

**Muscle Health Research Centre (MHRC)
Annual Report
2021-2022**

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

Name of Director	Dr. David Hood
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Campus address	302 Farquharson Building
Administrative contact	Adam Charnaw
ORU website	https://www.yorku.ca/mhrc/

2. **Original and Current Charter Dates:** July 1, 2008, re-chartered in 2014 and 2021.

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 two York Research Chairs) and graduate students from the Faculty of Health and the Faculty of Science. The new vision statement of the MHRC incorporated following the re-Chartering exercise in 2021 is *“to be Canada’s leader in exercise and muscle health research, training and education”*. 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. Recently, we spent considerable time analyzing and revising the vision and mandate of the MHRC for the purpose of the re-Chartering exercise, and this is reflected in our progress and goals for the future.

4. **2021-2022 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, heart and vascular 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, termed “Complete Contributions”, is provided on the MHRC website). It is clear from this Appendix that the MHRC is fulfilling its mandate in promoting muscle / heart / vascular 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.

Funding proposals: Several collaborations exist among MHRC faculty members, and many are in place with researchers at other institutions. The MHRC funded Collaborative Research Grants (CRGs) for start-up initiatives for Drs. Josse and Abdul-Sater, as well as for Drs. Scime and Haas in 2021. A Catalyst grant was applied for in 2021 but was not funded. Currently the MHRC is spearheading a new CFI application entitled “Fundamental Molecular Bioenergetics (FMB) Lab” to bring in needed infrastructure in this research area.

Educational events organized: We normally hold 3 types of events throughout the year:

These include **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. No Colloquia were held in 2021-22.

We had a very successful **Seminar Series**, in which external speakers from other Universities are invited to present their work and to interact with faculty members and graduate students. This year we had 9 speakers in total, from across the USA and Canada. Their names and affiliations are listed in the Table below (Visitors). Since the pandemic restricted personal visits, these Seminars were held using Zoom, and they were very well attended. Indeed, this method has the advantage of allowing us to “bring in” speakers from around the globe at very little cost, while providing our MHRC trainees and faculty members exposure to extremely high level science.

The Annual **Muscle Health Awareness Day (MHAD12)** was also very well attended in a virtual format. We used Zoom very effectively to draw in 8 Speakers from Europe, the USA and Canada. We had 60 posters submitted for publication in the MHAD12 Proceedings, and a total of 10 award winners and a record number of registrants (208) from all over the world. It was an overwhelming success, our biggest MHAD in its 12-year history, again helping as we do every year, to put York University on the map in the area of “Muscle Health”; This is the website: <https://mhrc.info.yorku.ca/mhad-12-2021-via-zoom-2/>

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.

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 >130 trainees over the past year;

Continuing Education: We developed a **Graduate Diploma** in "Muscle Health and Exercise" to increased graduate enrollments from within and outside; feedback has already been received, and the plan is to move forward with this by Fall 2022, if possible. We also developed 3 different UG **Concentrations** (now in consideration in KINE) focusing on our strengths in "Muscle Health", "Cardiovascular Health" and "Metabolic Health" (and Exercise) to further fortify our 4th year class enrollments in these areas, and provide micro-credentials to students.

Other leadership activities: The MHRC sponsored four \$1000 MHRC Student Fellowships directed against the Graduate Student's fees. This Fellowship is for MSc students and PhD students in second year who do not have Tri-Council external funding sources. We also made the decision to actively participate in the Vaughan-McKenzie Health collaboration / initiative, in the **Musculoskeletal Health Pillar**. This is currently in progress and development.

We developed a **Collaborative Research Grant (CRG)** that can be applied for by Active MHRC Faculty members who want to initiate a new collaboration and start a new project. Two grants were offered in 2021 valued at \$5000 each.

We created an **MHRC Strategic Plan 2021-2026** (likely the only ORU on campus with such a document). It has been reviewed also by the Dean and Associate Dean of Health and feedback was also sought from all MHRC members. It has been finalized and posted on the website along with other administrative documents.

(<https://mhrc.info.yorku.ca/administration/>).

We generated MHRC sub-Committees for internal **tri-Council grant reviews**, prior to submission (for NSERC, CIHR and Foundations); this will have a major impact on our already satisfactory success rates in this area.

We Initiated **expansion** of the MHRC through discussions with our "applied physiology / motor control / biomechanics" colleagues to potentially expand and diversify our active faculty and HQP membership; it should be noted that we currently have 24 active faculty members, and >130 trainees at all levels, from UG to post-doctoral fellows.

We continued to organize the **International Biochemistry of Exercise Conference (IBEC 2022)** to be held May 25-28, 2022 at the Marriott Eaton Centre. This major international conference has been in development for 5 years, requiring considerable time and effort.

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.

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 speakers. The Committee recently organized an *MHRC Career Day* on April 22, 2022, featuring 5 PhD graduated speakers who now hold positions outside of academia. Their advice on future careers was very well received by the live audience of trainees.

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 submitting a new CFI grant for infrastructure related to Bioenergetics (please see above). 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. Charter Goals – What progress has been made toward the goals of the ORU's current charter?

- Created an **MHRC Strategic Plan 2021-2026**;
- Created MHRC sub-Committees for internal **tri-Council grant reviews**, prior to submission (for NSERC, CIHR and Foundations);

- Initiated **expansion** of the MHRC through discussions with our "applied physiology / motor control / biomechanics" colleagues to potentially expand and diversify our active faculty and HQP membership;
 - Developed a **Graduate Diploma** in "Muscle Health and Exercise" to increased graduate enrollments from within and outside;
 - Developed 3 different UG **Concentrations** (now in consideration in KINE) focusing on our strengths in "Muscle Health", "Cardiovascular Health" and "Metabolic Health" (and Exercise) to further fortify our 4th year class enrollments in these areas, and provide micro-credentials to students;
 - Expanded our Muscle Health Awareness Day (**MHAD, 12th Annual**) to an international audience for the first time with speakers from across Europe and N. America (this took place on Friday May 28th, 2021);
 - Participated in the Vaughan-McKenzie Health collaboration / initiative, in the **Musculoskeletal Health Pillar**.
 - We have collaborated to produce a "Catalyst" grant NOI, entitled "Assessing the Mechanisms of Cardiovascular and Muscle Involvement in COVID-mediated Fatigue";
 - We have altered our Governance, by instituting internal sub-Committees to deal with MHRC-related issues (please see the **SP 2021-2026**), including the addition of a new position of "MHRC Associate Director".
7. **Charter Challenges** – What are the challenges your ORU has faced in making progress towards the goals stated in your charter?
- The challenge for all of us is financial constraint, fitting priorities that are important into a fixed budget. Fundraising initiatives with a focus on "Muscle Health" in its broadest terms would help alleviate these constraints.
8. **Financial Position¹:**
The "Financial Position" is attached as Appendix 4.
9. **Graduate Diplomas and Non-Degree Activities**
See the Certificate description above in Continuing Education

Space Utilization - Provide a list of current space usage data as appropriate to your ORU in the charts and space provided in Appendix 3.

10. **Objectives for Upcoming Year**

We will continue to pursue our educational, training and research objectives as described above, to fulfill our Vision statement and our Strategic Plan Objectives.

(a) **FUNDING PROPOSALS:** anticipated for submission by **April 30, 2023** by active members of the ORU

Funding Proposal	Funder	Value	Type (grant, contract, other)	Role of ORU
1. FMB Lab	CFI	\$2.5M	Infrastructure	Critical

(b) **PLANNED EVENTS:** List conferences, workshops, exhibits or other events to be hosted or organized by **April 30, 2023**, and target audience(s).

	Events (Workshop, Exhibit, Conference, Other)	Target Audience(s)
1.	IBEC	Scientists and Trainees from all over the world
2.	MHRC Seminars	As above

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

	Visitor	University	Purpose
1.	Dr. Joseph Gordon	University of Manitoba	MHRC Seminar speaker
2.	Dr. Rachel Colley	Statistics Canada	MHRC Seminar speaker
3.	Dr. Natasha Chang	McGill University	MHRC Seminar speaker
4.	Dr. Jamie Burr	University of Guelph	MHRC Seminar speaker
5.	Dr. Douglas Millay	Cincinnati Children's Medical Centre	MHRC Seminar speaker
6.	Dr. Bernadette Murphy	University of Ontario-Institute of Technology	MHRC Seminar speaker
7.	Dr. Jon Ramsey	University of California-Davis	MHRC Seminar speaker
8.	Dr. Nicholas Burd	University of Illinois-Urbana Champaign	MHRC Seminar speaker
9.	Dr. Celine Aguer	McGill University-Outaouais	MHRC Seminar speaker
10.	Dr. Kristian Gundersen	University of Oslo	MHAD 12 speaker
11.	Dr. Matthijs Hesselink	Maastricht University	MHAD 12 speaker
12.	Dr. Helga Ellingsgaard	University of Copenhagen	MHAD 12 speaker
13.	Dr. Philip Atherton	University of Nottingham	MHAD 12 speaker
14.	Dr. Katrien De Bock	Swiss Federal Institute of Technology	MHAD 12 speaker
15.	Dr. John Floras	Mount Sinai Hospital Toronto	MHAD 12 speaker
16.	Dr. Jeffrey Woods	University of Illinois Urbana	MHAD 12 speaker
17.	Dr. Melissa Spencer	University of California Los Angeles	MHAD 12 Speaker

APPENDIX 1 – Active Members and Governance

Active Membership

Active Member Name	Faculty	Department
1. Abdul- Sater, Ali	Faculty of Health	KHS
2. Adegoke, Olasunkanmi	Faculty of Health	KHS
3. Backx, Peter	Faculty of Science	Biology
4. Belcastro, Angelo	Faculty of Health	KHS
5. Birot, Olivier	Faculty of Health	KHS
6.Ceddia, Rolando	Faculty of Health	KHS
7.Cheng, Arthur	Faculty of Health	KHS
8.Connor, Michael	Faculty of Health	KHS
9.Drake, Janessa	Faculty of Health	KHS
10.Edgell, Heather	Faculty of Health	KHS
11.Gage, William	Faculty of Health	KHS
12.Haas, Tara	Faculty of Health	KHS
13.Hamadeh, Mazen	Faculty of Health	KHS
14.Hood, David	Faculty of Health	KHS
15.Hynes, Loriann	Faculty of Health	KHS
16.Josse, Andrea	Faculty of Health	KHS
17.Kuk, Jennifer	Faculty of Health	KHS
18.McDermott, John	Faculty of Science	Biology
19.Perry, Christopher	Faculty of Health	KHS
20.Riddell, Michael	Faculty of Health	KHS
21.Roudier, Emilie	Faculty of Health	KHS
22.Scime, Anthony	Faculty of Health	KHS
23.Sweeney, Gary	Faculty of Science	Biology
24.Tsushima, Robert	Faculty of Science	Biology

Other Members

Other Member Name	Faculty	Department	Membership category
1.Biggard, Xavier	Medical Director	Union Cycliste Internationale (UCL)	Adjunct
2.Coe, Imogen	Faculty of Science	Toronto Metropolitan University	Adjunct
3.Grace, Sherry	Faculty of Health	York University	Adjunct
4.Hawke, Thomas	Medicine	McMaster University	Adjunct
5.Jacobs, Ira	Faculty of Physical Education	University of Toronto	Adjunct
6.Laham, Robert	Physician	York Lanes Appletree Medical Centre	Adjunct
7.Wharton, Sean	Physician	Wharton Medical Clinic	Adjunct

**Appendix 1: Members Contributions between
May 1, 2021- April 30, 2022**

Ali Abdul- Sater

Funding Received:

2021/11 – 2023/11 *Identifying novel biomarkers of balanced inflammation*

Funding Sources: Minor Research Grant, Faculty of Health, York University

Principal Applicant, Total Funding - \$3,000

2021/10 *The influence of dairy consumption on systemic and leukocyte inflammation following high-intensity exercise – A Pilot Study*

Funding Sources: Collaborative Research Grant, Muscle Health Research Centre (MHRC)

Co-Applicant, Total Funding - \$5,000

Publications

1. Safoura Zangiabadi and Ali A. Abdul-Sater. Regulation of the NLRP3 Inflammasome by Posttranslational Modifications. *The Journal of Immunology*, 15, 2022, 208 (2) 286-292; DOI: <https://doi.org/10.4049/jimmunol.2100734>
2. Ali Akram, Safoura Zangiabadi and Ali A. Abdul Sater. Detection of ASC Oligomerization by Western Blotting. *Methods in Molecular Biology*, 2022;2459:73-78. doi: 10.1007/978-1-0716-2144-8 7
3. Mayoorey Murugathan and Ali A. Abdul Sater. Measurement of Inflammasome-Induced Mitochondrial Dysfunction by Flow Cytometry. *Methods in Molecular Biology*, 2022;2459:65-72. doi: 10.1007/978-1-0716-2144-8 6
4. Maria I Edilova, Jaclyn C Law, Safoura Zangiabadi, Kenneth Ting, Achire Mbanwi, Andrea Arruda, David Uehling, Methvin Isaac, Michael Prakesch, Rima Al-awar, Mark D Minden, Ali A. Abdul-Sater, and Tania H. Watts. (Abdul-Sater and Watts are joint senior authors). The PKN1- TRAF1 signaling axis as a potential new target for chronic lymphocytic leukemia. *Oncoimmunology* – Volume 10, 2021 - Issue 1 <https://doi.org/10.1080/2162402X.2021.1943234>

Olasunkanmi Adegoke:

Guest Editor:

Guest editor for a collection on a research topic in *Frontiers in Physiology* (Nutrition in the Regulation of Muscle Development and Repair. *Frontiers in Physiology*, 2021-22 (<https://www.frontiersin.org/research-topics/14688/nutrition-in-the-regulation-of-muscle-development-and-repair#articles>)).

New Publications:

Olasunkanmi A. J. Adegoke, Yan Huang, Xing Fu and Stephen Mora. (2022). Editorial: Nutrition in the Regulation of Muscle Development and Repair. *Frontiers in Physiology*. 13(853007): 1-4. <https://doi.org/10.3389/fphys.2022.853007>.

Gagandeep Mann, Stephen Mora, Glory Madu, Olasunkanmi A J Adegoke. (2021). Branched-chain Amino Acids: Catabolism in Skeletal Muscle and Implications for Muscle and Whole-body Metabolism. *Frontiers in Physiology*. 12(702826): 1-25. <https://doi.org/10.3389/fphys.2021.702826>.

Stephen Mora and Olasunkanmi A.J. Adegoke. (2021). The Effect of a Chemotherapy Drug Cocktail on Myotube Morphology, Myofibrillar Protein Abundance and Substrate Availability. *Physiol Rep*. 2021 Jul;9(13):e14927. doi: 10.14814/phy2.14927.

Funding Received:

NSERC Discovery Grant (2021-2026), \$140k

Peter Backx:

Awards

April 2022 Grant Pierce Award for Excellence in Cardiovascular Sciences,
International Academy of Cardiovascular Science

Grant Awards

CIHR Project Grant (5 years, 749k) "Understanding the role of atrial stretch in promoting atrial fibrillation.

Papers

Lakin R, Debi R, Yang S, Polidovitch N, Goodman JM, Backx PH. Differential negative effects of acute exhaustive swim exercise on the right ventricle is associated with disproportionate hemodynamic loading. *Am J Physiol Heart Circ Physiol*. 320(4):H1261-1275, 2021. \

Wang Y, Liu L, Lakin R, Polidovitch N, Liu G, Yang H, Yu M, Yan M, Zhao D, Backx PH, Sun H, He Y, Yang FP. [Revisiting right anterior oblique projections for the triangle of Koch: implications from computed tomography.](#) *BMC Cardiovasc Disord*. 20(1):383-86, 2020.

Barazi N, Polidovitch N, Debi R, Yakobov S, Lakin R, Backx PH. Dissecting the Roles of the Autonomic Nervous System and Physical Activity on Circadian Heart Rate Fluctuations in Mice. *Front Physiol*. 2021 Oct 18;12:692247. doi: 10.3389/fphys.2021.692247.

Olivier Birot

FUNDING

2021	Natural Science and Engineering Council of Canada (NSERC)	COVID-19 extension for DG (2022-2023)	Principal Investigator	\$28,000
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PUBLICATIONS

Trembley J, Patrician A, Birot O, Howe C, Simsonson T, Ainslie P High altitude acclimatization and adaptation in humans. *Comprehension Physiology* (Invited Review). Submission pending

Lemieux P & **Birot O**. Altitude, exercise, and skeletal muscle angio-adaptive responses to hypoxia: A complex story. *Front. Physiol.* 229, 2020.

Lam B, Nwadozi E, Haas TL, **Birot O**, Roudier E. High glucose treatment limits Drosha protein expression and alters Angiomir maturation in microvascular primary endothelial cells via an Mdm2-dependent mechanism. *Cells* 27, 2021.

INVITED ORAL COMMUNICATIONS

Université Claude Bernard Lyon, France. Impact of cellular and ambient hypoxia on physiological skeletal muscle angio-adaptation, October 27th 2021.

Università di Corsica, Corte, France. "From Toronto to Corte : Insight into the impact of physical activity and environmental stressors on tissue angio-adaptation », October 7th, 2021.

Rolando Ceddia

1. [Distinct mechanisms involving diacylglycerol, ceramides, and inflammation underlie insulin resistance in oxidative and glycolytic muscles from high fat-fed rats.](#)

Jani S, Da Eira D, Hadday I, Bikopoulos G, Mohasses A, de Pinho RA, Ceddia RB. *Sci Rep.* 2021 Sep 27;11(1):19160. doi: 10.1038/s41598-021-98819-7.PMID: 34580412.

2. [Obesogenic and Ketogenic Diets Distinctly Regulate the SARS-CoV-2 Entry Proteins ACE2 and TMPRSS2 and the Renin-Angiotensin System in Rat Lung and Heart Tissues.](#)

Da Eira D, Jani S, Ceddia RB. *Nutrients.* 2021 Sep 25;13(10):3357. doi: 10.3390/nu13103357.

Arthur Cheng

Funding received:

- Junior Faculty Fund/Minor Research Grant - York University (Sole principal investigator), Amount: \$5000, Project title: Investigating the role of interstitial glucose levels on neuromuscular fatigue

- Industry Grant - Supersapiens (Sole principal investigator), Amount: \$4000, Project title: The effect of interstitial glucose levels on neuromuscular fatigue

Peer-reviewed publications:

- Chaillou, T., Treigyte, V., Moseley, S., Brazaitis, M., Venckunas, T., **Cheng, A.J.** (2022) Functional impact of post-exercise cooling and heating on recovery and training adaptations: application to resistance, endurance, and sprint exercise. *Sports Medicine - Open*. 8(37):1-26. <https://doi.org/10.1186/s40798-022-00428-9>
- Jordan, A.C., Perry, C.G.R., **Cheng, A.J.** (2021). Promoting a pro-oxidant state in skeletal muscle: Potential dietary, environmental, and exercise interventions for enhancing endurance-training adaptations. *Free Radical Biology and Medicine*. 176: 189-202. <https://doi.org/10.1016/j.freeradbiomed.2021.09.014>
- Mader, T., Chaillou, T., Santos Alves, E., Jude, B., **Cheng, A.J.**, Kenne, E., Mijwel, S., Kurzejamska, E., Vincent, C.T., Rundqvist, H., Lanner, J.T. Exercise reduces intramuscular stress and counteracts muscle weakness in mice with breast cancer. *Journal of Cachexia, Sarcopenia and Muscle*. <https://doi.org/10.1002/jcsm.1294>

Michael Connor:

1. Desai AV, Agarwal R, Epstein AS, Kuperman GJ, Michael CL, Mittelstaedt H, Connor M, Bernal C, Lynch KA, Ostroff JS, Katz B, Corrigan KL, Kramer D, Davis ME, Nelson JE. Needs and Perspectives of Cancer Center Stakeholders for Access to Patient Values in the Electronic Health Record. *JCO Oncol Pract*. 2021 Oct;17(10):e1524-e1536. doi: 10.1200/OP.20.00644. Epub 2021 Feb 8. PMID: 33555928.

Janessa Drake:

1. Johnston HA, Drake JDM. Multivariate shoulder and spine relationship using planar range of motion assessment. *Musculoskelet Sci Pract*. 2021 Aug;54:102398. doi: 10.1016/j.msksp.2021.102398. Epub 2021 May 14. PMID: 34045171.

Heather Edgell

1. Habib K, Fallah B and **Edgell H** (2022) Effect of upright posture on endothelial function in women and men. Accepted by *Front. Physiol*. Invited submission to “Rising Stars in Environmental, Aviation, and Space Physiology” edition.
2. Solve ME/CFS (2021) - **\$45,000 USD** - Physiological and cognitive function in patients with Post Acute Sequelae of SARS-CoV-2 (PASC) or myalgic encephalomyelitis (ME) before and after inspiratory muscle training

3. Khan D, Rotondi M, **Edgell H**, and Tamim H (2022) The association between shift work exposure and the variations in age at natural menopause among adult Canadian workers: Results from the Canadian Longitudinal Study on Aging (CLSA). Accepted by Journal of Menopause.
4. CFI Infrastructure operating funds (2022) - **\$2,800**
5. Conference oral presentation: Pereira TJ, Wasef S, Assadpour E, Ivry I, Adeyinka BO and Edgell H. The influence of menstrual cycle and oral contraceptives on cerebrovascular dynamics during chemoreflex activation (2022 Okanagan Cardiovascular and Respiratory Symposium)

William Gage:

1. Stone RC, Gage WH, Baker J. The Intersecting Influence of Age and Performance Stereotypes on Physical and Psychological Aspects of Stair Navigation in Older Adults. *J Appl Gerontol.* 2021 Dec;40(12):1865-1875. doi: 10.1177/0733464820965340. Epub 2020 Oct 22. PMID: 33090074.
2. Sidhu R, Gage WH. Enhancing the odds of adopting e-learning or community-focused experiential learning as a teaching practice amongst university faculty. *Heliyon.* 2021 Apr 16;7(4):e06704. doi: 10.1016/j.heliyon.2021.e06704. PMID: 33898828; PMCID: PMC8060549.

Sherry Grace:

1. Served on WHO's development group for their Package of Rehabilitation Interventions for Ischemic Heart Disease – to be released this year and implemented by member states
2. # 1 most productive author in bibliometric review that came out on cardiac rehab literature (see table 1 <https://www.frontiersin.org/articles/10.3389/fcvm.2021.672913/full#F2>)
3. #1 expert in the world in cardiac rehab research: <https://expertscape.com/ex/cardiac+rehabilitation>
4. On stanford list of top 2% of cited researchers across all disciplines globally
5. Couple grants:
 - a) **Grace, S.L.**, Turk-Adawi, K., Alhashemi, M., & Abrahamyan, L. (2022). Realist multi-method evaluation of referral and access to heart function clinics. Qatar University International Research Collaboration Co-Fund. Role: *lead principal investigator, partner institution (i.e., co-PI)*. \$186,394USD (~\$237,340CAD) for 2 years.
 - b) Gagliardi, A., Nerenberg, K., **Grace, S.L.**, O'Keefe-McCarthy, S., Neil-Sztramko, S., Colella, T., Dayan, N., Dobbins, M., & Murray-Davis, B. (2022). Evaluating a culturally

appropriate question prompt tool about heart disease risk and prevention after hypertensive pregnancy. CIHR Project Grant. 2 years. *Role: co-investigator*.

Tara Haas

Peer reviewed Publications:

Nwadozi, E. and T.L. Haas. Emerging roles of pericytes in co-ordinating skeletal muscle functions: implications and therapeutic potential. *Current Tissue Microenvironment Reports*, July 2021; DOI: 10.1007/s43152-021-00029-w

Lam B, Nwadozi E, Haas TL, Birot O, Roudier E. High glucose treatment limits Drosha protein expression and alters angiomiR maturation in microvascular primary endothelial cells via an Mdm2-dependent mechanism. *Cells*. 2021; 10(4):742. doi: 10.3390/cells10040742

Editorial Comment:

Rudnicki, M. and Haas, T.L. Exploring risk factors at the molecular level. *eLife*. 2021; 10:e68271; DOI: 10.7554/eLife.68271

Book chapter:

Rudnicki, M., A. Pislaru and T.L. Haas. **“Quantitative Methods to Assess Adipose Vasculature”** In: Benest A.V. (ed) *Angiogenesis. Methods in Molecular Biology*, vol 2441, pp. 201-221. Humana, New York, NY January 2022; ISBN 978 1-0716-2058-8 10.1007/978-1-0716-2059-5_16

Conference presentations:

Nader, G., E. Nwadozi, T.L. Haas. Influences of high fat diet and ischemia on skeletal muscle pericytes. *Experimental Biology (virtual)* April 2021.

Pislaru, A., M. Rudnicki, O. Rezvan, T.L. Haas. Sex-related differential gene expression underlies distinct responses of adipose endothelial cells under a high fat diet. *Experimental Biology (virtual)* April 2021.

Invited seminars:

April 2022: Invited speaker: University of Missouri, USA (April; host: Steven Segal); *“Capillary remodeling in skeletal muscle: influence by environmental stressors”*

April 2022: Invited speaker: University of Toronto (April; host: Amira Klip); *“FoxO1 and sex in the regulation of adipose tissue angiogenesis”*

March 2022: Invited speaker, Dept. of Clinical Physiology, Karolinska Institute, Sweden (March; host: Thomas Gustafsson); *“Non-invasive and histological monitoring of ischemic myopathy in PAD patients”*.

Thomas Hawke:

Publications:

1. Dial AG, Grafham GK, Monaco CMF, Voth J, Brandt L, Tarnopolsky MA, Hawke TJ.

Alterations in skeletal muscle repair in young adults with type 1 diabetes mellitus. Am J Physiol Cell Physiol. 2021 Nov 1;321(5):C876-C883.

2. Monaco CMF, Tarnopolsky MA, Dial AG, Nederveen JP, Rebalka IA, Nguyen M, Turner LV, Perry CGR, Ljubicic V, Hawke TJ. Normal to enhanced intrinsic mitochondrial respiration in skeletal muscle of middle- to older-aged women and men with uncomplicated type 1 diabetes. Diabetologia. 2021 Nov;64(11):2517-2533.
3. Dial AG, Monaco CMF, Grafham GK, Patel TP, Tarnopolsky MA, Hawke TJ. Impaired Function and Altered Morphology in the Skeletal Muscles of Adult Men and Women With Type 1 Diabetes. J Clin Endocrinol Metab. 2021 Jul 13;106(8):2405-2422.

Funding:

4. CIHR Project Grant: \$875,985
Targeting vascular and skeletal muscle health to improve the quality of life in males and females with Type 1 Diabetes
NPI: Hawke, TJ. Co-PI: MacDonald M
Co-investigator(s): Dr. Zubin Punthakee, Dr. Christopher G.R. Perry, Dr. Baraa K. Al-Khazraji
5. NFRF Explorations Grant: \$250,000
Biofabrication technologies for cultured meat products
NPI: Selvaganapathy, R
Co-investigator(s): Dr. Thomas Hawke, Dr. Devashish Pujari

Mazen Hamadeh

AWARDS, FELLOWSHIPS, DISTINCTIONS AND RESEARCH GRANTS

2022 Dean's Award for Excellence in Service and Engagement Impact (Established Career), Faculty

of Health, York University

2021 Offered the inaugural Provostial Fellowship (declined; due to assuming the role of Associate

Dean for Students, Faculty of Health), Office of the Provost, York University

WORK EXPERIENCE

Sept 2021-present **Interim Associate Dean for Students**, Faculty of Health, York University

TEACHING EXPERIENCE

Winter 2022 Nutritional Aids in Sport and Exercise (KINE 4120 3.0; 9 students; 4th year), KAHS, York U

Oct 2020-Apr 2021 **Hiring Committee for the Head of Bethune College**, Faculty of Science, York University

David Hood

Funding:

- 2021-26 Natural Science and Engineering Research Council of Canada Discovery Grant entitled: "Mitochondrial Biogenesis in Skeletal Muscle" (\$55,000 per year).
- 2021-22 Natural Science and Engineering Research Council of Canada Research Tools and Instruments Grant entitled: "Multi-mode plater reader" (\$145,283)

Publications:

- Triolo, M, M. Slavin, N. Moradi and D.A. Hood. Time-dependent changes in autophagy, mitophagy and lysosomes in skeletal muscle during denervation-induced disuse. *J. Physiol.* doi: 10.1113/JP282173, 2022.
- Memme, J.M., A.N. Oliveira and D. A. Hood. p53 regulates skeletal muscle mitophagy and mitochondrial quality control following denervation-induced muscle disuse. *J. Biol. Chem.* 298: 101540-101558, 2022.
- Oliveira, A.N., B. Yanagawa, S. Verma and D.A. Hood. Blunted stress response with age in right atrial tissue following ischemia-reperfusion. *J. Card Surg.* doi: 10.1111/jocs.15807, 2021.
- Cheema, N., J.M. Cameron and D.A. Hood. Mitochondrial dysfunction in fibroblasts with mtDNA defects is attenuated with rapamycin treatment. *Am. J. Physiol. Cell Physiol.* 321:C176-C186, 2021.

Loriann Hynes

2022 King CD, **Hynes LM**. An Action Research Approach to Designing the Athletic Therapy Interactive Concussion Educational Tool. *In Press: The International Journal of Technology, Knowledge, and Society*.

2022 Smeha N, Kalkat R, Sergio LE, **Hynes LM**. Sex-related differences in visuomotor skill recovery following [wing concussion in working-aged adults](https://doi.org/10.1186/s13102-022-00466-6). *BMC Sports Science, Medicine and Rehabilitation*. April 2022, <https://doi.org/10.1186/s13102-022-00466-6>

2021 King CD & **Hynes LM**. An Exploration of Concussion Assessment and Management Knowledge in a Sample of Athletic Therapy Students. *International Journal for the Scholarship of Teaching and Learning*, Nov. 2021, Vol. 15, Issue 2, p1-9.

ABSTRACTS

2022 King CD & **Hynes LM**. "Exploring the Impact of the Athletic Therapy Interactive Concussion Educational (AT-ICE) Tool in Athletic Therapy Education. *Accepted: Canadian Athletic Therapists Association Annual Conference 2022, Winnipeg, MB, Canada, May 2022.*

2022 McAllister JR, Lafave LMZ, **Hynes LM**, Lafave MR. “Evidence Informed Practice Knowledge in Athletic Therapy. *Accepted*: Canadian Athletic Therapists Association Annual Conference 2022, Winnipeg, MB, Canada, May 2022.

FUNDING

2021 **SSHRC Institutional Grant (\$3,000)** “Exploring the Impact of the Athletic Therapy Interactive Concussion Education (AT-ICE) Tool in Athletic Therapy Education.” Co-Investigator (CD King)

Andrea Josse:

Funding:

1. **Awarded as Co-Investigator:** Dairy Farmers of Canada Grant. **Principal Investigator:** Dr. Jenna B. Gillen, University of Toronto. TITLE: Influence of post-exercise Greek yogurt consumption on 24 h glycemic control in women with overweight/obesity - a crossover study. Awarded: \$110,000 CAD over 2 years. September 2021.
2. **Awarded as Principal Investigator:** York University, Muscle Health Research Centre (MHRC) Collaborative Research grant. **Collaborator:** Dr. Ali Abdul-Sater. TITLE: The influence of dairy consumption on systemic and leukocyte inflammation following high-intensity exercise – A Pilot Study. **Awarded:** \$5000 over 1 year. October 2021.
3. **Awarded as Principal Investigator:** CFI-JELF Infrastructure Grant. TITLE: Novel Targets of Whole-food Dairy Products for Human Musculoskeletal and Cardiometabolic Health. **Awarded:** \$125,000 (the CFI portion of \$340,639 CAD total cost). February 2022.
*ORF portion applied for/submitted in November 2021.

Publications – original research articles:

1. McKinlay B, Wallace PJ, Olansky S, Woods S, Roy BD, **Josse AR**, Falk B, Klentrou P. Intensified Training in Adolescent Female Athletes: A Cross-Over Study of Greek Yogurt Effects on Indices of Recovery. *Journal of the International Society for Sports Nutrition* MS#: JISN-D-21-00076. *Accepted Nov 2, 2021, In Press*.
2. Chouinard-Watkins R, Calleja M, Bazinet RP, **Josse AR**. Dairy product consumption is associated with a lowering of linoleic acid within serum triglycerides in adolescent females with overweight or obesity: a secondary analysis. *Br J Nutr*. 2021 May 24;124:1-30.
3. Skelly LE, Barbour-Tuck EN, Kurgan N, Calleja M, Klentrou P, Falk B, **Josse AR**. Neutral effect of increased dairy product intake, as part of a lifestyle modification program, on cardiometabolic health in adolescent girls with overweight/obesity: a secondary analysis from a randomized controlled trial. *Frontiers in Nutrition*. 2021 May 21;8:673589.

Jennifer Kuk:

Funding Received

1. Training platform in diabetes, obesity and cardiometabolic health (CIHR Health Research Training Platform - 2021/22 Pilot - Co-Applicant - \$2,400,000)

Peer – Reviewed Publications

1. Adil O, **Kuk JL**, Ardern CI: Associations Between Weight Discrimination and Metabolic Health: a Cross Sectional Analysis of Middle Aged Adults (Obesity Research & Clinical Practice – In Press)
2. **Kuk JL**, Christensen RAG, Kamran Samani E, Wharton S. Predictors of Weight loss and weight gain in weight management patients during the COVID-19 pandemic. (J Obesity – in Press)
3. Swayze S, Rotondi M, **Kuk JL**: The associations between blood and urinary concentrations of metal metabolites, obesity, hypertension, type 2 diabetes, and dyslipidemia (J Environ Public Health. 2021 Oct 25;2021:2358060. doi: 10.1155/2021/2358060. eCollection 2021.)
4. Christensen RAG, High S, Wharton S, Kamran E, Delehhosseinzadeh M, Fung M, **Kuk JL** Sequential diets and weight loss: Including a low-carbohydrate high-fat diet with and without time-restricted feeding. Nutrition. 2021 Nov-Dec;91-92:111393. doi: 10.1016/j.nut.2021.111393. Epub 2021 Jun 24. PMID: 34399399
5. Oye-Somefun A, **Kuk JL** Ardern CI: Associations between Elevated Kidney and Liver Biomarker Ratios, Metabolic Syndrome and All-Cause and Coronary Heart Disease (CHD) Mortality: Analysis of the U.S. National Health and Nutrition Examination Survey (NHANES) (BMC Cardiovascular Disorders 21, 352 (2021). <https://doi.org/10.1186/s12872-021-02160-w>)
6. Christensen RAG, **Kuk JL**, Wharton S, Brooks JG, Bondy SJ: The Association of Sex and Calendar Month with Changes in Weight: A Retrospective Cohort Study of a Community-Based Weight Management Clinic (Obesity Research & Clinical Practice. 2021 Sep-Oct;15(5):515-517. doi: 10.1016/j.orcp.2021.07.002. Epub 2021 Jul 17. PMID: 34281794)
7. Yu WW, Lee SJ, Arslanian S, Tamim H, **Kuk JL**: Effects of exercise on resting metabolic rate in adolescents with overweight and obesity (Childhood Obesity - 2021 Jun;17(4):249-256. doi: 10.1089/chi.2020.0280. Epub 2021 Mar 18.).

John McDermott:

- 1) MEF2 in cardiac hypertrophy in response to hypertension. Cornwell JD, McDermott JC. **Trends Cardiovasc Med.** 2022 Jan 11:S1050-1738(22)00004-4. doi: 10.1016/j.tcm.2022.01.002.
- 2) [TAZ exhibits phase separation properties and interacts with Smad7 and \$\beta\$ -catenin to repress skeletal myogenesis.](#) Tripathi S, Miyake T, Kelebeev J, McDermott JC. **J Cell Sci.** 2022 ;jcs.259097. doi:10.1242/jcs.259097. PMID: 34859820

3) [Nucleolar localization of c-Jun](#). Miyake T., and McDermott JC. **FEBS J**. 2022. Feb;289(3):748-765. doi: 10.1111/febs.16187. PMID: 34499807

4) Member of CIHR College of Reviewers: Peer Review Panel –Member. Cardiovascular System - A: Cells and Tissues. November 2021

5) Frontiers in Cell and Developmental Biology - Editor

Christopher Perry:

1. Grant received: Muscular Dystrophy Canada (\$100,000)
2. Grant received: Co-applicant, CIHR (\$875,925). PI: Thomas Hawke, McMaster University
3. Grant received: MITACS (\$15,000)
4. Book chapter: Bellissimo CA, [Perry CGR](#); Regulation of skeletal muscle reactive oxygen species during exercise. In Tiidus P, LeBlanc P, Macpherson R, Josse A (Eds.) The Routledge Handbook on Biochemistry of Exercise: 1st edition. UK: Routledge, Ch. 4, 2021.
5. Appointed to CIHR peer reviewer, MOV committee

Michael Riddell

Sam N. Scott, Matt Cocks, Anton J. M. Wagenmakers, Sam O. Shepherd and **Michael C. Riddell**. Biochemistry of Exercise Training and Type 1 Diabetes. The Routledge Handbook on Biochemistry of Exercise. 2021. Editors: Peter M. Tiidus, Rebecca E.K. MacPherson, Paul J. LeBlanc, Andrea R. Josse. Routledge/CRC Press; Taylor & Francis Group, ISBN 9780367223830,

Papers in Refereed Journals

Paldus B, Morrison D, Zaharieva DP, Lee MH, Jones H, Obeyesekere V, Lu J, Vogrin S, La Gerche A, McAuley SA, MacIsaac RJ, Jenkins AJ, Ward GM, Colman P, Smart CEM, Seckold R, King BR, **Riddell MC**, O'Neal DN. A Randomized Crossover Trial Comparing Glucose Control During Moderate-Intensity, High-Intensity, and Resistance Exercise With Hybrid Closed-Loop Insulin Delivery While Profiling Potential Additional Signals in Adults With Type 1 Diabetes. *Diabetes Care*. 2022 Jan 1;45(1):194-203. doi: 10.2337/dc21-1593. PMID: 34789504.

Brockman NK, Sigal RJ, Kenny GP, **Riddell MC**, Perkins BA, Yardley JE. Afternoon aerobic and resistance exercise have limited impact on 24-h CGM outcomes in adults with type 1 diabetes: A secondary analysis. *Diabetes Res Clin Pract*. 2021 Jul;177:108874. doi: 10.1016/j.diabres.2021.108874. Epub 2021 May 28. PMID: 34052249.

Riddell MC, Shakeri D, Scott SN. A Brief Review on the Evolution of Technology in Exercise and Sport in Type 1 Diabetes: Past, Present, and Future. *Diabetes Technol Ther*. 2021 Nov 30. doi: 10.1089/dia.2021.0427. Epub ahead of print. PMID: 34809493.

Invited scholarly lectures, conference keynotes and scientific sessions

SPORT- Challenges for patients with diabetes type 1. 9th Congress of the Polish Society of Pediatric Endocrinology and Diabetology - 25 th Symposium of the Polish Society of Pediatric Endocrinology and Diabetology. October 22, 2021 (remote lecture)

Anthony Scime:

Funding Received: MHRC grant \$5,000

Peer – Reviewed Publications: p107 mediated mitochondrial function controls muscle stem cell proliferative fates", Bhattacharya, D., Shah, V, Oresajo, O, and Scimè, A., *Nature Communications* 12.

Gary Sweeney:

1. Sung HK, Mitchell P, Gross S, Marette A & Sweeney G.
ALY688 elicits adiponectin-mimetic signaling and improves insulin action in skeletal muscle cells
American Journal of Physiology (Cell) (2022) 322(2):C151-C163

2. da Silva Rosa SC, Liu M, & Sweeney G.
Adiponectin synthesis, secretion and extravasation from circulation to interstitial space
Physiology (2021) 36(3):134-149

3. Botta A, Forest A, Daneault C, Pantopoulos K, Tantiworawit A, Phrommintikul A, Chattipakorn S,
Chattipakorn N, Des Rosiers C & Sweeney G.
Identification of circulating endocan-1 and ether phospholipids as biomarkers for complications in thalassemia patients
Metabolites (2021) 11(2):70.

4. MITACS Accelerate Award (intern to be named).

5. Invited speaker: Kwanak International Symposium on Metabolic Diseases (online)

Governance:

Executive Committee	
Meeting Date(s): via Email or Zoom, as needed	
Member	Affiliation
1. Dr. David Hood	Director, MHRC, Faculty Member, KHS
2. Dr. Christopher Perry	Faculty Member, KHS

3.	Dr. Janessa Drake	Faculty Member, KHS
4.	Dr. Rolando Ceddia	Faculty Member, KHS
5.	Dr. Michael Connor	Faculty Member, KHS
6.	Dr. Peter Backx	Faculty Member, Biology
7.	Mr. Daniel Da Eira	PhD Student, Representative

APPENDIX 2 – Additional **Centre-specific** accomplishments. Do not repeat information already included elsewhere in this report.

APPENDIX 3

(a) **Office Space** – fill out the table below indicating the utilization of office space within your ORU.

Room #	Name of Occupant	Occupant Affiliation ¹	Type of Workspace ²	Length and Frequency of Occupancy ³	Notes ⁴
332 Farq	Adam Charnaw	Coordinator	Office	2.5 days/week	
333 Farq	Dr. David Hood	Director	Office	5d/week	

(b) **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 Farquharson	Lab, vivarium	MHRC Members, key	Unspecified key access 5/d week	Shared space agreement in place
320 Farquharson	Core facility, large shared equipment lab	MHRC Members, key	Unspecified key access 5/d week	Shared space agreement in place
322 Farquharson	Exercise and biopsy lab	MHRC Members, key	Unspecified key access 5/d week	Shared space agreement in place
330 Farquharson	Meeting Room	MHRC Members, key	Unspecified key access 5/d week	Shared space 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.

Cumulative Financial Statement

ORU: Muscle Health Research Centre (MHRC)								
Cost Centre: 200- 157001								
Account Description	2019-2020 Actuals	2020-21 Actuals	2021-22 Actuals	Comments	3 Year Rolling Budget			\$ 53,654.56
					2022-23	2023-24	2024-25	
Revenue:								
Base Allocation from Central								
VPRI support (CR, stipend, operating)								
Faculty support	\$50,212.47	\$53,654.56	\$65,000.00	Support from the Faculty of Health	\$ 80,000.00	\$ 65,000.00	\$ 65,000.00	22/23 one time FoH top up
Endowment Revenue								
Indirect Costs (Overhead)								
Support from Grants and Contracts								
Other Internal Revenue	\$4,450.00	\$4,200.00	\$650.00	ICR Donations and Grants to support Muscle Health Awareness Day (MHAD) &	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	
Other External Revenue	\$6,025.00	\$300.00		Conference registration fees	\$ 1,000.00	\$ 1,500.00	\$ 1,500.00	
TOTAL REVENUE	\$60,687.47	\$58,154.56	\$65,650.00		\$82,000.00	\$67,500.00	\$67,500.00	
Expenses:								
Total Faculty Admin. Sal & Ben	\$7,897.92	\$7,930.44	\$7,930.44	Directors stipend and benefits	\$ 7,950.00	\$ 8,181.00	\$ 8,262.81	
Total Research Staff Sal & Ben								
Total Support Staff Sal & Ben	\$36,810.02	\$39,685.93	\$28,615.27	MHRC Coordinator salary and benefits	\$ 41,249.00	\$ 41,661.49	\$ 42,078.11	
Total Other Salaries & Ben	\$1,920.00	\$1,600.00		Housing, food and travels costs for guests/invited speakers and associated				
Total Equipment	\$1,860.37	\$1,139.85	\$50.00	Maintenance and repairs, lab equipment	\$ 2,000.00	\$ 1,000.00	\$ 1,000.00	
Total Other Expense	\$2,071.12	\$2,350.00	\$15,946.06	Annual MHRC Graduate Student Fellowship awards, Research Grants and honoraria	\$ 25,000.00	\$ 13,500.00	\$ 13,000.00	
Total Travel & Hospitality	\$8,318.18	\$141.78	\$592.50	Travel, housing accommodations and food for MHRC speakers	\$ 650.00	\$ 600.00	\$ 600.00	
Total Supplies	\$1,809.86	\$5,306.56	\$7,608.27	Office and research supplies	\$ 5,000.00	\$ 2,400.00	\$ 2,400.00	
Total Telephone & Power					\$ 150.00	\$ 150.00	\$ 150.00	
TOTAL EXPENSES	\$60,687.47	\$58,154.56	\$60,742.54		\$81,999.00	\$67,492.49	\$67,490.92	
Total Revenue Less Total Expenses	\$0.00	\$0.00	\$4,907.46		\$1.00	\$7.51	\$9.08	
Carryforward from Previous Year	\$0.00	\$0.00	\$0.00		\$ 4,907.46	\$ 4,888.46	\$ 3,175.97	
Balance (cwfd to next year)	\$0.00	\$0.00	\$4,907.46		\$4,908.46	\$4,895.97	\$3,185.05	