloo	Hypertension, muscle
17	Dr. Kyra Pyke	Queen's	Muscle, blood flow
18	Dr. Celine Boudreau	Laurentian	Cytoskeletal proteins in muscle
19	Dr. Russ Tupling	Waterloo	Sarcolipin, muscle
20	Dr. Peter Tiidus	Wilfred Laurier	Hormones, muscle
21	Dr. David Malkin	Toronto	Rhabdomyosarcoma muscle
22	Dr. Simon Lees	Laurentian	Satellite cells, muscle
23	Dr. Greg Steinberg	McMaster	AMPK, muscle
24	Dr. Mark Tarnopolsky	McMaster	Mitochondrial disease, exercise
25	Dr. Tom Hawke	McMaster	Satellite cells, muscular dystrophy
26	Dr. Greg Cartee	Michigan, USA	Insulin sensitivity, muscle
27	Dr. Jack Goodman	Toronto	Cardiac adaptations to exercise
28	Dr. Coral Murrant	Guelph	Angiogenesis
29	Dr. Maureen MacDonald	McMaster	Blood flow in muscle
30	Dr. Tami Martino	Guelph	Circadian rhythms and the heart
31	Dr. Joe Quadrilatero	Waterloo	Apoptosis, muscle
32	Dr. Eldad Zacksenhaus	Toronto	Myogenesis
33	Dr. David Wright	Guelph	Adipose tissue, muscle
34	Dr. Ian Scott	Hospital for Sick Children	Muscle development
35	Dr. Robert Dirksen	Rochester, USA	Calcium, muscle
36	Dr. John Grande	Hospital for Sick Children	Neuromuscular junction
37	Dr. Jeffrey Horowitz	Michigan, USA	Metabolism, exercise
38	Dr. Bernard Jasmin	Ottawa	Muscular dystrophy
39	Dr. Jayne Kalmar	Wilfrid Laurier	Neurological, muscle
40	Dr. Geoff Pickering	Western	Angiogenesis, muscle
41	Dr. Lawrence Spriet	Guelph	Mitochondria, muscle
42	Dr. Michael Tschakovsky	Queen’s	Muscle blood flow regulation
43	Dr. Rene Vandenboom	Brock	Myosin light chain phosporylation
44	Dr. David Williamson	Buffalo, USA	Cell cycle in muscle
45	Dr. James Carson	South Carolina, USA	Cancer cachexia
46	Dr. Daniel Kane	St. Francis Xavier	Mitochondria, muscle
47	Ms. Marion Pauly	Montpellier, France	Muscle autophagy
48	Dr. Michael Rudnicki	Ottawa Hospital Research Institute	Stem cells, muscle

Muscle Health Reseach Centre: 2014-2019 Budget Plan						
Revenue	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	
Muscle Health Awareness Day sponsorship	2,000	2,500	2,500	2,500	2,500	
Muscle Health Awareness Day conference registration fees	1,750	2,000	2,000	2,250	2,250	
Continuing professional development workshop fees	1,500	1,500	2,000	2,000	2,500	
Diagnostic services fees (@ $5/sample)	2,500	2,500	3,000	3,000	3,500	
Anticipated overhead from research contracts	1,000	1,000	1,500	1,500	1,500	
Contribution from Health - Director's course release (1.0 FCE)	20,000	20,000	20,000	20,000	20,000	approximate
Contribution from Health - under discussion						TBD during November
Costs covered by Director's CRC	10,000	10,000	10,000	10,000	10,000	
Total Revenue	**38,750**	**39,500**	**41,000**	**41,250**	**42,250**	
Expenses						
Operating Expenses						
Director's Stipend and Benefits	7,200	7,200	7,200	7,200	7,200	
Director's course release (1.0 FCE)	20,000	20,000	20,000	20,000	20,000	approximate
Admin Support (CUPE GA 270hr + 135hr assignment @ 60%)	10,920	10,920	10,920	10,920	10,920	approximate
Office/Computer Supplies	1,200	1,200	1,200	1,200	1,200	
Telephone	1,200	1,200	1,200	1,200	1,200	
Research, Training and KMb Expenses						
MHRC Faculty Research Awards (1 @ $3000)	3,000	3,000	3,000	3,000	3,000	seeking donor
MHRC Student Scholarships (2 @ $1000)	2,000	2,000	2,000	2,000	2,000	seeking donor
Muscle Health Awareness Day	5,000	5,000	5,000	5,000	5,000	seeking additional sponsors
Poster Prizes for Muscle Health Awareness Day (4 @ $150)	600	600	600	600	600	seeking additional sponsors
Seminar series - hospitality and invited speakers	4,500	4,500	5,000	5,000	5,000	
Total Expenses	**55,620**	**55,620**	**56,120**	**56,120**	**56,120**	
Total Revenue Less Expenses	**(16,870)**	**(16,120)**	**(15,120)**	**(14,870)**	**(13,870)**	
Carryforward From Previous Year	**25,000**	**8,130**	**(7,990)**	**(23,110)**	**(37,980)**	
Carryforward to Next Year	**8,130**	**(7,990)**	**(23,110)**	**(37,980)**	**(51,850)**	

Muscle Health Research Centre Annual Report
July 1, 2011 - April 30, 2012

Director:	David A. Hood
Admin Contact:	Ayesha Saleem
Address:	302 Farquharson
Tel:	Ext 66640
Fax:	Ext 55728
E-Mail:	dhood@yorku.ca or mhrc@yorku.ca
Website:	http://www.yorku.ca/mhrc/

1. Mandate of the Unit

The mandate of the MHRC 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 became York University's first organized research unit (ORU) in the Faculty of Health dedicated to Biomedical Sciences, and it continues to increase the University's visibility in this important area of research. The MHRC consists of a strong cohort of very well-funded and highly productive scholars (including a Canada Research Chair) and graduate students from the Faculty of Health and the Faculty of Science & Engineering. Its intent is to become a renowned centre for muscle health research in North America.

2. Organizational Structure of the Unit

Executive Committee (elected for a 3 year term):
Director: David A. Hood
Faculty Members: Mike Connor, Olivier Birot (both Kinesiology and Health Science) and Robert Tsushima (Biology);
PhD student member: Sobia Iqbal.
Advisory Board: we do not have one

3. Membership List

Appendix A contains the list of the 15 active, 2 Adjunct and 1 Emeritus Faculty members of the MHRC in 2011-12. We added a new member this past year, Dr. Jennifur Kuk, who studies obesity, exercise body composition and health risk factors. New members to the MHRC require a nomination from an existing member, and membership is voted upon by the group. Support by fifty percent plus one of the existing members is required to gain MHRC membership.

4. Activities of the Unit

The research accomplishments of the MHRC are outlined in detail in Appendices B (Funding obtained), C (Awards) and D (Publications in peer-reviewed journals). It is very clear from these extensive lists that the MHRC is fulfilling its mandate in promoting muscle research for the health and well-being of Canadians. We are very successful at obtaining NSERC, CIHR, Heart and Stroke Foundation and Canadian Diabetes Association research funding, at publishing our findings.

We held a successful Research Colloquium in the Fall of 2011, attended by approximately 70 faculty members and students. In addition, we brought in our first MHRC-sponsored external speakers in the Winter term, 2012. These were Dr. Vickie Baracos (University of Alberta) and Dr. Patrick Seale (University of Pennsylvania). They spoke on the topics of "Cancer Cachexia" and Brown Fat Gene Expression", respectively, two topics that are very current in the literature on muscle health and metabolism. We are currently planning our most successful event of the year, the Muscle Health Awareness Day (MHAD). In May, this will represent our 3rd annual event of this kind continue to develop and expand the annual Muscle Health Awareness Day. Thus, we had a very successful year, and we continue to expand our functions and our outreach.

- Number of Collaborative grants between MHRC members: (**3**; See Appendix B).
- Number of collaborative peer-reviewed publications between MHRC members: (**8**, see Appendix D)

5. Measures taken to Promote Equity as Enunciated in the University Academic Plan

There are now 3 female faculty members and 1 female administrative assistant within the MHRC out of 16 members. This inequity can be addressed within the hiring of future faculty members in both the faculty of Health and the faculty of Science and Engineering. However, student membership is more evenly balanced, at approximately 45% female, and 55% male. Our list of research publications and grants provide clear evidence for excellence and innovation in research. This fulfills an important component of the mandate of the University Academic Plan.

6. Statement of Operations

Attached along with this document for 2011-12.

7. Budget for Current Fiscal Year

Attached along with this document for 2011-12.

8. Graduate Training Activities/Accomplishments

In its third full year of operation, the MHRC had 66 graduate student and trainees (50% male, 50% female):

Post-doctoral fellows: - 6
PhD students: – 13
MSc students: – 34
Undergraduate students: – 13
TOTAL current trainees: - 66
Alumni – 37

9. Any Changes in Physical Space at the Unit: None.

10. List of all Contractual Obligations Entered into By or on Behalf of the Unit: None.

Updated: May 15, 2012

Muscle Health Research Centre

Contact list

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
Adegoke, Olasunkanmi	Assistant Professor	Protein and amino acid nutrition and metabolism	oadegoke@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	anbelcas@yorku.ca (416)736-2100 x 21088	Norman Bethune College, 333B
Birot, Olivier	Assistant 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
Connor, Michael	Associate Professor	Muscle Development and Cancer	mconnor@yorku.ca (416)736-2100 x 77206	Lumbers Building, 224
Gage, William	Associate Professor	Biomechanics of postural control and of joint stability	whgage@yorku.ca (416)736-2100 x 33027	Sherman Health Science Research Centre, 2022
Haas, Tara	Associate Professor	Angiogenesis in Muscle	thaas@yorku.ca (416)736-2100 x 77313	Farquharson Building, 341
Hamadeh, Mazen	Associate Professor	Human Nutrition and Exercise Physiology, Diabetes and ALS	hamadeh@yorku.ca (416)736-2100 x 33552	Norman Bethune College, 365
Kuk, Jennifer L.	Assistant Professor	Obesity, CVD, Type 2 diabetes and exercise interventions	jennkuk@yorku.ca (416)736-2100 x 20080	Sherman Health Science Research Centre, 2002
Riddell, Michael	Associate Professor, KAHS Graduate Program Director	Exercise Physiology, Stress and Diabetes Metabolism	mriddell@yorku.ca (416)736-2100 x 40493	Norman Bethune College, 347
Scime, Anthony	Assistant Professor	Stem Cell Biology; Muscle Regeneration; Adipose Differentiation	ascime@yorku.ca (416) 736-2100 x33559	Norman Bethune College, 327C

Department of Biology				
Coe, Imogen	Professor and Chair, Dept. of Biology	Cardiac Muscle Biochemistry	coe@yorku.ca (416)736-5243	Farquharson Building, 246 A
McDermott, John	Professor and Biology Graduate Program Director	Muscle Development	jmcderm@yorku.ca (416)736-2100 x 30389	Farquharson Building, 327
Tsushima, Robert	Associate Professor	Cardiac Muscle Physiology and Disease	tsushima@yorku.ca (416)736-2100 x 20996	Farquharson Building, 344
Adjunct Members				
Cafarelli, Enzo (Emeritus)	Professor Emeritus	Neuromuscular Physiology	ecaf@yorku.ca	
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
MHRC Coordinator				
Saleem, Ayesha (till June 2012)	Graduate Student		asaleem@yorku.ca X 77832	Farqhuarson Bldg, 342 X 22999 Fax: 416-650-8483

Appendix B: FUNDING RECEIVED or CONTINUING between July, 1 2011 – April 30, 2012

1. O. Adegoke

- NSERC Discovery Grant, 2008/2009 Competition: $100000.00 over 5 years to study 'Mechanism of nutritional regulation of protein metabolism in skeletal muscle'.

2. O. Birot

NSERC discovery grant (5 years)
France-Canada Research Fund (FCRF 2011)

3. R. Ceddia

NSERC *Discovery Grant*
Project Title: Regulation of whole-body energy metabolism
Funding period: 5 years (2011 – 2016) Amount awarded: $200,000.00

4. I. Coe

EXTERNAL RESEARCH FUNDING

1. NSERC Discovery Grant 2011-2016 $56,000 per year.

2. 2007-2012, Canadian Institutes for Health Research Operating Grant
Amount: $541,930
Role of Nucleoside Transporters in Cardiovascular Physiology

3. 2012: NSERC RTI; "Components to support a Spinning Disk Confocal Microscope" $140,767.

5. M. Connor

Natural Sciences & Engineering Research Operating Grant
$29,500/yr 09/2006- 08/2011

6. W. Gage

Title: Acute effects of mechanical loads on bone and cartilage turnover:
A pilot study to develop a model for human research.
Investigators: William Gage (PI), David Hood (co-Applicant), Jason
Vescovi (co-Applicant)
Amount: $98,875

7. T. Haas

New: NSERC Research Tools and Instrumentation; $140,767 (Dr. Imogen Coe, PI +6 co-applicants)
Continuing:
2010 Heart and Stroke Foundation of Ontario; $75,000/year (3 years);

2008 NSERC Discovery Grant (renewal); $40,050/year (5 years).

8. D.A. Hood

2011-17 Canadian Institutes for Health Research (CIHR) Research Grant entitled "Autophagy in skeletal muscle" (103,661 per year). (New, July 1, 2011);

2008-12 Canadian Institutes for Health Research (CIHR) Research Grant entitled "Mitochondria in aging muscle" (106,000 per year);

2011-16 Natural Science and Engineering Research Council of Canada Discovery Grant entitled: "Mitochondrial Biogenesis in Skeletal Muscle" ($110,000 per year). (Continuing);

2012 NSERC RTI grant: "Components to support a Spinning Disk Confocal Microscope" $140,767 (co-applicant, PI: I. Coe).

9. M. Hamadeh

Project RADICAL: Race/ethnicity And the perception of Diabetes and cardiovascular disease risk factors In the context of Canada's Lifestyle and obesity guidelines
Heart and Stroke Foundation of Ontario, Pilot Grant, Co-applicant, $50,000 (PI: Dr. Jennifer Kuk).

10. J. Kuk

Project RADICAL: Race/ethnicity And the perception of Diabetes and cardiovascular disease risk factors In the context of CAnada's Lifestyle and obesity guidelines (2011-2012) - $50,000 (Heart and Stroke Foundation - Principal Investigator)

11. J. McDermott

2012-2017 NSERC Discovery grant, $175,000
Role of AP-1 in skeletal myogenesis

2012-2014 Heart and Stroke Foundation of Canada operating grant, $180,000
Effects of blockers on cardiac gene expression

2010-2013 CIHR operating grant, $375,000
Regulation of MEF2 by signalling pathways

2010-2013 Heart and Stroke Foundation of Canada operating grant, $287,000
Regulation of Vascular Smooth Muscle Cells by MEF2 dependent signalling pathways

12. M. Riddell

Principle Investigator or Cc-Principle Investigator (M Riddell):
(Total awarded= $774,350)

1. MaRS Innovation MSCPoP Program Round 2. Treatment of hypoglycemia in Insulin-treated diabetes. Feb 2012 to Feb 2013- amount $100,000 (with M Vranic).

2. Ministry of Health Promotion and Sport- Project Title: "Pre-Diabetes Detection and Physical Activity Intervention"- Phase IIIb April 1, 2011 to March 31, 2012- amount $30,000 (with V Jamnik).

3. CIHR Proof of Principle Program - $160, 000 (August 2011- December 2012) Phase I: Pharmaceutical intervention to decrease the threat of hypoglycemia in insulin-treated diabetics (with M. Vranic).

4. NSERC Discovery Grant (individual). $190,000 (2007-2012), Project Title: Mechanisms of exercise training induced alterations in the hypothalamo-pituitary-adrenal axis.

5. Centre for Drug Research and Development (Pfizer CDRD Innovation Fund) with support from MaRS Innovation. Pharmaceutical intervention to decrease the threat of hypoglycemia in insulin-treated diabetics (Leaders M. Vranic, M. Riddell and D. Coy). $294,350 (2011-2012).

External grants as co-applicant (M Riddell)
(Total Awarded= 2,575,297)

1. 1. CIHR Operating Grant (P.I. Timmons, Co-investigators MORRISON, Katherine Mary; RIDDELL, Michael C). $225,347 (20011-2013). Metabolic flexibility in obese youth: Exercise as a screening test and a treatment, Competition 2010/09.

2. 2. CIHR Team Grant (Nutrition, Metabolism and Diabetes): Obesity and Related Diseases - Principle Investigator(s): ANDERSON, Gerald Harvey ; HAMILTON, Jill Krysti ; MCCRINDLE, Brian Wayne ; PARKIN, Patricia ; PENCHARZ, Paul Bernard Co-Investigators: BELLISSIMO, Nicola ; BIRKEN, Catherine Sari ; DETTMER, Elizabeth Lynn ; HANLEY, Anthony James ; LANGER, Jacob Charles ; O'CONNOR, Deborah Louise ; RIDDELL, Michael Charles ; TEIN, Ingrid ; WELLS, Greg D. Operating Grant Title: CIHR Team in Childhood Obesity Research. 2008-05-01 to: 2013-04-30. 468,799 per year, (2,349,950 total).

13. A. Scimè

2012	NSERC- Discovery Grant	$125,000 5 years
2012	Canadian Foundation for Innovation (CFI-LOI)	$342,288

14. R. Tsushima

07.2009 – 06.2013	*SNARE Protein Regulation of Cardiac Ion Channels and ANF Secretion* Principal Investigator Heart and Stroke Foundation of Ontario (T6770) - $409,181 (total)
07.2011 – 06.2014	*Role of Endogenous Cholesterol in Beta-Cell Stimulus-Secretion Coupling* Principal Investigator Canadian Diabetes Association (OG) - $274,725 (total)
01.2012 – 12.2013	*In Vivo Imaging of Cardiovascular Function* Principal Investigator: Robert Tsushima Leaders Opportunity Fund Canadian Foundation for Innovation - $350,720

Appendix C: AWARDS RECEIVED between July, 1 2011 – April 30, 2012

J. Kuk
Laboratory Equipment Scientist of the Week (2011)

R. Tsushima
2009.07 – 2014.06 Career Investigator Award
Heart and Stroke Foundation of Ontario – $438,750

Appendix D: PUBMED-listed publications by MHRC Faculty members between July, 1 2011 – April 30, 2012

- **Olasunkanmi Adegoke**

Olasunkanmi A.J. Adegoke, Abdikarim Abdullahi, Pegah Tavajohi-Fini. mTORC1 and the regulation of skeletal muscle anabolism and mass. Applied Physiology, Nutrition, and Metabolism, 2012, 37(3): 395-406, 10.1139/h2012-009

Serino AS, **Adegoke OA**, Zargar S, Gordon CS, Szigiato AA, Hawke TJ, Riddell MC.Voluntary physical activity and leucine correct impairments in muscle protein synthesis in partially pancreatectomised rats.Diabetologia. 2011 Dec;54(12):3111-20. *senior authorship shared between Adegoke OA, Riddell MC*

- **Olivier Birot**

Delghingaro-Augusto V, DÃ©cary S, Peyot ML, Latour MG, Lamontagne J, Paradis-Isler N, LacharitÃ©-Lemieux M, Akakpo H, **Birot O**, Nolan CJ, Prentki M, Bergeron R. Voluntary running exercise prevents Î²-cell failure in susceptible islets of the Zucker diabetic fatty rat. Am J Physiol Endocrinol Metab. 2012 Jan;302(2):E254-64. Epub 2011 Nov 1.

Birot O. Genetic background, endurance performance and muscle capillarization: lessons from the 'mini mice'. Exp Physiol. 2011 Nov;96(11):1116-7. No abstract available.

- **Rolando Ceddia**

Souza RP, Tiwari AK, Chowdhury NI, **Ceddia RB**, Lieberman JA, Meltzer HY, Kennedy JL, Müller DJ. Association study between variants of AMP-activated protein kinase catalytic and regulatory subunit genes with antipsychotic-induced weight gain. J Psychiatr Res 46(4):462-8, 2012.

Ceddia RB. Motilin beyond gut motility: A novel role in the regulation of adipose tissue metabolism. Am J Physiol Endocrinol Metab 301(5):E756-7, 2011.

Gonzalez R, Perry RLS, Gao X, Gaidhu MP, Tsushima RG, **Ceddia RB**, Unniappan S, Nutrient Responsive Nesfatin-1 Regulates Energy Balance and Induces Glucose-Stimulated Insulin Secretion in Rats. Endocrinology 152(10):3628-37, 2011.

Gaidhu MP, Frontini A, Hung S, Pistor K, Cinti S, **Ceddia RB**. Chronic AMP-kinase activation with AICAR reduces adiposity by remodeling adipocyte metabolism and increasing leptin sensitivity. J Lipid Res 52(9):1702-11, 2011.

- **Imogen Coe**

Grenz, A., Bauerle, J.D., Dalton, J.H., Ridyard, D., Badulak, A., Tak, E., McNamee, E.N., Clambey, E., Moldovan, R., Reyes, G., Klawitter, J., Ambler, K., Magee, K., Christians, U., Brodsky, K.S., Ravid, K., Choi, D.-S., Wen, J., Lukashev, D., Blackburn, M.R., Osswald, H., **Coe, I.R.,** Nürnberg, B., Haase, V.H., Xia, Y., Sitkovsky, M., and Eltzschig, H.K. 2012. Equilibrative nucleoside transporter ENT1 regulates post-ischemic blood-flow during acute kidney injury in mice. *Journal of Clinical Investigation*, 122(2):693-710

Rose, J., Naydenova, Z., Bang, A., Ramadan, A., Klawitter, J., Schram, K., Sweeney, G., Grenz, A., Eltzschig, H., Hammond, J., Choi, D-S., and **Coe, I.R**. 2011. Absence of equilibrative nucleoside transporter 1 in ENT1 knockout mice leads to altered nucleoside levels following hypoxic challenge. *Life Sciences.* 89(17-18):621-30

Reyes, G, Nivillac, NMI, Karim, M.Z., DeSouza, L, Siu, K.W.M., and **Coe, IR**. 2011. The Equilibrative Nucleoside Transporter 1 (ENT1) is a phosphoprotein. *Molecular Membrane Biology*, 28(6):412-26

Nivillac, NMI, Bacani, J, and **Coe, IR**. 2011. The life cycle of the human equilibrative nucleoside transporter 1: From ER export to degradation. *Experimental Cell Research* 317(11):1567-79.

- **Tara Haas**

Kobus, K, J. Kopyciñska, A. Kozlowska-Wiechowska, E. Urasinska, P. Milkiewicz, A. Kempinska-Podhorodecka, T.L. Haas, M. Milkiewicz. Angiogenesis within the duodenum of patients with cirrhosis is modulated by mechanosensitive Kruppel-like factor 2 and microRNA-126. Liver Int. 2012 May 10

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- **David Hood**

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- **Jennifer Kuk**

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- **John McDermott**

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- **Michael Riddell**

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- **Anthony Scimè**

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- **Robert Tsushima**

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Appendix E: – List of Specialized Equipment

Olivier Birot

- Harvard Isoflurane anesthesia station
- Tissue lyser Retsch MM400 using stainless steel beads.
- Imaging station Kodak 4000MM Pro.

Rolando Ceddia

- Scintillation counter (Beckman Coulter LS 6500)
- Plate reader (Biotek Synergy HT)

- Temperature controlled spectrophotometer (Ultrospec 4300 Pro)
- Real Time - PCR (Biorad CFX96)

Mike Connor

- Kodak In Vivo FX Pro imaging station
- Hunter apparatus
- Cell culture electrical stimulator
- Ultracentrifuge
- Nanodrop spectrophotometer

Will Gage

- 7 camera optoelectronic motion capture system (Vicon)
- Six 6-degree of freedom force plates (AMTI)
- Wireless, 16 channel EMG data collection system (Noraxon)
- XY gantry for perturbing postural control and balance
- Wireless three-dimensional accelerometers for measuring movement "in the field"
- HUMAC isokinetic muscle strength testing system

Tara Haas

- Heraeus Table top centrifuge (up to 100 mL volumes)
- UV Crosslinker
- Hybridization Oven
- Shaking Water Bath
- Bacterial Incubator with shaking platform
- Bioptechs closed Flow Chamber for cultured cells
- FlexCell Fx4000 Cell Stretch Apparatus
- Gel Dryer
- Homogenizer
- MilliQ water purification
- Arcturus PixCell II Laser Capture Microdissection system
- Zeiss M200 Inverted Fluorescence microscope with Quantix57 Digital Cooled CCD imaging system and Metamorph image analysis software.

Mazen Hamadeh

- Microcentrifuge
- Mettler balance
- Equipment to run Western blots
- Electrophoresis apparatus
- PCR machine (Bio-Rad MyCycler)
- Spectrophotometer
- HPLC with -ve conductivity dectector

David Hood

- Real-time PCR system (Applied Biosystems)

- Kodak In Vivo Fx Pro Imaging System
- Cell culture facility
- Ultracentrifuge (Beckman)
- Flow Cytometer (non-sorting, BD)
- Small animal surgical facility
- Mitochondrial respirometer (Strathkelvin)
- Muscle contractile activity equipment
- Fluorescent plate reader
- Upright and inverted fluorescent microscopes
- Cryostat for muscle sectioning
- Rodent treadmills and activity wheels

Michael Riddell

- Rodent voluntary activity wheels and forced activity wheels
- Muscle stimulator and Power lab in situ muscle stimulation equipment
- Luminex multiplex
- Cryostat
- Metabolic cart-human
- Metabolic cages
- Tissue freeze dryer
- Paediatric cycle ergometer
- RT-PCR
- Spectrophotometer
- Plate reader
- Imaging station for in situ hybridization

Robert Tsushima

- 2 patch-clamp electrophysiology setups
- 2 isolated perfused heart systems
- Low speed tabletop centrifuge
- Beckman spectrophotometer
- Mitochondria respirometer (Strathkelvin)

STATEMENT OF OPERATIONS

Fund Code: 200 **Cost Centre:** 157001 FH-Muscle Health Reseach Ctre **For the Period Ended: 30-Apr-12**
Start Date: 7/1/2008 **End Date:** 12/31/2099 **Fiscal Year:** 2012
Cost Centre Status: ACTIVE **HST Rebate Rate:** 73 %

Run Date/Time: 5/24/2012 2:34:25 PM
Manager: Verrilli,Mary
Location: Health, Nurs & Envir Stud Bldg
Department: 53850 HH-Office of the Dean

Current Month Actual	Account Description	Account#	Annual Budget	Current YTD Actual	Current YTD Commitment	Current YTD Total (Act+Commit)	Budget to YTD Total Var	% Remaining	Prior YTD Total
	Revenue								
-	ECR Registration Fees	045000	3,500.00	-	-	-	(3,500.00)	0%	3,250.00
-	ECR Conf-Registr-Fees	050305	1,500.00	1,630.00	-	1,630.00	130.00	9%	8,488.00
-	**Total External Cost Recoveries**		5,000.00	1,630.00	-	1,630.00	(3,370.00)	0%	11,738.00
-	ICR Donations & Grants	034040	3,000.00	3,000.00	-	3,000.00	-	0%	3,000.00
-	**Total Internal Cost Recoveries**		3,000.00	3,000.00	-	3,000.00	-	0%	3,000.00
-	OTO Trsf within F/D F200 CC Ra	099912	10,500.00	10,500.00	-	10,500.00	-	0%	32,240.00
-	**Total OTO Budget Allocations**		10,500.00	10,500.00	-	10,500.00	-	0%	32,240.00
-	**Total Central Allocations**		10,500.00	10,500.00	-	10,500.00	-	0%	32,240.00
-	**Total Revenue**		18,500.00	15,130.00	-	15,130.00	(3,370.00)	0%	46,978.00
	Expenses								
446.33	Admin Stipend Yufa	113000	5,356.00	5,355.96	-	5,355.96	0.04	0%	5,355.96
446.33	**Total Faculty - Admin Salaries**		5,356.00	5,355.96	-	5,355.96	0.04	0%	5,355.96
89.27	Ben Admin Stipend Yufa	213000	1,071.00	1,071.24	-	1,071.24	(0.24)	0%	1,071.24
89.27	**Total Faculty - Admin Benefits**		1,071.00	1,071.24	-	1,071.24	(0.24)	0%	1,071.24
535.60	**Total Fac Admin Salary & Benefits**		6,427.00	6,427.20	-	6,427.20	(0.20)	0%	6,427.20
-	Asst'Shp-Ft Yk Grad Stud - Can	194001	7,200.00	-	-	-	7,200.00	100%	2,000.00
-	GuestLecturers&Honoraria NYork	195001	1,300.00	850.00	-	850.00	450.00	35%	300.00
-	**Total Research Staff - Salaries**		8,500.00	850.00	-	850.00	7,650.00	90%	2,300.00
-	Ben Guest Lecturers- employees	295000	-	-	-	-	-	0%	31.50
-	**Total Research Staff - Benefits**		-	-	-	-	-	0%	31.50
-	**Total Res Staff Salary & Benefits**		8,500.00	850.00	-	850.00	7,650.00	90%	2,331.50
535.60	**Total Total Salaries and Benefits**		14,927.00	7,277.20	-	7,277.20	7,649.80	51%	8,758.70
-	Repair & Maintenance-Building	431000	100.00	-	-	-	100.00	100%	71.79
-	Alterations	439000	-	-	-	-	-	0%	20.21
-	Cleaning Services	451000	-	53.76	-	53.76	(53.76)	0%	-

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Location: Health, Nurs & Envir Stud Bldg
Department: 53850 HH-Office of the Dean

Current Month Actual	Account Description	Account#	Annual Budget	Current YTD Actual	Current YTD Commitment	Current YTD Total (Act+Commit)	Budget to YTD Total Var	% Remaining	Prior YTD Total
	Expenses								
-	**Total Equipment, Furniture, & Bldgs**		100.00	53.76	-	53.76	46.24	46%	92.00
-	L.D./Telegrams	332000	25.00	-	-	-	25.00	100%	2.83
-	Pay-At-Bank Charges	370700	-	15.00	-	15.00	(15.00)	0%	-
-	Minor Research Grants	382500	-	2,850.00	-	2,850.00	(2,850.00)	0%	-
-	**Total Other Expenses**		25.00	2,865.00	-	2,865.00	(2,840.00)	0%	2.83
-	Hotel Expense-Faculty	401300	-	-	-	-	-	0%	1,415.24
-	Travel-General-Other	402500	-	718.44	-	718.44	(718.44)	0%	-
713.15	Visiting Speakers-Travel -Gen	405000	3,000.00	1,941.85	-	1,941.85	1,058.15	35%	-
-	Functions - Campus	406000	5,000.00	1,276.44	-	1,276.44	3,723.56	74%	2,841.63
294.40	Hospitality - Campus	406200	1,500.00	2,245.54	-	2,245.54	(745.54)	0%	1,392.55
1,007.55	**Total Travel & Hospitality**		9,500.00	6,182.27	-	6,182.27	3,317.73	35%	5,649.42
-	Office Supplies Gen	301000	3,000.00	187.64	-	187.64	2,812.36	94%	3,706.42
435.00	Teach.&Res Gen Sup	305000	3,000.00	(2,178.36)	-	(2,178.36)	5,178.36	173%	2,626.47
-	Audio-Visual	305300	-	25.00	-	25.00	(25.00)	0%	-
-	Printing And Photocopy Gen	320900	-	2,232.07	-	2,232.07	(2,232.07)	0%	-
435.00	**Total Supplies-Comprehensive&General**		6,000.00	266.35	-	266.35	5,733.65	96%	6,332.89
1,442.55	**Total Operating Costs**		15,625.00	9,367.38	-	9,367.38	6,257.62	40%	12,077.14
198.30	Telephone Equip Rental-Telecom	467000	1,200.00	1,189.80	-	1,189.80	10.20	1%	1,189.80
198.30	**Total Telephone & Power**		1,200.00	1,189.80	-	1,189.80	10.20	1%	1,189.80
198.30	**Total Taxes and Utilities**		1,200.00	1,189.80	-	1,189.80	10.20	1%	1,189.80
-	Scholarships - Pay Off	802000	-	1,000.00	-	1,000.00	(1,000.00)	0%	-
-	**Total Scholarships & Bursaries**		-	1,000.00	-	1,000.00	(1,000.00)	0%	-
2,176.45	**Total Expenses**		31,752.00	18,834.38	-	18,834.38	12,917.62	41%	22,025.64

STATEMENT OF OPERATIONS

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Run Date/Time: 5/24/2012 2:34:25 PM
Manager: Verrilli,Mary
Location: Health, Nurs & Envir Stud Bldg
Department: 53850 HH-Office of the Dean

Current Month Actual	Account Description	Account#	Annual Budget	Current YTD Actual	Current YTD Commitment	Current YTD Total (Act+Commit)		Budget to YTD Total Var	% Remaining	Prior YTD Total
(2,176.45)	**Surplus/ (Deficit) Current Year**		(13,252.00)	(3,704.38)	-	(3,704.38)	**(1)**	9,547.62	0%	24,952.36
					Employee Advances	-	**(2)**			
					Carry Forward from Previous Year	55,601.47	**(3)**			
					Balance Available (Overspent)	51,897.09	**(4) = (1-2+3)**			

Muscle Health Reseach Centre: 2012-2013 Budget	
Expenses	**2012-13**
Operating Expenses	
Director's Stipend and Benefits	6,428
Centre Coordinator Salary and Benefits (2 days/wk)*	6,000
Office/Computer Supplies	1,500
Telephone	1,200
Research, KT and Training Expenses	
Research Supplies	1,000
MHRC Faculty Research Awards	3,000
MHRC Student Scholarships	2,000
Muscle Health Awareness Day	2,000
Poster Prizes and Guest Speaker Honoraria	1,850
Travel for visiting speakers	3,600
Hospitality for events, meetings, visitors	3,000
Printing costs	1,500
Total Expenses	**33,078**
Revenue	
Membership Fees (15 x $250)	3,500
Conference registration fees	1,500
Contribution from FSE	3,000
Contribution from Health	10,500
Costs covered by CRC	10,000
Total Revenue	**28,500**
Total Revenue Less Expenses	**(4,578)**
Carryforward From Previous Year	**51,897**
Carryforward to Next Year	**47,319**
Other Costs - Health	
Approximate cost of Director's course release 1.5 FCE	27,900

Muscle Health Research Centre Annual Report
May 1, 2012 - April 30, 2013

1. Contact Information

Director:	David A. Hood
Admin Contact:	Heather Carter
Address:	302 Farquharson
Tel:	Ext 66640
Fax:	Ext 55728
E-Mail:	dhood@yorku.ca or mhrc@yorku.ca
Website:	http://www.yorku.ca/mhrc/

2. **List Faculties that supplied active members to the ORU, indicating the number of active members from each**.

Faculty of Health (13), Faculty of Science and Engineering (2)

3. **Charter date**: July 1 2008

4. Mandate

The mandate of the MHRC 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 became York University's first organized research unit (ORU) in the Faculty of Health dedicated to Biomedical Sciences, and it continues to increase the University's visibility in this important area of research. The MHRC consists of a strong cohort of very well-funded and highly productive scholars (including a Canada Research Chair) and graduate students from the Faculty of Health and the Faculty of Science & Engineering. Its intent is to become a renowned centre for muscle health research in North America.

5. Membership and Governance

Active members (York faculty): 15; a complete list of active and adjunct members of the MHRC and their departmental affiliations is provided below.

Other members: Adjunct faculty members: 4; Graduate and UG student members (York): 63; Graduate and UG student members (non-York, other Universities): 79

Executive Committee members: Drs. David Hood (Director), Olivier Birot, Mike Connor, Robert Tsushima, and Ms. Sobia Iqbal (Graduate Student Member)

Executive Committee Subcommittee (name and members)(if any): N/A

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
Adegoke, Olasunkanmi	Assistant Professor	Protein and amino acid nutrition and metabolism	oadegoke@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	anbelcas@yorku.ca (416)736-2100 x 21088	Norman Bethune College, 333B
Birot, Olivier	Assistant 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
Connor, Michael	Associate Professor	Muscle Development and Cancer	mconnor@yorku.ca (416)736-2100 x 77206	Lumbers Building, 224
Gage, William	Associate Professor	Biomechanics of postural control and of joint stability	whgage@yorku.ca (416)736-2100 x 33027	Sherman Health Science Research Centre, 2022
Haas, Tara	Associate Professor	Angiogenesis in Muscle	thaas@yorku.ca (416)736-2100 x 77313	Farquharson Building, 341
Hamadeh, Mazen	Associate Professor	Human Nutrition and Exercise Physiology, Diabetes and ALS	hamadeh@yorku.ca (416)736-2100 x 33552	Norman Bethune College, 365
Kuk, Jennifer L.	Assistant 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 G.R.	Assistant Professor	Redox Metabolism, Skeletal Muscle, Diet and Exercise	cperry@yorku.ca (416)736-2100 x 33232	Norman Bethune College, 324
Riddell, Michael	Associate Professor, KAHS Graduate Program Director	Exercise Physiology, Stress and Diabetes Metabolism	mriddell@yorku.ca (416)736-2100 x 40493	Norman Bethune College, 347
Scime, Anthony	Assistant Professor	Stem Cell Biology; Muscle Regeneration; Adipose Differentiation	ascime@yorku.ca (416) 736-2100	Norman Bethune College, 327C

			x33559	
Department of Biology				
McDermott, John	Professor and Biology Graduate Program Director	Muscle Development	jmcderm@yorku.ca (416)736-2100 x 30389	Farquharson Building, 327
Tsushima, Robert	Associate Professor	Cardiac Muscle Physiology and Disease	tsushima@yorku.ca (416)736-2100 x 20996	Farquharson Building, 344
Adjunct Members				
Cafarelli, Enzo (Emeritus)	Professor Emeritus	Neuromuscular Physiology	ecaf@yorku.ca	
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
MHRC Coordinator				
Carter, Heather (July 2012 onwards)	Graduate Student		heathery@yorku.ca X 77832	Farqhuarson Bldg, 342 X 22999 Fax: 416-650-8483

6. Annual Progress in Fulfilling Mandate

The MHRC continues to expand its activities every year within its limited budget, consistent with the goal of uniting muscle health researchers and graduate students and providing a platform which will serve to increase the visibility of York University, and the MHRC, in Canada and around the world. Despite the achievements of our goals over the past year, we have a continuing list of impressive plans for the future (see Section 8, below). Our accomplishments are listed in Appendix 2, including the funding obtained, awards received and most significant publications in peer-reviewed journals. This appendix contains a truncated version of the vast list of accomplishments of our faculty members (a complete list is provided on the MHRC website). Nonetheless, it is very clear from this Appendix that the MHRC is fulfilling its mandate in promoting muscle research for the health and well-being of Canadians. We are very successful at obtaining NSERC, CIHR, Heart and Stroke Foundation and Canadian Diabetes Association research funding, and at publishing our findings.

a) Funding proposals: Perhaps because of the many individual successes noted above, there is less emphasis or necessity within the MHRC to develop large-scale collaborative grants to help support trainees and graduate students. In addition, graduate students are largely funded by departmental teaching assistantships. Nonetheless, several collaborations do exist among MHRC faculty members,

and among faculty at other institutions, and a large scale CREATE grant application is planned for submission in the coming year;

b) Events organized: We held 3 types of events in the last year: 1) Colloquia, featuring internal speakers discussing their work in an informal interactive research presentation, 2) Seminars, in which external speakers from other Universities were invited, presented their work, and interacted with faculty members and graduate students, and 3) the Annual Muscle Health Awareness Day (MHAD), which attracted 10 external speakers, 40-50 posters presented by graduate students, and a total registration of 120-130 people. This was our third Annual MHAD, and the event grows progressively every year. Indeed all events were extremely successful;

c) Knowledge Mobilization / Outreach: All MHRC faculty members are involved in promoting knowledge mobilization of their research via the MHRC website. 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. 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 trained and mentored 57 MSc and PhD students, 56 undergraduate students, and 4 post-doctoral fellows over the past year alone;

e) Continuing Education: Over the past year the Director, in collaboration with faculty of Health staff, began to investigate the possibility of providing continuing education programs in "Muscle Health", "Exercise" and "Muscle Physiology" for the Board of Education (Teacher training), as well as the fields of Nursing and Message Therapy. Discussion are ongoing;

f) Other leadership activities: The MHRC sponsored one Faculty Research Award ($3000) and one MHRC Student Fellowship directed against the Graduate Student's fees.

7. Financial Accountability

The attached Excel spreadsheet provides the 3 year rolling budget and line-by-line explanation. At the moment, there are no research grants or contracts that are administered by the MHRC. In addition, the MHRC is surviving on the financial surplus acquired in previous years. The faculties of Health and Science have made no commitment to provide supportive funding for the Centre beyond 2013-14. Thus, the MHRC will continue to investigate the possibility of acquiring financial support through other initiatives, such as Continuing Education programs (see above), fundraising, or industry or granting agency contract overhead contributions.

8. Objectives for Upcoming Year

a) Continue to try to develop Continuing Education initiatives with Teachers, Nurses, Massage Therapists in an effort to bring in revenue to support the MHRC;

b) Develop more relationships with industry to initiate contractual agreements which will bring in revenue for the MHRC;

c) Develop more Knowledge mobilization initiatives to increase the exposure of the MHRC to the public for educational purposes, as well as to encourage the involvement of potential donors;
d) Consider having a grant crafting workshop, one or twice a year;
e) Organize a workshop related to clinical/human research, involving dialogue between individuals who are already participating;
f) Generate interest and ideas to formulate a CREATE grant for submission next Winter, 2014;
g) Organize a 1-day Professional development presentation for trainees to critique and video tape student presentations. Involve the career Centre or industry representative in this initiative;
h) Develop more collaborations between laboratories within the MHRC.

9. Other relevant items the Director wishes to report

(None)

10. **Appendix 1** – Additional Information about Progress in Fulfilling Mandate (that does not appear elsewhere in the Report). (N/A; not included)

11. **Appendix 2** – Individual Member Contributions (up to five most notable items only for each member)

Appendix 2 is attached. Please note that this represents only a small sampling of the publications and achievements of our MHRC faculty members, as requested for this Annual Report template. A more complete list is available at **yorku.ca/mhrc/**

Cumulative Financial Statement

ORU: MUSCLE HEALTH RESEARCH CENTRE (MHRC)							
Cost Centre: 157001							
					3 Year Rolling Budget		
Account Description	**2010-11 Budget**	**2011-12 Budget**	**2012-13 Budget**	**Comments**	**2013-14**	**2014-15**	**2015-16**
Revenue:							
Base Allocation from Central							
VPRI support							
Faculty support	35240	13500	13500	Contributions from Health and Science. (Director's course release not in included - this is funded directly by Health)	13500		
Endowment Revenue							
Indirect Costs (Overhead)							
Support from Grants and Contracts							
Other Internal Revenue	3250			Faculty membership fees are no longer charged			
Other External Revenue	8488	1630	1720	conference (MHAD) fees	2000	2000	2000
TOTAL REVENUE	**46978**	**15130**	**15220**		**15500**	**2000**	**2000**
Expenses:							
Total Faculty Administrators	6427.2	6427.2	6427.2	Director's stipend	7200	7200	7200
Total Research Staff	2331.5	850	9361.95	RA, honoraria	3000	3000	3000
Total Support Staff				Centre Coordinator supported directly via Director's CRC			
Total Scholarships and Awards		3850	4000	Faculty Research Award, Student Awards	5000	5000	5000
Total Miscellaneous expenses	13266.94	7707.18	9397.51	travel, events, maintenance, phone, supplies	10000	10000	10000
TOTAL EXPENSES	**22025.64**	**18834.38**	**29186.66**		**25200**	**25200**	**25200**
Total Revenue Less Total Expenses	24952.36	-3704.38	-13966.66		-9700	-23200	-23200
Carryforward from Previous Year	30649.11	55601.47	51897.09		37930.43	28230.43	5030.43
Carryforward to Next Year	55601.47	51897.09	37930.43		28230.43	5030.43	-18169.57

Appendix 2: Individual Member Contributions
(Five most notable contributions)
May, 1 2012 – April 30, 2013

O. Adegoke

1. Funding Received:

- NSERC Discovery Grant, 2008/2009 Competition: $100000.00 over 5 years to study 'Mechanism of nutritional regulation of protein metabolism in skeletal muscle'.

2. - Minor Research: Branched-chain amino acid metabolism and regulation of muscle differentiation.
Amount awarded: $3000;
Organization: Faculty of Health, York University. May 2012.

3. Funding Applied for:

- Title: Liquid Chromatography System
Co-investigators: Riddell MC, Hamadeh M
Amount requested: $149,000.00
Organization and program: NSERC; Research Tools and Instruments, Fall 2012

4. Olasunkanmi A.J. Adegoke, Abdikarim Abdullahi, Pegah Tavajohi-Fini. mTORC1 and the regulation of skeletal muscle anabolism and mass. Applied Physiology, Nutrition, and Metabolism, 2012 Jun, 37(3): 395-406, 10.1139/h2012-009

5. In submission:

Dhanshri Kakade**, Nushaba Islam**, and **Olasunkanmi A.J. Adegoke**. Regulation of PDCD4 by amino acids and growth factors in L6 myotubes is sensitive to mTORC1 and the proteasome. Submitted to PLoS ONE, April 2013.

A. Belcastro

1. Fundng Applied for:

- Community-Driven Solution for Active Healthy Kids. (Submitted – not received) SunLife Community Foundation ($74,100)

2. Angelo N. Belcastro, Katherine S. Morrison, Emma Hicks, and Helin Matta. (2012) Cardiorespiratory and metabolic responses associated with children's physical activity during self-paced games. Canadian Journal of Physiology and Pharmacology, 90: 1269–1276.

O. Birot

Funding Received:

1. - NSERC Research Tool Infrastructure, 2013, **Co**-PI with Dr. Haas, $40,741, Awarded.

2. - NSERC Discovery Grant, 2011-2016, PI, $120,000, Awarded.

3. 2012 Nomination by the School of Kinesiology and Health Science for the award of International recognition in research.

4. Roudier E, Forn P, Perry ME, **Birot O**. Murine Double Minute-2 is required for capillary maintenance and exercise-induced angiogenesis in skeletal muscle. FASEB Journal 26: 4530-4539, 2012 - (IF 5,712)

5. Gouzi F, Prefaut C, Abdellaoui A, Roudier E, de Rigal P, Molinari N, Laoudj-Chenivesse D, Mercier J, **Birot O**, Hayot M. Blunted muscle angiogenic training-response in COPD patients versus sedentary controls. European Respiratory Journal, In press 2012 (IF 5,895)

R. Ceddia

1. Funding Received:
NSERC *Discovery Grant*
Project Title: Regulation of whole-body energy metabolism
Funding period: 5 years (2011 – 2016) **Amount awarded**: $200,000.00

2. Funding Applied for:

- Operating grant – CIHR – Amount requested: $437,100.00

3. Vitzel KF, Bikopoulos G, Hung S, Pistor KE, Patterson J, Curi R, **Ceddia RB**. Chronic treatment with the AMP-kinase activator AICAR increases glycogen storage and fatty acid oxidation in skeletal muscles but does not reduce hyperglucagonemia and hyperglycemia in insulin deficient rats. Plos One 2013 (Ms # PONE-D-13-06759 – *In Press*)

4. **Ceddia RB**. The role of AMP-activated protein kinase in regulating white adipose tissue metabolism. Mol Cell Endocrinol. 25;366(2):194-203, 2013.

5. Gaidhu MP, Bikopoulos G, **Ceddia RB**. Chronic AICAR-induced AMP-kinase activation regulates adipocyte lipolysis in a time-dependent and fat depot-specific manner in rats. Am J Physiol Cell Physiol. 1;303(11):C1192-7, 2012.

M. Connor

Funding Received:

1. York University Faculty of Health Minor Research Grants. *The Paracrine Role of Adipokines in Prostate Cancer.* This project will look at the paracrine role of adipose tissue obtained from prostate cancer patients on prostate cancer cell cycle regulation. This project uses a co-culture model (primary adipose tissue and prostate cancer cells). Value: $2,850 over 2 years (2013-2015).

2. Canada Foundation for Innovation Infrastucture Operating Funds. *Molecular regulation of muscle development.* This project will look at the role of electrical activity in the molecular regulation of muscle development/differentiation. Value: $50,000 over 3 years (2012-2015).

3. Funding Applied for:
Title: *The paracrine/endocrine effects of adipose tissue on prostate cancer.*
Source: Prostate Cancer Canada

Dollars Requested: $190,400
Dates of Project: 07/ 2013 - 06/2015
PI: **Michael Connor**
Co-PIs: Fleshner N,
Major Goal of project: Investigate whether metformin and statin administration alter the serum adipokine profile in obese prostate cancer patients from one that promotes disease progression to one that prevents progression.

4. Title: *The interaction between stress hormones and adipokines.*
Source: N.S.E.R.C. Discovery Grant
Dollars Requested: $265,050
Dates of Project: 04/ 2013 - 03/2018
PI: **Michael Connor**
This project is designed to evaluate the effects of stress hormones (cortisol) and their effects on skeletal muscle cell cycle regulation and differentiation. In addition, cortisol has been shown to affect adipocyte adipokine secretion patterns and these adipokines can have affects skeletal muscle cell cycle regulation. Thus, we will look at the combinatory effects of cortisol and adipocyte effects on cell cycle control in skeletal muscle.

5. Walker, O.S., D.N. Trivedi, C.F. Theriau, M.P. Gaidhu, R.B. Ceddia and **Connor, M.K**. Adipokines Create a Growth Microenvironment in Breast Cancer That Depends on the Adiponectin:Leptin Ratio and Involves AMPK. Submitted to J. Biol. Chem. August 2012. Currently in revision.

W. Gage

1. Funding Received:
Harris L (PI), Gage WH (Investigator), + 7 others. (2012). Full field vision and spatial orientation. Canadian Foundation for Innovation – Leading Edge and New Initiatives Fund. $790,891

2. Harris L (PI), Gage WH (Investigator), + 7 others. (2012). Full field vision and spatial orientation. Ontario Research Fund. $790,891

3. Tung JY, **Gage WH**, Poupart P, McIlroy WE. (in press). Upper Limb Contributions to Frontal Plane Balance Control in Rollator-Assisted Walking. Assistive Technology.

4. Prajapati SK, Mansfield A, **Gage WH**, Brooks D, McIlroy WE. (in press). Cardiovascular responses associated with daily walking in sub-acute stroke. Stroke Research and Treatment.

5. Street BD, **Gage WH**. (in press) The effects of an adopted narrow gait on the external adduction moment at the knee joint during level walking: evidence of asymmetry. Human Movement Science.

T. Haas

Funding Received:

1. 2013 NSERC Discovery Grant (renewal); $33,000/year (5 years)
"Regulation of capillary sprouting and stabilization in skeletal muscle"

2. 2013 NSERC Research Tools and Instrumentation; $40,741 (PI; 1 co-applicant)
"Multi-modal plate reader"

3. E.Roudier, M.Milkiewicz, O.Birot, D.Slopack, A.Montelius, T.Gustafsson, J.H. Paik, R.A. DePinho, G.P. Casale, I.I. Pipinos, **T.L. Haas**. Endothelial FoxO1 is an intrinsic regulator of thrombospondin1 expression that restrains angiogenesis in ischemic muscle. Journal of Angiogenesis, 2013

4. Kopycinska,J., P. Milkiewicz, A. Kempińska-Podhorecka, **T.L. Haas**, E. Elias, R.A. DePinho, J. Paik, M. Milkiewicz. Activation of FoxO3a/ Bim axis in patients with Primary Biliary Cirrhosis. Liver Int. 2013 Feb;33(2):231-8. doi: 10.1111/liv.12030.

5. Shikatani, E.A., A. Trifonova, E.R. Mandel, S.T.K. Liu, E. Roudier, A. Krylova, A. Szigiato, J. Beaudry, M.C. Riddell, and **T.L. Haas**. Inhibition of proliferation, migration and proteolysis contribute to corticosterone-mediated inhibition of angiogenesis. Plos One 2012 Oct, 7: e46625. doi:10.1371/journal.pone.0046625

M. Hamadeh

1. Funding Received:

October 2012 Does vitamin D deficiency influence skeletal muscle pathology in amyotrophic lateral sclerosis?
Muscle Health Research Centre Faculty Research Award, York University, $3,000 (PI).

2. Funding Applied for:

March 2013 Optimal vitamin D supplementation in mitigating amyotrophic lateral sclerosis
CIHR – $125,234 over 2 years (PI)
Results: Awaiting response

3. 2012 Dean's Service Award (Early Career), Faculty of Health, York University

4. **Gianforcaro A, **Hamadeh MJ**. Vitamin D as a potential therapy in amyotrophic lateral sclerosis. CNS Neurosci Ther 2013 (in revision; ms# CNSNT-2012-133.R1).

5. **Seevaratnam R, Tarnopolsky MA, **Hamadeh MJ**. Coffee is more effective than caffeine and chlorogenic acid in reducing oxidative stress, inflammation and the pro-apoptotic Bax in male G93A mice. PLoS One 2013 (*in revision;* ms# PONE-D-11-12506R1).

D.A. Hood

1. Funding Received:

Natural Science and Engineering Research Council of Canada Research Tools and Instruments Grant entitled: "Ultracentrifuge and rotors" ($143,438)

2. Natural Science and Engineering Research Council of Canada Discovery Grant entitled: "Mitochondrial Biogenesis in Skeletal Muscle" ($110,000 per year; continued).

3. Canadian Institutes for Health Research (CIHR) Research Grant entitled "Autophagy in skeletal muscle" (103,661 per year; continued).

4. Menzies, K.J., K. Singh, A. Saleem and **D.A. Hood**. Sirtuin 1-mediated effects of exercise and resveratrol on mitochondrial biogenesis. J. Biol. Chem. 288: 6968-79, 2013 (March).

5. O'Leary, M.F., A. Vainshtein, S. Iqbal, O. Ostojic and **D.A. Hood**. Adaptive plasticity of autophagic proteins to denervation in aging skeletal muscle. Am J Physiol Cell Physiol. 304: C422-30, 2013 (March).

J. Kuk

1. Funding Received:

Project RADICAL: Race/ethnicity And the perception of Diabetes and cardiovascular disease risk factors In the context of CAnada's Lifestyle and obesity guidelines (2011-2012) - $50,000 (Heart and Stroke Foundation - Principal Investigator)

2. Funding Applied for:

Causes and Implications of Metabolically Healthy Obese. Canadian Diabetes Association - $111,780 (PI)

3. Spassiani NA, Jeffery-Tosoni S, **Kuk JL** and Fraser-Thomas J: Understanding Youths' Experiences in a Holistic Weight Management Program (Journal of Youth Development – 7(2), 15-26, 2012).

4. Abramovitch SL, Reddigan JI, Hamadeh MJ, Jamnik VK, Rowan CP, **Kuk JL**: Estimating serving sizes and food intake using Canada's Food Guide (APNM – Oct;37(5):923-30, 2012).

5. Yates EA, MacPherson A, **Kuk JL**: Secular trends in the diagnosis & treatment of obesity among U.S. adults in the primary care setting (Obesity – Sep;20(9):1909-14, 2012).

J. McDermott

1. 2013-2018 CIHR operating grant, $578,000 Regulation of MEF2 in cardiac and skeletal muscle cells (NEW)

2. 2013-2018 CIHR operating grant, $542,000 Role of Smad7 in Cardiac and Skeletal muscle (NEW)

3. Dionyssiou MG, Salma J, Bevzyuk M, Wales S, L LZ, **McDermott JC.** Kruppel-like factor 6 (KLF6) promotes cell proliferation in skeletal myoblasts in response to TGFbeta/Smad3 signaling. Skelet Muscle. 2013 Apr 2;3(1):7.

4. Dionyssiou MG, Nowacki NB, Hashemi S, Zhao J, Kerr A, Tsushima RG, **McDermott JC**. Cross-talk between glycogen synthase kinase β (GSK3β) and p38MAPK regulates myocyte enhancer factor 2 (MEF2) activity in skeletal and cardiac muscle. J Mol Cell Cardiol. 2013 Jan;54:35-44.

5. Belozerov VE, Lin ZY, Gingras AC, **McDermott JC**, Michael Siu KW High-resolution protein interaction map of the Drosophila melanogaster p38 mitogen-activated protein kinases reveals limited functional redundancy. Mol Cell Biol. 2012 Sep;32(18):3695-706.

Christopher Perry

1. Funding Received:

NSERC Discovery 2013-2018
Total Award: $145,000

2. Funding Applied for:

CFI Notice of Intent – York University internal competition ($349,500)

3. **Perry CGR***, Kane DA*, Lanza I, Neufer PD. Methods for assessing mitochondrial function in Diabetes. *Invited Review,* Diabetes. 62: 1041-1053, 2013. (1st publication during faculty position)

4. Lally JS, Herbst EA, Matravadia S, Maher AC, **Perry CGR**, Ventura-Clapier R, Holloway GP. Over-expressing mitofusin-2 in healthy mature mammalian skeletal muscle does not alter mitochondrial bioenergetics. *IN PRESS,* PLoS One. 2013.

5. Wan Z, **Perry CGR**, MacDonald T, Beaudoin MS, Castellani L, Chan CB, Schertzer J, Holloway GP, Wright DC. IL-6 is not necessary for the regulation of mitochondrial content in mouse adipose tissue. *IN PRESS*, PLoS ONE. 2013

M. Riddell

Funding Received:

New Grants

1. NSERC Discovery Grant (individual- 3rd renewal). $165,000 (2013-2017), Project Title: Examining the mechanisms for the lipolytic and antilipolytic effects of glucocorticoids in adipose tissue.

2. Corcept Therapeutics contract. $22,633.90 (5/7/2012-5/7/2013). Project Title: Glucocorticoid Inhibitors in a Rodent Model of Diabetes.

3. MaRS Innovation MSCPoP Round 2b. Prophylactic treatment of hypoglycemia in insulin-treated diabetes 11/15/2012- 7/31/2013) (partners Drs. Herbert Gaisano, Mladen Vranic, MaRS Innovation and the Centre for Drug Research and Development)- amount $65,000.

4. C. Panagiotopoulos, **M. C. Riddell** and E.A. Sellers. Canadian Diabetes Association 2013 Clinical Practice Guidelines. Chapter 35: Type 2 Diabetes in Children and Adolescents. Can J Diabetes 37 (2013) S117-S118.

5. Shpilberg Y, Beaudry JL, D'Souza A, Campbell JE, Peckett A, **Riddell MC**. A rodent model of rapid-onset diabetes induced by glucocorticoids and high-fat feeding. Dis Model Mech. 2012 Sep;5(5):671-80. doi: 10.1242/dmm.008912. Epub 2011 Dec 19. PubMed PMID: 22184636; PubMed Central PMCID: PMC3424464.

A. Scimè

Funding Received:

1. 2012 NSERC- Discovery Grant $125,000 5 years

2. 2012 Canadian Foundation for Innovation (CFI-LOI) $342,288 one time

3. 2012 NSERC-RTI $56 138 one time Co-Investigator (not received)

Funding Applied for:

4. 2013 Stem Cell Network (Stem Cell Drug Discovery) $75 000 one time
Principal Investigator (in Review)

5. **Scimè A**, (2012). The heat is on: a new avenue to study brown fat formation in humans. Frontiers in Cellular Endocrinology. Jan. 13: 2:118.

R. Tsushima

Funding Received:

1. 07.2009 – 06.2013 *SNARE Protein Regulation of Cardiac Ion Channels and ANF Secretion*
Principal Investigator
Heart and Stroke Foundation of Ontario (T6770) - $409,181 (total)

2. 07.2011 – 06.2014 *Role of Endogenous Cholesterol in Beta-Cell Stimulus-Secretion Coupling*
Principal Investigator
Canadian Diabetes Association (OG) - $274,725 (total)

3. 01.2012 – 12.2016 *In Vivo Imaging of Cardiovascular Function*
Principal Investigator: Robert Tsushima
Leaders Opportunity Fund
Canadian Foundation for Innovation - $350,720

Funding Applied for:

4. 2013.07 – 2018.06 *SNARE Protein Regulation of Cardiac Ion Channels and ANF Secretion*
Principal Investigator
CIHR – applied

5. Dionyssiou MG, Nowacki NB, Hashemi S, Zhao J, Kerr A, **Tsushima RG**, McDermott JC. Cross-talk between glycogen synthase kinase 3β (GSK3β) and p38MAPK regulates myocyte enhancer factor 2 (MEF2) activity in skeletal and cardiac muscle. Journal of Molecular and Cellular Cardiology 54:35-44, 2013

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External Review of Organized Research Unit (ORU) Charter Application

External Reviewer Questionnaire

Thank you for agreeing to participate in the external review of a Research Centre or Institute at York University. Your expertise and insight are highly valued. The review team is requested to submit a single report which as far as possible answers each of the following questions. We are seeking concise reports under 15 pages where feasible. This questionnaire should be read in conjunction with the Senate Policy on ORUs and its associated guidelines, a copy of which has been provided to you with the charter application. Your final report, and any questions about the process, should be addressed to Lia Cavaliere of the Office of the Vice-President Research & Innovation (lia@yorku.ca, or 416-736-2100 ext. 33782).

1. *Progress since last external review.* To what extent has the Centre/Institute taken appropriate steps to address recommendations from its last external review, as well as any VPRI or Faculty feedback on its last two annual reports? Please identify any areas where the Centre/Institute needs to take further action to address peer recommendations or institutional feedback on its progress.

2. *Success in meeting Senate expectations for ORUs.* How well has the Centre/Institute succeeded since its last review in meeting the expectations set out the Senate Policy on ORUs (s.2.2) and associated Guidelines (s.1)? For each of the following expectations, please score the Centre/Institute's achievements out of 5 (with 5 being the highest score). Please feel free to add qualitative or explanatory comments or to refer to specific information that has influenced your assessment. You may provide additional commentary outside the table if more space is needed.

Senate Policy Expectation	**1** little success	**2**	**3**	**4**	**5** great success
Foster a vibrant program of collaborative, interdisciplinary research			XX		

Comments:

The current membership of the MHRC consists of 13 researchers in Kinesiology & Health Science, with 2 members from Biology, and 4 adjunct members (1 Emeritus, and 1 each from Ryerson, McMaster, and U of T). As the Centre's mandate is rather specialized (skeletal muscle), it is to be expected that most members share an interest in muscle research, although some demonstrate other expertise (Adegoke and Hamadeh in metabolism, Birot in vascular plasticity, Ceddia and Kuk in adipose tissue, Gage in biomechanics, Hass in vascular, and Tsushima in cardiac tissue, as well as a focus in disease with Connor (cancer) and Riddell (diabetes)). The membership has not changed significantly since the MHRC's inception in 2009, and the application proposes the addition of at least 4 new members from the York community, and several from other universities to be included as adjunct members. What is not evident from the report is the extent to which these researchers interact on a regular basis, other than through seminars and colloquia. A vibrant collaborative interdisciplinary research program would be evidenced by examples of collaborative publications, grants, and colloquia involving presentations/discussions concerning skeletal muscle health in general. A collaborative CFI 'notice of intent' has apparently been submitted, which, if awarded, will renovate an animal facility and reorganize some laboratories to provide core equipment. The MHRC does clearly benefit from its program of colloquia involving internal presentations, seminars that include externally invited speakers, and the annual Muscle Health Awareness Day. The latter, of which 4 have been held, appear to be attracting increasing numbers of attendees from outside the university. This event involves external speakers and graduate student posters from York and beyond, and many opportunities for discussion and interaction. With respect to collaborative grants, several opportunities have been pointed out, but few actually exist at this time. This component should be highly encouraged, given the strong potential for collaborative research in the MHRC. Similarly, collaboration in published works appears limited at present, and should be encouraged in order to demonstrate more strongly that the MHRC is more than just the sum of its component faculty. The Director is advised to facilitate discussions on strategies to address the new funding structure of CIHR, and in particular a possible coordinated MHRC strategy for identifying possible candidates for pending Foundation vs. Project funding schemes. Ideally, some of this planning may involve the creation of collaborative application teams that may, for example, chose to organize themselves on a team-approach to addressing over-arching scientific questions of importance to

muscle health and disease. In addition, the Reviewers identified a lack of participation (in the MHRC) from other than "biomedical" researchers, and suggest that further efforts be made to recruit collaborators to address this. The Reviewers heard of some possibility of building of a diverse network and clinical contacts in the York region; this is in its infancy. Examples were presented by the Reviewers of possible contacts in the Toronto area that would provide valuable expertise and collaboration potential in clinical aspects of muscle health/disease. Increasing the participation of more clinical, population health, and health services/systems researchers in the MHRC may increase the collaboration potential of the MHRC, and may also better position the group for different funding streams (e.g. Ministry of Health, Ministry of Innovation, Genome Canada, etc).

The Appendix of the 2011-12 report includes an impressive list of facilities and equipment used by researchers in the MHRC. The extent to which these facilities are available for collaborative research, or common use, is not indicated.

Plans for the future include the promotion of more collaborations with York and extra-York laboratories, and to develop a Muscle Health Network with researchers in southern Ontario, upstate NY and Northern Michigan. Such a network, involving Skype and/or Webex technology, could easily go farther afield than what is proposed in the application.

A feasible long-term goal is the establishment of a Research network of excellence in Muscle Health.

SUMMARY. The Center has been very successful in creating a "home" for muscle health researchers – future efforts might be directed to creating more of a "forum" for the fostering of new and exciting discussions of skeletal muscle health from the perspectives of the various MHRC members, and perhaps others. The MHRC is now poised to demonstrate strong collaborative research that addresses issues in muscle health that go beyond those normally addressed by individual investigators. This may implicate the targeted recruitment of adjuncts from outside York University to contribute to specific issues, such as clinical issues pertaining to skeletal muscle health (examples given were rehabilitation from orthopedic procedures, COPD and respiratory muscle health, immune function, pain). Reviewers suggest that the MHRC consider recruiting population health and health services/systems researchers with an interest in muscle health. Reviewers also suggest that the MHRC start to cultivate increased communication and pursue potential partnerships with industry and relevant governmental and NGOs (Rx&D, Genome Canada, Muscular Dystrophy Association, as examples).

Provide community to support individual researchers			**XX**		

Comments:

The common activities of the MHRC include colloquia (where graduate students present), seminars by invitees from outside York, and the annual Muscle Health Awareness Day. These are all examples of a research community that provides evidence of "value added". Apart from these activities, community engagement and interactions appear to depend on individual/independent efforts of the MHRC faculty members. No administrative support is provided broadly to members of the MHRC. Reviewers learned during their visit that minimal administrative support is available to York researchers in general, and that the current group's common activities are supported by the part-time assistance of a graduate student. As such, neither the Director of the MHRC, nor its members have the support needed to administer present activities (e.g., maintain website, organize research days) and need such support to pursue initiatives or activities such as exploring commercialization/sponsorship opportunities. Reviewers saw this as a significant barrier to the future progress of the MHRC. Reviewers believe that expanding the 'bandwidth' of the MHRC's highly capable Director and faculty membership by providing dedicated (or at the very least shared) professional administrative assistance in communication, advancement, commercialization, and infrastructure are critical investments required for this Centre to emerge as a self-sustaining ORU. In particular, the MHRC should now interact with advancement services/development officer (the area is "ripe" for philanthropy) and should further knowledge translation (KT) directions, such as a community muscle research day be pursued, the services of a communications officer would be essential.

Supporting letters, especially from young researchers, and perhaps grad students, would have been helpful to reviewers to assess this criterion more fully.

A notice of intent to CFI for a centralized, novel, multidisciplinary Core Research Facility which will assist all Center members in their research, has been submitted. The claim is that this facility "will serve as a catalyst for the growth of important collaborative research projects on muscle metabolism, development, disease and adaptation". Part of this funding is for the renovation of the current animal facility as well as reorganization of research laboratories for the incorporation of common infrastructure, including a clinical research unit.

Some limited student support in the form of MHRC student scholarships (2@ $1000) appears to be available.

A meeting with four of the MHRC members plus the Director of the School of Kinesiology provided positive feedback on the value-added of the MHRC, with individuals referring to the value for recruiting graduate students, helping to build on individual strengths, providing a focus that helps in recruitment of high-quality faculty members, and of the common activities (seminars, Muscle Health Awareness day, colloquia). One newly-recruited faculty member (C. Perry) indicated that the

MHRC was a factor in his career choice of York over other possibilities. It was also noted that simply having a named group (i.e., belonging to the MHRC) was helpful for grant applications.

SUMMARY. While it is evident that the organized activities of the MHRC (colloquia, seminar series, Muscle Health Awareness Day) provide some support for individual researchers, it is not entirely clear how these activities require the existence of the MHRC – as these activities could theoretically be organized within existing Departments and Faculties. Administrative support necessary to provide more of a home to the researchers in the MHRC is currently inadequate. MHRC members seem satisfied with the value-added of the MHRC, and confirmed that this is a growing unit that will continue to develop into a world-class unit. While Reviewers did have the opportunity to talk with 5 members, supporting letters from other members addressing this specific issue would have been helpful.

Senate Policy Expectation	**1** little success	**2**	**3**	**4**	**5** great success
Bring together a critical mass of scholars				**X**	

Comments:

There is no doubt that the MHRC brings together a unique blend of skeletal muscle research scholars that is unparalleled in Canada (15 full and 4 adjunct members, with plans for 2 additional hires currently advertised:1 in Cardiovascular Physiology, the other, a CRC, in in Biology). Other Centers concentrating on skeletal muscle health are present in the US (National Skeletal Muscle Research Center in San Diego has 21 scientists spanning 5 research institutes and nine academic departments, and is on Facebook; Pennsylvania Muscle Institute has about 50 members; University of Kentucky has a Center for Muscle Biology, since 2008, and includes members from 30 departments and 9 colleges; a Skeletal Muscle Exercise Research Facility exists at U Utah) and Canada has a Center of Bone and Muscle Health at Brock. There are other international Centres as well, such as one in Copenhagen on which York's MHRC was apparently modeled. It would have been instructive to Reviewers to have the Director's impressions as to how MHRC compares to these other Centers, including such information as the participation of pillars other than biomedical in their respective Centres, their funding models, administrative resources, and corresponding academic activities (publications, citations, impact factors). In other words, a benchmarking exercise of the MHRC against comparable units is recommended. This would be particularly important at the time of the next review of the Centre.

Plans are presented to increase membership from other academic units at York, and particularly from other Universities. Consideration of areas of recruitment should probably include discussions with current members, and perhaps an Advisory Board, which has yet to be established.

Future growth of the MHRC would be enhanced through, and in fact may be dependent upon, provision of more administrative support which many other similar units in other institutions enjoy, such as professional writers, communication experts, commercialization specialists, and the like.

Although the MHRC has an Executive Committee that advises the Director, the function of this committee seems restricted to suggestions for speakers for the Annual Meeting, and organizational details for other common events. Reviewers suggest that the Director consider implementing a more participatory management approach, whereby meetings with all MHRC members (once or twice per year, for example) would provide a forum for discussion of such issues as new directions and initiatives, succession planning for Center membership and direction, community activities, partnerships and the like.

SUMMARY. The critical mass of scholars is in place, at least from a biomedical pillar perspective, and some discussion should be initiated on the need for more pillar 2-4 inclusion in the Center. Further growth of membership should be a consultative process, involving representation of current membership, and this may involve a more participatory management approach, with clear task-involvement of executive members, and regular MHRC membership meetings. Establishment of an Advisory Board, with representation reflective of potential community engagement and investment in the Centre, should be considered a priority.

Attain at least national leadership and international recognition in research field				**XX**	

Comments:

National and international leadership is being promoted in the Centre primarily through traditional publication of its members, and to some extent through dissemination of information that results from invited speakers. It would have been helpful to have letters from external, non-affiliated muscle researchers from Canada and abroad in order to allow Reviewers to adequately assess this component. Reviewers are cognizant of the international profile of several of the MHRC members, independent of the reputation of the MHRC.

The MHRC plans to offer Continuing Education programs in Neuromuscular Physiology, Exercise and Sports Physiology, and Review of Muscle Physiology, targeting Massage Therapists, with future plans to include Nurses, and Fitness Assessment and Counseling professionals. These activities will

certainly assist in heightening the profile of the Center. Increased administrative assistance would be necessary to help move this component forward. There was some debate as to whether these targets and continuing education programs were needed or whether an application – knowledge translation one-day community symposium might be effective.

On page 10, plans to achieve greater national and international prominence include more of the same activities which have characterized the Centre during the past few years. These provide little evidence of the "value added" component of the MHRC in national and international leadership in this research field.

The MHRC plans to develop an MHRC Summer School/Workshop for visiting students. If national and/or international, this would certainly enhance leadership profile of the Center.

SUMMARY. The MHRC is poised to attain national and international leadership role in skeletal muscle health research. Several individuals in the Centre are known internationally, which sets the stage for eventually achieving increased international profile. The Centre is strongly encouraged to move forward with proposed activities to attain that end. Some careful study and discussion on how other similar research centers in North America promote their activities nationally and internationally is recommended. Increased administrative assistance from the Institution would be necessary to move this component forward.

Senate Policy Expectation	**1** little success	**2**	**3**	**4**	**5** great success
Provide successful leadership in building external research funding			XX		

Comments:

Members are well-funded, mostly individually, and the community has begun to come together to write grants together. They have not yet formulated an over-arching research question or set of questions as a research group – this would be a valuable exercise for the MHRC in the eyes of the Reviewers. External funding for the Centre *per se* is very limited, and appears to be a priority for the next reporting period, through contracts and sponsorships. The Dean has pledged a portion of the indirect costs from individual research grants to the Centre to offset the financial deficit which results

from expenditures for activities, if necessary. It is recommended that the Director, in collaboration with the development office of the University, move ahead with plans to engage external donors to help fund Centre activities.

Enhance research and teaching environment for undergraduate and graduate students and post-doctoral fellows				XX	

Comments:

Over the past year, 56 UG, 57 graduate students and 4 PDFs have been trained at the Centre. It would have helped the Reviewers to receive letters or feedback from trainees at all levels, as we were only able to meet with a small group of graduate students during our site visit. Letters from trainees that have moved on to research and/or Faculty positions would have been particularly helpful.

Not much mention is made in the report of the nature of involvement of UG students in the Centre. Are they paid lab workers, or satisfying course requirements? Do they continue on the graduate work? With respect to graduate students, they clearly voiced how they benefit from the colloquia, seminars, and annual Muscle Health Awareness Day.

Graduate students have access to MHRC student fellowships, although these are limited (2 @ $ 1000).

An MHRC student committee has recently been created, essentially to allow more student input into Centre activities. MHRC has also developed a student-invited seminar speaker, and is in the process of developing a Career Workshop and an MHRC Student Colloquium, where students present. The MHRC plans to develop an MHRC Summer School/Workshop for visiting students.

The Reviewers met with a group of graduate students (7), who expressed the sentiment that they felt part of a team working within the MHRC, and thought that increased outreach to undergraduate students and the public might be a worthwhile goal for the MHRC, perhaps through graduate student engagement in these activities.

SUMMARY. The MHRC would seem a fertile research environment for UG and graduate students. Supporting letters from trainees who have moved since 2009 to other programs, PDF situations, and research positions, would have helped Reviewers evaluate this criterion more effectively.

Senate Policy Expectation	**1** little success	**2**	**3**	**4**	**5** great success
Develop external relationships and engage in knowledge transfer/knowledge mobilization/community engagement activities			XX		

Comments:

In 2013, MHRC proposes to offer Continuing Education programs in Neuromuscular Physiology, Exercise and Sports Physiology, and Review of Muscle Physiology, targeting Massage Therapists.

On page 8, the statement is made that the MHRC "serves as clear point of entry for scientists exterior to the University to connect with muscle health researchers". Is there any evidence that this occurs?

The MHRC is collaborating with industry. Specifically, one collaborator is Panacea Global, a cancer screening company, for which the MHRC will supply a diagnostic service for fees. Another potential (apparently not yet realized) collaboration involves provision of diagnostic services for OmniActive health Technologies Canada, a natural health product company.

Efforts are under way to work with the York Development Office to promote outreach and visibility of the MHRC. Currently the MHRC is improving visibility through the website, Facebook, webinars and blogs on muscle health.

Most KT occurs "passively" through promotion of knowledge via the MHRC website, which refers to published papers and media interviews.

An important first step in promoting the Centre outside the university would be the establishment of an Advisory Board, which is proposed in the current application. The role of the Advisory Board needs to be clearly established and in large part the role is related to community contacts and potential donors.

SUMMARY. The Centre is entering a phase in their development where engagement with the "outside world" should be high on the priority list. This will involve engagement of an Advisory Board, and interaction with external bodies interested in skeletal muscle health (pharmaceutical

companies, muscle-related NGOs). These activities could facilitate the establishment of contacts to external sponsorship funding. The Centre should also consider holding regular community-engagement activities, such as Cafés scientifique, and other knowledge dissemination activities for the general public.

Build the external reputation and raise the external profile of York research and researchers				XX	

Comments:

The statement is made on page 8 that the existence of the MHRC "puts York University on the map" in this area, promotes its visibility, and is a model of research excellence for the entire institution". Apart from support for this statement from the Dean and VP Research, evidence to support this "enhanced visibility", and "on the map" claim is not strongly presented. Letters from externals in the muscle research area would have been helpful here. There is an external profile of York research and researchers in this area; these individuals are mostly tri-council funded, and well-published with strong reputations or new emerging scientists, however externally it is not yet recognized that the group forms an MHRC (but this is likely related to the infancy of the Centre).

Efforts are under way to work with the York Development Office to promote outreach and visibility of the Centre. Currently the MHRC is improving visibility through the website, Facebook, webinars and blogs on muscle health. The MHRC executive might consider investigating how other similar centers in North America enhance visibility.

SUMMARY. The MHRC is still in the developmental stage, but must now begin to consider ways to enhance the reputation of itself and the University through other than traditional publication and presentation methods. This most probably involves increased engagement with the community.

Any additional comments on how the Centre/Institute has (or has not) met Senate Policy expectations since its last review:

3. *Quality of proposal for new charter*. To what extent does the proposal for the next 5 years meet the standard of high academic quality, with realistic and clearly defined goals and aspirations to achieve the expectations set out in the Senate Policy and guidelines?

   Goals for the next 5-yr cycle are fairly clearly outlined, but are limited, and approaches to attain these goals are somewhat nebulous. The MHRC should consider the creation of more tangible, realistic and evaluable goals relative to: 1) community outreach; 2) external funding through sponsorship; 3) a participatory management model allowing for more active involvement of MHRC members in planning/doing; 4) short-and long-term plans to generate research questions that are more Centre- (vs. individual)-directed; 5) addressing CIHR's Foundation vs. Project schemes, as well as other funding opportunities, as a Centre; and, 6) addressing, as a Centre, the extent to which the inclusion of all "pillars", including clinical, population health, and health services/systems, should be a future goal.

4. *Adequacy of deliverables and evaluation metrics.* Would you recommend any changes to the deliverables and evaluation metrics that the applicants have proposed for the next 5 years?

   Reviewers would have benefitted from letters from young researchers, graduate and undergraduate students, and past trainees now in the field, regarding their experiences in the MHRC.

5. *Value added.* To what extent does the proposal justify the necessity of a Centre/Institute to enhance individual/departmental/Faculty based structures in realizing research goals in this field?

   This is a growing research unit with a critical mass of muscle health researchers that has no parallel in Canada, and is poised to become an internationally renowned ORU. It is obviously attracting high-quality students and faculty, and is engaging many

other muscle scientists from Ontario and northern US states through its invited seminar series and Muscle Health Awareness Day. These are clearly "value added" components that add significantly to the role of the Centre in fostering research excellence at the Department, Faculty, and University and should thus continue to be supported. The next phase of growth of this unit will depend very much on the Faculties in question (Health/Science) mobilizing resources necessary to expand the Centre's administrative support so that it can actually have the operational 'bandwidth' to help fund itself. Such investments, made over the next 5 year cycle, are critical to enable the MHRC to truly attain national and international stature. It seemed nebulous to the Reviewers as to whether this administrative support to the MHRC would happen as funding seemed dependent on implementation of new Faculty budget models or named donors.

6. *Strategic alignment.* To what extent have the applicants demonstrated the proposal's alignment with emergent new directions in their field of research? Is the proposal well positioned in relation to external research funding and other opportunities that are likely to emerge over the next five years?

Skeletal muscle health as it relates to the health of other physiological systems is becoming recognized as an important emerging area of research. In a meeting of muscle physiologists from across Canada in November 2012, organized by the Institute of Musculoskeletal Health & Arthritis of the CIHR (to which Dr. Hood and 12 other prominent Canadian muscle researchers were invited), this was indicated as a priority research area, especially if involving 2 or more research "pillars" working together in a common research program. The MHRC is poised to benefit from funding in this area, especially if recommendations referred to above are addressed.

Muscle Health Research Centre
Annual Report
2018-2019

1. Contact Information

Director:	David A. Hood
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E-Mail:	dhood@yorku.ca or mhrc@yorku.ca
Website:	http://mhrc.info.yorku.ca

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 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 3. Supporting Research Growth & Development	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 3rd floor of Farquharson is helping us achieve this	

	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 3rd 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 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	oadegoke@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	anbelcas@yorku.ca (416)736-2100 x 21088	Norman Bethune College, 333B

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	Farqhuarson 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 PDGFRα and PDGFRβ 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 H_2O_2 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, Lambzerz 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 TNFα 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 Institue	Employee	Feb 22, 2019	Career Day
Dr. Andrew Foster	Novartis	Employee	Feb 22, 2019	Career Day
Dr. Lawerence Kazak	McGill University	Assistant Professor	April 5, 2019	MHRC Student Committee Invited Speaker

Cumulative Financial Statement

ORU: Muscle Health Research Centre							
Cost Centre: 157001							
					3 Year Rolling Budget		
Account Description	**2016-17 Actuals**	**2017-18 Actuals**	**2018-19 Actuals**	**Comments**	**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:							
Actuals must match bottom line in ereports - that is TR-TE, Cwfd and Balance must be the same as in ereports				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.			
A separate spreadsheet for each cost centre (no roll up).							

Name of Muscle Health Research Centre (MHRC)
Annual Report
2019 – 2020

1. **Contact Information**: Include the following:

Name of Director	
Telephone number	Ext 66640 or 77832
Email address	dhood@yorku.ca or mhrc@yorku.ca
Campus address	302 Farquharson
Administrative contact	Louise Solomon
ORU website	http://mhrc.info.yorku.ca

2. **Original and Current Charter Dates:**

July 1, 2008, re-charted in 2014.

3. **Mandate**

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 Canada Research Chairs and a York Research Chair) and graduate students from the Faculty of Health and the Faculty of Science. The current 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. As noted below, we have spent considerable time in 2019-20 analyzing and revising the vision and mandate of the MHRC (see **APPENDIX 2** – Additional **Centre-specific** accomplishments). This set of revisions has been submitted to the Dean of the Faculty of Health for approval.

4. **2019-2020 Outstanding Centre-specific Accomplishments**

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 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, and CFI 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.
    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 4 speakers in total, from the University of Montreal, the University of Florida, York University and the Mayo Clinic, Rochester MN. The Seminar Series was shortened to only 4 speakers because of COVID-19.
    3) The 10th Annual Muscle Health Awareness Day (MHAD10), which attracted 8 speakers (1 internal, 7 external), 28 other faculty members and 104 students. A total of 60 posters were presented by trainees (total registration: 140 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).
f) Other leadership activities: The MHRC sponsored two $1000 MHRC Student Fellowships directed against the Graduate Student's fees. This Fellowship is for MSc students in second year who do not have Tri-Council external funding sources;
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), Stealth Biotechnologies and F2C Nutrition (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. We look forward to hosting the next Career Day in February, 2021.

5. Challenges and Areas for Improvement

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 are beginning to re-formulate the plan for CFI funding if the opportunity arises in the near future. In the meantime, we continue to use the NSERC RTI application process to acquire new equipment to support our MHRC Core Facility.

b) Funding of the MHRC itself, either through donor contributions, industry support, or Continuing Education initiatives. 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 of Health Development Office.

6. Financial Position: The "Financial Position" is attached as Appendix 4.

7. Graduate Diplomas and Non-Degree Activities - Provide a brief list of all current graduate diplomas, courses, non-credit, and/or non-degree activities whether revenue generating and "other" offered by the ORU in the chart below. Be sure to indicate the home Faculty of any credit-assigned courses or diplomas.

List all current activities:

	Activity Type	**# Attendees**	**Affiliation**
1.	Advanced Certificate in Exercise and Muscle Health	In development	Kinesiology
2.	MHAD10	140	MHRC
3.	Seminar Speaker's Series	30-50/seminar	MHRC

Space Utilization

Room #	**Name of Occupant**	**Occupant Affiliation[1]**	**Type of Workspace[2]**	**Length and Frequency of Occupancy[3]**	**Notes[4]**
332 Farq	Louise Solomon	Coordinator	Office	Feb 18,2020 2.5 days/week	
333 Farq	Dr. David Hood	Director	Office	5d/week	

(a) **Shared Space/Equipment –** fill out the table below indicating the utilization of shared space and equipment within your ORU.

Room # [5]	**Type of Space/Equipment**[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	Core facility, large shared equipment lab	MHRC members, key	Unspecified, key access, 5d/week	Shared lab space, agreement in place
322 Farq	Exercise and Biopsy Lab	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
5 If no room number, indicate where it is located.				
6 Choose the type of space: meeting room, cubicle, reception, open space, resource centre, supply room, storage, coat closet, kitchen, photocopier room, break room, lab, etc.				
7 Choose type of access: open access, key badge, key, etc.				
8 Choose unspecified or list a *realistic* period (starting and ending) regarding how often this room gets used (e.g. 4 days a week, 3 days a week, etc.)				
9 Explain if there is an agreement in place and how this room is being utilized.				

8. Objectives for Upcoming Year

a) Funding proposals anticipated for submission by April 30, 2021:
We will reformulate a CFI Infrastructure proposal if given the opportunity, as we have done in the past. In addition, we always organize submissions for group infrastructure grants from using the NSERC RTI opportunity on a yearly basis. Individual faculty members also regularly 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 have also successfully won the bid to host the International Biochemistry of Exercise Conference in June, 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. Organization of this, including website development, is ongoing and well underway.

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 discussion with the Kinesiology and Health Science UPD to develop a Certificate in Exercise and Muscle Health for undergraduate students. 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 2020-21 we will be hosting MHAD11 via Zoom with 7 external and 1 internal speaker, along with 50-60 Abstract submissions. Our regular MHRC Seminar series will entertain 6 external speakers, as usual. We will also organize one Trainee Colloquium, featuring (internal) 3 speakers. We also anticipate 2-3 new post-doctoral fellows to be affiliated with the MHRC, from external institutions.

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.
- Continue to participate in NSERC and CIHR workshops to educate fellow York faculty members with the ins-and-outs of writing tri-Council funding applications.

FUNDING PROPOSALS: anticipated for submission by **April 30, 2021** by active members of the ORU

Funding Proposal	**Funder**	**Value**	**Type (grant, contract, other)**	**Role of ORU**
1. Infrastructure	CFI	TBD	Grant	Write the application, provide the space
2. Infrastructure	NSERC	TBD	Grant	As above
3. Operating	NSERC / CIHR	TBD	Individual Grant	Provide support where possible

PLANNED EVENTS: List conferences, workshops, exhibits or other events to be hosted or organized by **April 30, 2021**, and target audience(s).

	Events (Workshop, Exhibit, Conference, Other)	**Target Audience(s)**
1.	11th Muscle Health Awareness Day (MHAD11)	130-150 faculty and trainees
2.	MHRC Seminar Series	30-40/seminar, faculty and trainees
3.	Career Day	50-100, Graduate Students

PLANNED ACTIVITIES: List knowledge mobilization/engagement/outreach/technology transfer activities planned

	Activities (Knowledge Mobilization, Engagement, Outreach, Technology Transfer, Other)
1.	11th Muscle Health Awareness Day May 2020 – online Via Zoom
2.	MHRC Seminar Speaker's Series Fall 2020

All specific **visitors** invited or anticipated (visiting faculty or other)– please list

	Visitor	**Purpose**
1.	Dr. Charlotte Peterson	MHRC Seminar Speaker
2.	Dr. Imed Gallouzi,	MHAD11 speaker
3.	Dr. Jacob Haus	MHAD11 speaker
4.	Dr. Scot Kimball	MHAD11 speaker
5.	Dr. Sunita Mathur	MHAD11 speaker
6.	Dr. Phillip J. Millar	MHAD11 speaker
7.	Dr. Kimberly Dunham-Snary	MHAD11 speaker
8.	Dr. Richard l. Hughson	MHAD11 speaker
9.	At least 5 other speakers will be invited in F/W2020-21, TBD	

APPENDIX 1 – Active Members and Governance

Active Member Name	Faculty	Department
Abdul-Sater, Ali	Faculty of Health	School of Kinesiology and Health Science
Adegoke, Olasunkanmi	Faculty of Health	School of Kinesiology and Health Science
Backx, Peter	Faculty of Science	Department of Biology
Belcastro, Angelo	Faculty of Health	School of Kinesiology and Health Science
Birot, Olivier	Faculty of Health	School of Kinesiology and Health Science
Ceddia, Rolando	Faculty of Health	School of Kinesiology and Health Science
Cheng, Arthur	Faculty of Health	School of Kinesiology and Health Science
Connor, Michael	Faculty of Health	School of Kinesiology and Health Science
Drake, Janessa	Faculty of Health	School of Kinesiology and Health Science
Edgell, Heather	Faculty of Health	School of Kinesiology and Health Science
Gage, William	Faculty of Health	School of Kinesiology and Health Science
Haas, Tara	Faculty of Health	School of Kinesiology and Health Science
Hamadeh, Mazen	Faculty of Health	School of Kinesiology and Health Science
Hood, David	Faculty of Health	School of Kinesiology and Health Science
Hynes, Loriann	Faculty of Health	School of Kinesiology and Health Science
Josse, Andrea	Faculty of Health	School of Kinesiology and Health Science
Kuk, Jennifer	Faculty of Health	School of Kinesiology and Health Science
McDermott, John	Faculty of Science	Department of Biology
Perry, Christopher	Faculty of Health	School of Kinesiology and Health Science
Riddell, Michael	Faculty of Health	School of Kinesiology and Health Science
Roudier, Emilie	Faculty of Health	School of Kinesiology and Health Science
Scimè, Anthony	Faculty of Health	School of Kinesiology and Health Science
Sweeney, Gary	Faculty of Science	Department of Biology
Tsushima, Robert	Faculty of Science	Department of Biology

***Other Members*:** List all other members, designating the ORU's own categories and criteria for membership (e.g. members- affiliate or associate, student, external or community, non-active).

Other Member Name	Faculty	Department	Membership category
Biggard, Xavier	Medical Director	Union Cycliste Internationale (UCI)	Adjunct
Coe, Imogen	Faculty of Science	Ryerson University	Adjunct
Grace, Sherry	Faculty of Health	York University	Adjunct
Hawke, Thomas	Medicine	McMaster University	Adjunct
Jacobs, Ira	Faculty of Physical Education	University of Toronto	Adjunct
Laham, Robert	Physician	York Lanes Appletree Medical Centre	Adjunct
Wharton, Sean	Physician	Wharton Medical Clinic	Adjunct

Five notable contributions for each active member above

(A full and more complete list of MHRC contributions can be found on the MHRC website, under "Complete Contributions").

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:

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.

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)*

Adegoke, Olasunkanmi

Publications:

Interactions Of The Super Complexes: When Mtorc1 Meets The Proteasome. Adegoke OAJ, Beatty BE, Kimball SR, Wing SS. *Int J Biochem Cell Biol.* 2019 Dec;117:105638. Review.

Depletion Of Branched-Chain Aminotransferase 2 (BCAT2) Enzyme Impairs Myoblast Survival And Myotube Formation. Dhanani ZN, Mann G, Adegoke OAJ. *Physiol Rep.* 2019 Dec;7(23):e14299. doi: 10.14814/phy2.14299.

Backx, Peter

Publications:

Yimu Zhao, Naimeh Rafatian, Nicole T. Feric, Brian Cox, Roozbeh Aschar-Sobbi, Erika Yan Wang, Praful Aggarwal, Boyang Zhang, Genevieve Conant, Kacey Ronaldson-Bouchard, Aric Pahnke, Stephanie Protze, Jee Hoon Lee, Locke Davenport Huyer, Danica Jekic, Anastasia Wickeler, Hani Naguib, Gordon M. Keller, Gordana Vunjak-Novakovic, Ulrich Broeckel, **Peter H. Backx****, Milica Radisic** A platform for generation of chamber specific cardiac tissues and disease modelling. *Cell* 176(4): 913-927, 2019. ** Co-senior authors

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 remodelling in Duchenne muscular dystrophy. *J Physiol.* 598(7):1377-1392, 2020.

Wu J, You J, Wang X, Wang S, Huang J, Xie Q, Gong B, Ding Z, Ye Y, Wang C, Kang L, Xu R, Li Y, Chen R, Sun A, Yang X, Jiang H, Yang F,**Backx PH**, Ge J, Zou Y Left ventricular response in the transition from hypertrophy to failure recapitulates distinct roles of Akt, β-arrestin-2, and CaMKII in mice with aortic regurgitation. *Ann Transl Med.* 8(5):219, 2020

Li X, Zheng S, Tan W, Chen H, Li X, Wu J, Luo T, Ren X, Pyle WG, Wang L,**Backx PH**, Huang R, Yang FH. Slit2 Protects Hearts Against Ischemia-Reperfusion Injury by Inhibiting Inflammatory Responses and Maintaining Myofilament Contractile Properties. *Front Physiol.* 11:228, 2020.

Lidington D, Fares JC, Uhl FE, Dinh DD, Kroetsch JT, Sauvé M, Malik FA, Matthes F, Vanherle L, Adel A, Momen A, Zhang H, Aschar-Sobbi R, Foltz WD, Wan H, Sumiyoshi M, Macdonald RL, Husain M, **Backx PH**, Heximer SP, Meissner A, Bolz SS. CFTR Therapeutics Normalize Cerebral Perfusion Deficits in Mouse Models of Heart Failure and Subarachnoid Hemorrhage. JACC Basic Transl Sci. 4(8):940-958, 2020.

Birot, Olivier

Publications:
Nwadozi, E., Rudnicki, M., De Ciantis, M., Milkovich, S., Pulbere, A., Roudier, E., **Birot, O**., Gustafsson, T., Ellis, C. G., & Haas, T. L. (2020). High-Fat Diet Pre-Conditioning Improves Microvascular Remodelling During Regeneration Of Ischaemic Mouse Skeletal Muscle. *Acta Physiologica (Oxford, England), 229*(1), e13449. https://doi.org/10.1111/apha.13449

Di Bacco, V. E., Taherzadeh, M., **Birot, O**., & Gage, W. H. (2020). The Effects Of Single Versus Multiple Training Sessions On The Motor Learning Of Two Krav Maga Strike Techniques, *In Women. PeerJ, 8*, e8525. https://doi.org/10.7717/peerj.8525

Ceddia, Rolando

Publications:
Effting, P. S., Brescianini, S., Sorato, H. R., Fernandes, B. B., Fidelis, G., Silva, P., Silveira, P., Nesi, R. T., **Ceddia, R. B**., & Pinho, R. A. (2019). Resistance Exercise Modulates Oxidative Stress Parameters and TNF-α Content in the Heart of Mice with Diet-Induced Obesity. *Arquivos Brasileiros de Cardiologia, 112*(5), 545–552. https://doi.org/10.5935/abc.20190072

Cheng, Arthur

Funding Received:
NSERC Discovery Grant
Novel Fatigue-Related Mechanisms Driving Post-Exercise Recovery and Skeletal Muscle Adaptations and Dysfunction.
2020-2025, Total funding - $28,500 per year.

NSERC Discovery (Early Career Researcher Launch Supplement) Amounting To A One-Time
04/2020, Total Funding - $12,500.

Ontario Research Fund
Investigating The Role Of Intracellular Calcium Dynamics On Skeletal Muscle Function In Aged Muscle. 2/2019, Total - $150,000

Publications:
Cheng, A.J., Chaillou, T., Kamandulis, S., Subocius, A., Westerblad, H., Brazaitis, M., Venckunas, V. (2020). Carbohydrates Do Not Accelerate Force Recovery After Glycogen- Depleting Followed By High-Intensity Exercise In Humans. *Scandinavian Journal of Medicine & Science In Sports.* DOI:10.1111/sms.13655.

Cheng, A.J., Jude, B., Lanner, J.T. (2020). Intramuscular Mechanisms of Overtraining. *Redox Biology*. DOI:10.1016/j.redox.2020.101480.

Connor, Michael

Publications:
Turnbull, P. C., Dehghani, A. C., Theriau, C. F., **Connor, M.** K., & Perry, C. (2019). Synergistic Activation of Mitochondrial Metabolism and The Glutathione Redox Couple Protects Hepg2 Hepatocarcinoma Cells From Palmitoylcarnitine-Induced Stress. *American Journal of Physiology. Cell Physiology*, *317*(6), C1324–C1329. https://doi.org/10.1152/ajpcell.00366.2019

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)

Publications:
Schinkel-Ivy, A., & **Drake, J**. (2019). Interaction Between Thoracic Movement and Lumbar Spine Muscle Activation Patterns in Young Adults Asymptomatic for Low Back Pain: A Cross-Sectional Study. *Journal of Manipulative and Physiological Therapeutics*, *42*(6), 461–469. https://doi.org/10.1016/j.jmpt.2018.11.022

Edgell, Heather

Funding Received:
Canadian Institutes for Health Research (CIHR) Research Grant
Myalgic Encephalomyelitis (ME) Network Catalyst Grant
2019, Total Funding - $1,400,000 for the creation of a national collaborative network of researchers and knowledge users concerned with chronic fatigue syndrome/ME – Member of the Steering Committee

Publications:
Robertson A, *Papadima I, and **Edgell H** (2020) Sex Differences In The Cerebrovascular Response To Upright Tilt Are Associated With Disparate Autonomic Responses Between Men And Women. Submitted to Scientific Reports

Kirk V, **Edgell H**, *Joshi H, Constantin E, Katz SL, and MacLean JE (2020) Cardiovascular Changes In Children With Obstructive Sleep Apnea And Obesity After Treatment With Non-Invasive Ventilation. *Submitted To Journal Of Clinical Sleep Medicine* JC-20-00174

Nardone M, Guzman J, Harvey P, Floras J, and **Edgell H** (2020) Effect Of A Neck Compression Collar On Cardiorespiratory And Cerebrovascular Function In Postural Orthostatic Tachycardia Syndrome (POTS). J Appl Physiol March 12 [EPub ahead of print]

Invited presentations:
Toronto Rumsey Centre – Sex Differences in Cardiac Rehabilitation and Modified Exercise Programming for Women – September 19th, 2019

Gage, William

Publications:
Verniba D, **Gage WH**. (accepted for publication, July 23, 2019). Stepping Threshold with Platform-Translation and Shoulder-pull Perturbation Paradigms. *Journal of Biomechanics*.

Kiriella JB, DiBacco V, Hollands K, **Gage WH**. (accepted for publication, June 20, 2019). Evaluation of the effects of prescribing gait Complexity Using several Fluctuating Timing Tmperatives. *Journal of Motor Behavior*.

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.

Abstracts:
Power CR, Kiriella JB, Drake J, Gage WH. (2019). Adaptability of Human Gait: Effect Of Training With Red Noise Auditory Stimuli On Gait Fluctuation Patterns. *International Society for Posture and Gait Research Biannual Meeting, Edinburgh, United Kingdom.*

Di Bacco VE, KiriellaJB, Hollands KL, Gage WH. (2019). Retention of Entrained Auditory Fractal Patterns During Gait. *International Society for Posture And Gait Research Biannual Meeting, Edinburgh, United Kingdom.*

Haas, Tara
Funding Received:

NSERC New Frontiers Grant
Zero-Gravity 3D Bioprinting of Super-Soft Materials
2019-2021, Total Funding $250,000

Publications:

Nwadozi, E., Rudnicki, M., & **Haas, T. L.** *(2020).* Metabolic Coordination of Pericyte Phenotypes: Therapeutic implications. *Frontiers in Cell and Developmental Biology*, 8, 77. https://doi.org/10.3389/fcell.2020.00077

Nwadozi, E., Rudnicki, M., De Ciantis, M., Milkovich, S., Pulbere, A., Roudier, E., Birot, O., Gustafsson, T., Ellis, C. G., & **Haas, T. L**. (2020). High-Fat Diet Pre-Conditioning Improves Microvascular Remodelling During Regeneration of Ischaemic Mouse Skeletal Muscle. *Acta Physiologica (Oxford, England)*, *229*(1), e13449. https://doi.org/10.1111/apha.13449

Hamadeh, Mazen

Awards:
2020 Nominated for the Dean's Award for Excellence in Service and Engagement Impact (Established Career), Faculty of Health, York University

2019 Golden Key International Honour Society Honourary Member

Hood, David

Funding Received:
Natural Sciences and Engineering Research Council Research Tools and instruments Grant
Flow Cytometer for Muscle Health Research, 2020-2021, $149,600

Awards:
Canadian Association of Graduate Studies Mentorship Award Finalist 2019 (top 5 nationally)

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.

Memme, J. M., Erlich, A. T., Phukan, G., & **Hood, D. A**. (2019). Exercise and Mitochondrial Health. *The Journal of Physiology*, 10.1113/JP278853. Advance online publication. https://doi.org/10.1113/JP278853

Zhang, Y., Oliveira, A. N., & **Hood, D. A**. (2020). The Intersection of Exercise and Aging on Mitochondrial Protein Quality Control. *Experimental Gerontology*, *131*, 110824. https://doi.org/10.1016/j.exger.2019.110824

Hynes, Loriann

Funding Received:
Maple League of Universities
Maple League Teaching & Learning Centre, Innovative Pedagogies Fund

2019, Total Funding - $10,000

SSHRC Institutional Grant
SIG Committee, Acadia University
2019, Total Funding - $2997

Awards Received:
Certified Writing Award: Canadian Athletic Therapists Association, 2020

Publications:
Peisachovich E, Da Silva C, Gal R, Boni M, **Hynes LM**. (March 6, 2020) Exploring the Experiences of Learners Exposed to Simulated Person Methodology with an Athletic Therapy Course. Cureus 12(3): e7194. doi:10.7759/cureus.7194

Hurtubise JM, Gorbet DJ, **Hynes LM**, Macpherson AK, Sergio LE. White matter integrity and its Relationship to Cognitive-Motor Integration in Females with and without Post-Concussion Syndrome. Journal of Neurotrauma. Ahead of print http://doi.org/10.1089/neu.2019.6765

Josse, Andrea

Publications:
Beaudry, K. M., Ludwa, I. A., Thomas, A. M., Ward, W. E., Falk, B., & **Josse, A. R**. (2019). First-Year University Is Associated With Greater Body Weight, Body Composition And Adverse Dietary Changes In Males Than Females. *PloS One, 14(7), e0218554.*
https://doi.org/10.1371/journal.pone.0218554

Adebero, T., Mckinlay, B. J., Theocharidis, A., Root, Z., **Josse, A. R**., Klentrou, P., & Falk, B. (2019). Salivary and Serum Concentrations of Cortisol and Testosterone At Rest and in Response to Intense Exercise in Boys Versus Men. Pediatric Exercise Science, 1–8. *Advance Online Publication*. Https://Doi.Org/10.1123/Pes.2019-0091

Thomas, A. M., Beaudry, K. M., Gammage, K. L., Klentrou, P., & **Josse, A. R**. (2019). Physical Activity, Sport Participation, And Perceived Barriers to Engagement In First-Year Canadian University Students. *Journal of Physical Activity & Health*, *16*(6), 437–446. https://doi.org/10.1123/jpah.2018-0198

Theocharidis, A., McKinlay, B. J., Vlachopoulos, D., **Josse, A. R**., Falk, B., & Klentrou, P. (2020). Effects of Post Exercise Protein Supplementation on Markers of Bone Turnover in Adolescent Swimmers. *Journal of The International Society of Sports Nutrition*, *17*(1), 20. https://doi.org/10.1186/s12970-020-00350-z

Josse, A. R., Ludwa, I. A., Kouvelioti, R., Calleja, M., Falk, B., Ward, W. E., & Klentrou, P. (2020). Dairy Product Intake Decreases Bone Resorption Following A 12-Week Diet And Exercise Intervention In Overweight And Obese Adolescent Girls. Pediatric Research, 10.1038/S41390-020-0834-5. Advance Online Publication. Https://Doi.Org/10.1038/S41390-020-0834-5

Kuk, Jennifer

Publications:
Randhawa AK, Ardern CI, **Kuk JL**: Changes in The Prevalence Of Chronic Conditions Associated With Abdominal Obesity Between 1999-2014 (Clinical Obesity – In Press)

Wharton S, **Kuk JL**, Luszczynski M, Kamran E, Christensen RAG: *Liraglutide 3.0mg for the* Management of Insufficient Weight Loss or Excessive Weight Regain Post-Bariatric Surgery (Clinical Obesity – 2019 Aug;9(4):e12323. doi: 10.1111/cob.12323. Epub 2019 Jun 10).

Lee S, Kim Y, **Kuk JL**: What Is The Role of Resistance Exercise In Improving Cardiometabolc Health of Adolescents With Obesity*?* (Journal of Obesity & Metabolic Syndrome – 2019 Jun;28(2):76-91. Doi: 10.7570/Jomes.2019.28.2.76. Epub 2019 Jun 30. Review)

Kuk JL, Lee S: Sex and Ethnic Differences in The Relationship Between Changes In Anthropometric Measurements And Visceral Fat In Adolescents With Obesity (J Of Pediatrics – 2019 Oct;213:121-127. Doi: 10.1016/J.Jpeds.2019.05.052. Epub 2019 Jun 22)

Invited Presentations:
Truth versus Fiction – Causes of Obesity and the Effectiveness of Weight Loss Treatments (York Health Psychology Graduate Diploma Program Seminar Presentation, Sept 30, 2019).

McDermott, John

Publications:
Tripathi, S., Miyake, T., & **McDermott, J. C.** (2019). Smad7:β-catenin complex regulates myogenic gene transcription. *Cell Death & Disease*, *10*(6), 387. https://doi.org/10.1038/s41419-019-1615-0

Arnò, B., Galli, F., Roostalu, U., Aldeiri, B. M., Miyake, T., Albertini, A., Bragg, L., Prehar, S., **McDermott, J. C**., Cartwright, E. J., & Cossu, G. (2019). TNAP limits TGF-β-dependent cardiac and skeletal muscle fibrosis by inactivating the SMAD2/3 transcription factors. *Journal Of Cell Science*, *132*(15), jcs234948. https://doi.org/10.1242/jcs.234948

Öztürk, M., **McDermott, J. C.,** Laeseke, P. F., Nakada, S. Y., Hedican, S. P., Best, S. L., & Kleedehn, M. G. (2019). Management of Indiana pouch stones through a percutaneous approach: A single center experience. *Turkish Journal Of Urology*, *45*(5), 366–371. https://doi.org/10.5152/tud.2019.19049

Miyake, T., Aziz, A., & **McDermott, J. C**. (2020). Maintenance of the Undifferentiated State in Myogenic Progenitor Cells by TGFβ Signaling is Smad Independent and Requires MEK Activation. *International Journal Of Molecular Sciences*, *21*(3), 1057. https://doi.org/10.3390/ijms21031057

Perry, Christopher G. R.

Funding Received:
NSERC Discovery Grant: Regulation of mitochondrial bioenergetics in striated muscle
2019-2024, Total Funding - $200,000

Awards Received:
2020 - President's Emerging Research Leadership Award (PERLA)

Invited Presentations:
Striated muscle mitochondrial bioenergetics in health and disease. ***Ontario Exercise Physiology Annual Winter Meeting***, Barrie, ON (Keynote speaker, Feb. 2020)

Publications:
Monaco CMF, **Perry CGR**, Hawke TJ. Alterations In Mitochondrial Functions And Morphology In Muscle And Non-Muscle Tissues In Type 1 Diabetes: Implications For Metabolic Healt*h. Exp Physiol*. 2020 April; 105(4): 565-570.

Turnbull PC, Hughes, MC, **Perry CGR**. The Fatty Acid Derivative Palmitoylcarnitine Abrogates Colorectal Cancer Cell Survival By Depleting Glutathion*e*. *Am J Physiol: Cell Physiol*. 2019 December 1; 317(6): C1278-1288.(Chosen By Editors: Highlighted For Distinction In Scholarship In *APS Select* (https://www.physiology.org/apsselect/about)

Riddell, Michael

Funding Received:
Canadian Glycomics Network (GlycoNet) Strategic Initiatives Grant:
Elucidating the role of somatostatin in dysglycemia in a rodent model of type 2 diabetes.
April 1, 2019 - March 31, 2020 Total Funding - $69,047.00

Publications:
Zaharieva DP, McGaugh S, Davis EA, **Riddell MC.** Advances in Exercise, Physical Activity, and Diabetes. *Diabetes Technol Ther*. 2020;22(S1):S109–S118. doi:10.1089/dia.2020.2508

Scott SN, Anderson L, Morton JP, Wagenmakers AJM, **Riddell MC**. Carbohydrate Restriction in Type 1 Diabetes: A Realistic Therapy for Improved GlycaemicControl and Athletic Performance? *Nutrients*. 2019 May 7;11(5). pii: E1022. doi:10.3390/nu11051022. Review. *PubMed PMID: 31067747*.

Riddell MC, Pooni R, Fontana FY, Scott SN. Diabetes Technology and Exercise. *Endocrinol Metab Clin North Am. 2020;49(1):109–125. doi:10.1016/j.ecl.2019.10.011*

Roudier, Emilie

Publications :
Lam, B., & **Roudier, E**. (2019). Considering the Role of Murine Double Minute 2 in the Cardiovascular System?. *Frontiers in cell and developmental biology*, *7*, 320. https://doi.org/10.3389/fcell.2019.00320

Nwadozi, E., Rudnicki, M., De Ciantis, M., Milkovich, S., Pulbere, A., **Roudier, E**., Birot, O., Gustafsson, T., Ellis, C. G., & Haas, T. L. (2020). High-fat diet pre-conditioning improves microvascular remodelling during regeneration of ischaemic mouse skeletal muscle. *Acta physiologica (Oxford, England)*, *229*(1), e13449. https://doi.org/10.1111/apha.13449

Scimè, Anthony

Publications:
Bhattacharya, D., & **Scimè, A**. (2019). Metabolic Regulation Of Epithelial To Mesenchymal Transition: Implications For Endocrine Cancer. *Frontiers In Endocrinology*, 10, 773. https://doi.org/10.3389/fendo.2019.00773

Sweeney, Gary
Funding:
PI for IDRC Canada-Israel Diabetes Research Team Grant (2019-2022)

Awards:
Tier 1 York Research Chair (2019-2022)

Publications:
Liu, Y., Vu, V., & **Sweeney, G**. (2019). Examining The Potential Of Developing And Implementing Use Of Adiponectin-Targeted Therapeutics For Metabolic And Cardiovascular Diseases. *Frontiers in Endocrinology*, *10*, 842. https://doi.org/10.3389/fendo.2019.00842

Byrne, N. J., Matsumura, N., Maayah, Z. H., Ferdaoussi, M., Takahara, S., Darwesh, A. M., Levasseur, J. L., Jahng, J., Vos, D., Parajuli, N., El-Kadi, A., Braam, B., Young, M. E., Verma, S., Light, P. E., **Sweeney, G**., Seubert, J. M., & Dyck, J. (2020). Empagliflozin Blunts Worsening Cardiac Dysfunction Associated With Reduced NLRP3 (Nucleotide-Binding Domain-Like Receptor Protein 3) Inflammasome Activation In Heart Failure. Circulation. *Heart Failure*, 13(1), e006277. https://doi.org/10.1161/CIRCHEARTFAILURE.119.006277

Huang, X., Slavkovic, S., Song, E., Botta, A., Mehrazma, B., Lento, C., Johnson, P. E., **Sweeney, G**., & Wilson, D. J. (2020). A Unique Conformational Distortion Mechanism Drives Lipocalin 2 Binding To Bacterial Siderophores. *ACS Chemical Biology*, 15(1), 234–242. https://doi.org/10.1021/acschembio.9b00820

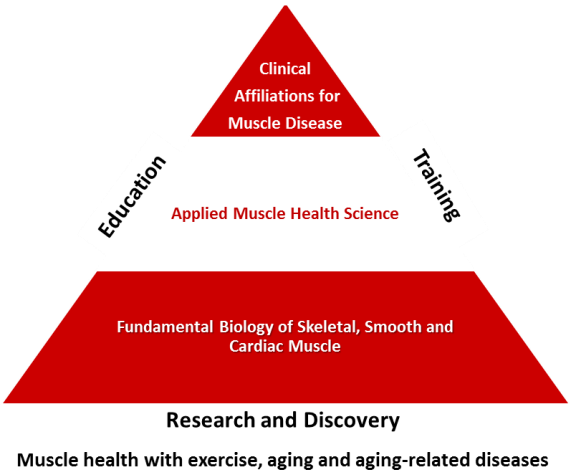
Governance: List members of the Executive Committee:

Executive Committee	
Meeting Date(s): October and November, 2019, and via email	
Member	**Affiliation**
1. Dr. David Hood	Director, MHRC, Faculty Member, KHS
2. Dr. Michael Riddell	Faculty Member, KHS
3. Dr. Rolando Ceddia	Faculty Member, KHS
4. Dr. Michael Connor	Faculty Member, KHS
5. Dr. Peter Backx	Faculty Member, Biology
6. Dr. Christopher Perry	Faculty Member, KHS
7. Mr. Matthew Triolo	PhD Student, Representative

APPENDIX 2 – Additional **Centre-specific** accomplishments.

At the direction of the Dean of the Faculty of Health, and in preparation for the next Charter application, the Director of the MHRC was challenged to investigate the possibility of either expanding or contracting the role of the MHRC within the University, in view of limited funding support. To embrace the challenge of forging a greater understanding of muscle health in aging and aging-related diseases, the MHRC Executive as well as senior MHRC faculty members met to discuss a revitalized path forward in which a broadened mandate would be proposed. The goals of this mandate are to increase faculty and trainee engagement in an expanded array of research and education initiatives to expand MHRC prominence in this field both nationally and internationally.

Our revised vision is to be: *"Canada's leader in exercise and muscle health research, training and education",* and this vision is encapsulated in a newly revised visual presented below:



We believe that this newly refined vision serves **to integrate** the three main priorities of the MHRC: research, education and training of highly qualified personnel (HQP). In addition, it spans the spectrum from the fundamental biology of muscle health, to its applied and clinical implications for the health of Canadians. This takes full advantage of the breadth of talent within our membership, with the hope of broad engagement in research, education and training of HQP. **A Proposal to grow the MHRC Mandate with an expansion of existing initiatives and plan for new initiatives was developed (Summarized below)** for the next 5 years (2020-25), designed to further research and education in investigating muscle health, and its decline, in aging and aging-related diseases. It includes current programming and activities, as well as new initiatives. The **purpose is to drive innovation in muscle health research and development, as well as trainee education, and to elevate the MHRC toward greater international visibility**. The mandate was re-designed to foster greater involvement of those

dedicated to the vision (above) of the MHRC as the leading research centre in Canada for the study of exercise, muscle health and disease. Initiatives are proposed below that further incentivize involvement for faculty members and their trainees, and thus there are resource implications for the Faculty of Health. In addition, new leadership roles are suggested within the membership to guide these initiatives forward.

We believe that the MHRC brings considerable added-value to the academic reputation of the Faculty of Health, and the University as a whole, through its educational programs, outstanding research and mentors, and knowledge translation. This revised mandate will take this reputation to a new, heightened level. A Table of activities was developed, including a brief description as well as the resources implications, and a brief statement of the "value-added" nature of the activity. Details are found in the Proposal submitted to the Dean of the Faculty of Health on Nov 28, 2019.

Summary Table of Activities, including the following categories:

1) Local and international conferences sponsorship;
2) Faculty support initiatives;
3) Student-based initiatives – designed to help students and support faculty supervisors;
4) Initiatives for external visibility and possible revenue generation;
5) Structural and Membership initiatives;
6) Summary of faculty and student incentives for regular members;
7) Requirements for faculty and student membership
8) Current MHRC Members and Organization (along with proposed new Committee structures)
9) Research groups within the MHRC

Overall Summary of this analysis:

Despite the national and international recognition that many of our MHRC faculty members have as individual scientists, we strongly believe that as a collective group within the MHRC, a greater international impact can be achieved, gaining further recognition for the individual, the Faculty of Health, and the University as a whole. This will be attained by a reformulation of our vision and mandate, and an investment in new initiatives designed to increase faculty member participation in all MHRC, Faculty of Health and University priorities. In this way, the MHRC can truly become a national and international leader in muscle health research, education and training.

List all visitors hosted by the ORU during the report period in this section (indicate each visitor's home institution, whether they are faculty, student, community representative, or other category, the duration of their visit and whether the ORU provided space to the visitor).

	Visitor	Home Institution	Position	Visit length	Space provided Y/N
1.	Dr. Keith Dadson	University Health Network	Professor	1 day	N
2.	Dr. Mireille Khacho	University of Ottawa	Assistant Professor	1 day	N
3.	Dr. Paul Oh	University of Toronto	Medical Director	1 day	N
4.	Dr. Geoffrey A. Power	University of Guelph	Associate Professor	1 day	N
5.	Dr. David J. Dyck	University of Guelph	Professor	1 day	N
6.	Dr. Marina Mourtzakis	University of Waterloo	Associate Professor	1 day	N
7.	Dr. Clark Dickerson	University of Waterloo	Professor	1 day	N
8.	Dr. K Sreekumaran Nair	Mayo Clinic	Consultant in Endocrinology and Professor of Medicine	1 day	N
9.	Dr. Eric Thorin	University of Montreal	Professor	1 day	N
10.	Dr. Andrew Judge	University of Florida	Professor	1 day	N

APPENDIX 3
Space tables in this Appendix are redundant with pages 3-4 of the Annual Report (same information)

Suggestions regarding space – No additional space is required.

Cumulative Financial Statement

ORU: Muscle Health Research Centre (MHRC)								
Cost Centre: 157001								
					3 Year Rolling Budget			
Account Description	**2017-2018 Actuals**	**2018-2019 Actuals**	**2019-2020 Actuals**	**Comments**	**2020-21**	**2021-22**	**2022-23**	**Additional Comments**
Revenue:								
Base Allocation from Central			$ 50,212.47		$ 63,914.00	$ 65,105.73	$ 66,327.25	
VPRI support (CR, stipend, operating)								
Faculty support								
Endowment Revenue								
Indirect Costs (Overhead)								
Support from Grants and Contracts								
Other Internal Revenue			$ 4,450.00	ICR Donations and grants to support Muscle Health Awarness Day (MHAD)events	$ 1,000.00	$ 1,000.00	$ 1,000.00	
Other External Revenue			$ 6,025.00	Conference registration fees	$ 7,500.00	$ 7,500.00	$ 7,500.00	
TOTAL REVENUE			$60,687.47		**$72,414.00**	**$73,605.73**	**$74,827.25**	
Expenses:								
Total Faculty Admin. Sal & Ben			$7,897.92	Director Stipend + Benefits	$ 7,930.00	$ 8,128.25	$ 8,331.46	*Year over year FY 20-21 & 21-22 increased by 2.5%*
Total Research Staff Sal & Ben								
Total Support Staff Sal & Ben			$36,810.02	MHRC Coordinator Salary + Benefits	$ 39,739.00	$ 40,732.48	$ 41,750.79	
Total Other Salaries & Ben			$1,920.00	Honoraria, housing, food and travels costs for guests/invited speakers and associated costs for their seminar presentations at York University (excluding MHAD guests)	$ 2,400.00	$ 2,400.00	$ 2,400.00	
Total Equipment			$1,860.37	Maintainance and Repairs, lab equipments	$ 3,800.00	$ 3,800.00	$ 3,800.00	
Total Other Expense			$2,071.12	Annual MHRC Graduate Student Fellowship awards (2 x $1000) for two graduate students.	$ 2,620.00	$ 2,620.00	$ 2,620.00	
Total Travel & Hospitality			$8,318.18	Travel, housing accomodations and food for MHRC speakers	$ 12,425.00	$ 12,425.00	$ 12,425.00	
Total Supplies			$1,809.86	Office Supplies	$ 3,200.00	$ 3,200.00	$ 3,200.00	
Total Telephone & Power			N/A		$ 300.00	$ 300.00	$ 300.00	
TOTAL EXPENSES			$60,687.47		**$72,414.00**	**$73,605.73**	**$74,827.25**	
Total Revenue Less Total Expenses			$0.00		$0.00	$0.00	$0.00	
Carryforward from Previous Year			$0.00		$0.00	$0.00	$0.00	
Balance (cwfd to next year)			$0.00		$0.00	$0.00	$0.00	