CURRICULUM VITAE

Matthew McHutcheson Robinson, Ph.D.

BIOGRAPHICAL

Citizenship:	United States
Office Address:	Milam Hall 118F School of Biological and Population Health Sciences Oregon State University Corvallis OR 97331
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EDUCATION

Post-doc:	2011-2015	Post-Doctoral Fellow Mayo Clinic Endocrine Research Unit Mentor: K. Sreekumaran Nair, M.D., Ph.D.
Graduate:	2007-2011	Ph.D. Human Bioenergetics Colorado State University Mentor: Benjamin F Miller, Ph.D.
	2005-2007	M.S. Health and Exercise Science Colorado State University Mentor: Tracy L Nelson, Ph.D.
Undergraduate:	1999-2004	B.S. Sports Medicine Colorado State University

POSITIONS

2016-Present	Assistant Professor, Oregon State University
2015-2016	Research Associate, Mayo Clinic
2011-2015	Post-Doctoral Research Fellow, Mayo Clinic
2007-2011	Graduate Research Assistant for Benjamin F Miller, PhD
2005-2009	Graduate Teaching Assistant, Department of Health and Exercise Science Colorado State University
2005-2007	Graduate Research Assistant for Tracy L Nelson, PhD

HONORS, SPECIAL RECOGNITIONS AND AWARDS

2015	Mayo/Karolinksa Insitutet Annual Meeting Travel Award
2015	American Diabetes Association Focus on the Fellows Award
2011	Summer Institute on Aging Research National Institute of Aging
2011	Graduate Student Writing Award American Kinesiology Association
2010	1st Place Student Oral Abstract Contest Rocky Mountain Chapter of the American College of Sports
2010	American Physiological Society, Carolyn tum Suden/Francis A. Hellebrandt Professional Opportunity Award
2009	Fellow, Grantmakers in Aging, Travel Award for Annual Conference and presentation invitation
2009	3rd Place Healthy Aging Scientific Poster Contest Colorado State University Research Colloquium
2009	American Physiological Society, Travel Award for Professional Skills Course: Writing and Reviewing for Scientific Journals.
2008	1st Place Student Oral Abstract Contest Rocky Mountain Chapter of the American College of Sports
2007	5th Place Student Abstract Contest Rocky Mountain Chapter of the American College of Sport
2007	2nd Place Oral Abstract Contest Epidemiological Exchange
2003	Dean's List for College of Applied Human Sciences

REVIEWING SERVICE

Editorial Board

- Journal of Applied Physiology (Current)

Ad Hoc Reviewer

- Diabetes
- Journal of Cellular Physiology
- Journal of Gerontology: Biological Sciences
- American Journal of Physiology: Endocrinology and Metabolism
- American Journal of Physiology: Heart and Circulatory Physiology
- European Journal of Sport Science
- Experimental Gerontology
- PLOS One
- FASEB Journal
- Physiology and Behavior

PROFESSIONAL MEMBERSHIPS

2017-Current	American Diabetes Association
2016-Current	American Society for Mass Spectrometry
2015-2016	Minnesota Obesity Center, Senior Participating Investigator
2008-Current	American Physiological Society
2005-Current	American College of Sports Medicine
2007-Current	American Heart Association, Advanced Cardiovascular Life Support (ACLS) Trained

GRANT SUPPORT

Current

2016 — Cambridge Isotope Laboratories Research Award
Role: Co-PI $2,500 (Direct Cost)
This grant provides funding for stable isotope tracers to measure glucose metabolism in response to exercise and insulin infusion.

2016-Current — Collins Medical Research Trust
2017-1275 Role: Co-PI $25,000 (Direct Costs)
"Novel and Reversible Mechanisms of Skeletal Muscle Insulin Resistance in Human Obesity." The project investigates cytoskeletal remodeling with obesity and exercise as a mechanism for regulating insulin sensitivity in humans.

2015-Current — NIDDK Mentored Research Scientist Development Award
K01DK103829 Role: PI $532,866 (Direct Costs)

"Regulation of the mitochondrial proteome by autophagy during insulin resistance." This K01 proposal is for career development in proteomics to determine post-translational modifications to the mitochondrial proteome during insulin resistance.

Completed

2013-2015 — Stephenson Family Fellowship in Diabetes

2011-2013 — National Institute of Diabetes and Digestive and Kidney Diseases Ruth L. Kirschstein National Research Service Award (NRSA)
5T32DK007352-32

2009-2011 — Gatorade Sports Science Institute, Doctoral Student Grant
"Nutritionally Stimulated Mitochondrial Biogenesis Following Exercise."
$3000.

Grants Not Awarded

KL2 Mentored Career Scientist Development Award
Center for Translational Sciences at Mayo Clinic
"Low-molecular weight peptide fragments and regulation of proteolytic pathways with exercise training and aging in man"
This proposal was for career development in proteomics to identify peptide fragments released from skeletal muscle protein degradation in humans.

Post-Doctoral Fellowship
American Federation for Aging Research
"Skeletal muscle mitophagy in response to exercise training and aging"
This proposal was to investigate skeletal muscle autophagy (mitophagy) in biopsy samples young and old humans.

Doctoral Student Grant
American College of Sport Medicine
"Nutritionally Stimulated Mitochondrial Biogenesis in Older Adults"
This proposal was to use localized delivery of amino acids using microdialysis infusion to determine mitochondrial protein synthesis to nutrition.

PUBLICATIONS

Peer-Reviewed Publications

1. Lalia AZ, Dasari S, **Robinson MM**, Abid H, Morse DM, Klaus KA, Lanza IR. Influence of omega-3 fatty acids on skeletal muscle protein metabolism and mitochondrial bioenergetics in older adults. Aging (Albany NY). 2017 Apr;9(4):1096-1129. doi: 10.18632/aging.101210.

2. ****Robinson MM**, Dasari S, Konopka AR, Johnson ML, Manjunatha S, Esponda RR, Carter RE, Lanza IR, Nair KS. Enhanced Protein Translation Underlies Improved Metabolic and Physical Adaptations to Different Exercise Training Modes in Young and Old Humans. Cell Metabolism. 2017 Mar 7;25(3):581-592. doi: 10.1016/j.cmet.2017.02.009.
   **Mansuscript featured on CNN, New York Times and radio shows.

3. O'Neill BT, Lee KY, Klaus K, Softic S, Krumpoch MT, Fentz J, Stanford KI, Robinson MM, Cai W, Kleinridders A, Pereira RO, Hirshman MF, Abel ED, Accili D, Goodyear LJ, Nair KS, Kahn CR. Insulin and IGF-1 receptors regulate FoxO-mediated signaling in muscle proteostasis. J Clin Invest. 2016 Sep 1;126(9):3433-46. doi: 10.1172/JCI86522.

4. ****Robinson MM**, Dasari S, Karakelides H, Bergen HR 3rd, Nair KS. Release of skeletal muscle peptide fragments identifies individual proteins degraded during insulin

deprivation in type 1 diabetic humans and mice. Am J Physiol Endocrinol Metab. 2016 Sep 1;311(3):E628-37. doi: 10.1152/ajpendo.00175.2016.
**Manuscript was recognized in APSselect Sept 2016

5. Konopka AR, Esponda RR, **Robinson MM**, Johnson ML, Carter RE, Schiavon M, Cobelli C, Wondisford FE, Lanza IR, Nair KS. Hyperglucagonemia Mitigates the Effect of Metformin on Glucose Production in Prediabetes. Cell Reports. 2016 May 17;15(7):1394-400. doi: 10.1016/j.celrep.2016.04.024.

6. Lalia AZ, Dasari S, Johnson ML, **Robinson MM**, Konopka AR, Distelmaier K, Port JD, Glavin MT, Esponda RR, Nair KS, Lanza IR.Predictors of whole-body insulin sensitivity across ages and adiposity in adult humans. Journal of Clinical Endocrinology and Metabolism. 2016 Feb;101(2):626-34. doi: 10.1210/jc.2015-2892.

7. Johnson ML, Distelmaier K, Lanza IR, Irving BA, **Robinson MM**, Konopka AR, Shulman GI, Nair KS. Mechanism by which caloric restriction improves insulin sensitivity in sedentary obese adults. Diabetes. 2016 Jan;65(1):74-84.

8. Jedrychowski MP, Wrann CD, Paulo JA, Gerber KK, Szpyt J, **Robinson MM**, Nair KS, Gygi SP, Spiegelman BM. Detection and Quantitation of Circulating Human Irisin by Tandem Mass Spectrometry. Cell Metabolism. 2015 Oct 6;22(4):734-40.

9. Konopka AR, Asante A, Lanza IR, **Robinson MM**, Johnson ML, Man CD, Cobelli C, Amols MH, Irving BA, Nair KS. Defects in mitochondrial efficiency and H2O2 emissions in obese women are restored to a lean phenotype with aerobic exercise training. Diabetes. 2015 Jun;64(6):2104-15.

10. Johnson ML, Irving BA, Lanza IR, Vendelbo MH, Konopka AR, **Robinson MM**, Henderson GC, Klaus KK, Morse DM, Heppelmann C, Bergen HRIII, Dasari D, Schimke JM, Jakaitis DR and Nair KS. Differential effect of endurance training on mitochondrial protein damage, degradation and acetylation in the context of aging. J Gerontol A Biol Sci Med Sci. 2015 Nov;70(11):1386-93.

11. **Robinson MM,** Soop M, Sohn TS, Morse DM, Schimke JM, Klaus KA, and Nair KS. High insulin combined with essential amino acids stimulates skeletal muscle mitochondrial protein synthesis while decreasing insulin sensitivity in healthy humans. Journal of Clinical Endocrinology and Metabolism. 2014 Dec;99(12):E2574-83s.

12. Johnson ML, **Robinson MM**, Nair KS. Skeletal muscle aging and the mitochondrion. Trends Endocrinol Metab. 2013 May;24(5):247-56.

13. Lanza IR, Zabielski P, Klaus KA, Morse DM, Heppelmann CJ, Bergen HR 3rd, Dasari S, Walrand S, Short KR, Johnson ML, **Robinson MM**, Schimke JM, Jakaitis DR, Asmann YW, Sun Z, Nair KS. Chronic Caloric Restriction Preserves Mitochondrial Function in Senescence without Increasing Mitochondrial Biogenesis. Cell Metabolism. 2012 Dec 5;16(6):777-88.

14. Miller BF, **Robinson MM**, Reuland DJ, Drake JC, Peelor FF 3rd, Bruss MD, Hellerstein MK and Hamilton KL. Calorie restriction does not increase short-term or long-term protein synthesis. Journal of Gerontol Biological Science Medical Science. 2013 May;68(5):530-8.

15. Barazzoni R, Short KR, Asmann Y, Coenen-Schimke JM, **Robinson MM**, and Nair KS. Insulin fails to enhance mTOR phosphorylation, mitochondrial protein synthesis and ATP production in human skeletal muscle without amino acid replacement. American Journal of Physioly Endocrinolology Metabolism. 2012 Nov 1;303(9):E1117-25.

16. Irving BA, **Robinson MM** and Nair KS. Age effect on myocellular remodeling: Response to exercise and nutrition in humans. Ageing Research Reviews. 2012 Jul;11(3):374-89.

17. Miller BF, **Robinson MM,** Bruss MD, Hellerstein MK and Hamilton KL. A comprehensive assessment of mitochondrial protein synthesis and cellular proliferation with age and caloric restriction. Aging Cell. 11: 150–161, 2012.

18. **Robinson MM**, Bell C, Peelor FF 3rd and Miller BF. β-adrenergic receptor blockade blunts post-exercise skeletal muscle mitochondrial protein synthesis rates in humans. American Journal of Physiology-Regulatory Integrative Comparative Physiology. 301: R327-34, 2011.

19. **Robinson MM**, Turner SM, Hellerstein MK, Hamilton KL and Miller BF. Long-term synthesis rates of skeletal muscle DNA and protein are higher during aerobic training in older humans than in sedentary young subjects but are not altered by protein supplementation. The Journal of the Federation of American Societies for Experimental Biology. 25(9):3240-9, 2011.

20. Miller BF, Ellis D, **Robinson MM**, Rivera JD, Kjaer M, and Langberg H Measurement of skeletal muscle collagen breakdown by microdialysis. Scandinavian Journal of Medicine and Science in Sports. 21(6):e1-8, 2011.

21. **Robinson MM,** Richards JC, Hickey MS, Moore DR, Phillips SM, Bell C, and Miller BF. Acute β-adrenergic stimulation does not alter mitochondrial protein synthesis or markers of mitochondrial biogenesis in adult men. American Journal of Physiology-Regulatory Integrative Comparative Physiology. 298: R25-33, 2010.

22. **Robinson MM**, Hamilton KL, and Miller BF. The interactions of some commonly consumed drugs with mitochondrial adaptations to exercise. Journal of Applied Physiology. 107(1):8-16, 2009.

23. Jacobs RA, Donovan EL, and **Robinson MM**. Parallels of snipe hunting and ROS research: the challenges of studying ROS and redox signaling in response to exercise. Journal of Physiology. 587(Pt 5):927-8, 2009.

24. Clark ML, Peel JL, Burch JB, Nelson TL, **Robinson MM**, Conway S, Bachand AM, and Reynolds SJ. Impact of improved cookstoves on indoor air pollution and adverse health effects among Honduran women. International Journal of Environmental Health Research. 19(5):357-368 2009.

Book Chapters

1. Miller BF and **Robinson MM**. "Metabolism, Protein." In: *Encyclopedia of Exercise Medicine in Health and Disease*. Edited by Mooren FC and Skinner JS. Springer, New York. 1st Edition 2012.

2. Miller BF and **Robinson MM**. Chapter 9: "Assessment of Protein Status in Athletes." In *Nutritional assessment of athletes*. Edited by Driskell JA and Wolinsky I. Boca Raton: CRC Press. 2nd Edition 2011.

Abstracts

1. **Robinson MM,** Konopka AR, Johnson ML, Shankarappa M, Esponda RR, Lanza IR and K. Sreekumaran Nair. *Insulin Sensitivity and Mitochondrial Respiration following 12 Weeks of High-Intensity Aerobic Interval, Resistance, or Combined Training in 18- to 30-Year-Old Humans.* 2015 Annual Meeting for the American Diabetes Association.

2. **Robinson MM**, Konopka AR, Jakaitis DR and KS Nair. *Short-term insulin deprivation activates skeletal muscle autophagy but not proteasome activity in streptozotocin diabetic mice*. Presented at 2014 Annual Meeting for the American Diabetes Association.

3. **Robinson MM**, Klaus KA, Morse DM and KS Nair. *Decreased Insulin Sensitivity During Essential Amino Acid Infusion Does Not Change Skeletal Muscle Protein Synthesis in Healthy Adults.* Presented at 2013 Annual Meeting for the American Diabetes Association.

4. **Robinson MM**, Turner SM, Hamilton KH, and BF Miller. *Skeletal Muscle DNA and Mixed Muscle Protein Synthesis Rates with Endurance Training in Aging Humans.* Presented at the National Meeting for the American College of Sports Medicine and Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, 2011.

5. **Robinson MM**, Turner SM, Hellerstein MK and BF Miller. *D_2O consumption to determine muscle protein synthesis rates in response to post-exercise nutrition in adults.* Presented at the Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, 2010.

6. **Robinson MM**, Turner SM, Hellerstein MK and BF Miller. *D_2O consumption to determine muscle protein synthesis rates in response to post-exercise nutrition in adults.*

Presented at the Colorado State University Research Colloquium on Healthy Aging, 2009.

7. **Robinson MM**, Bell C, Richards JC, Voyles WF and Miller BF. *β-adrenergic and whole body protein turnover.* Presented at the Annual Meeting of the American College of Sports Medicine, 2009.

8. **Robinson MM**, Richards JC, Bell C, and Miller BF. *β-adrenergic stimulation does not increase transcription of genes involved in mitochondrial biogenesis in humans.* Presented at the Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, 2009.

9. **Robinson MM**, Ellis D, Langberg H, Kjaer MJ, and Miller BF. *Effect of acute resistance exercise on collagen breakdown in human skeletal muscle using microdialysis*. Presented at the Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, 2008.

10. **Robinson MM**, Stevens JR**,** Hickey MS, and Nelson TL. *The Effect of Omega-3 Fatty Acid Supplementation on a Novel Marker of Inflammation In Healthy Adults*. Presented at the Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, 2007.

11. **Robinson MM**, Stevens JR, Hickey MS, and Nelson TL. *Long Term Dietary Omega-3 Fatty Acid Intake Does Not Change Soluble Interleukin-6 Receptor In Healthy Adults.* Presented at the Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, 2006.

INVITED ORAL PRESENTATIONS

1. *"Amino acid kinetics using stable isotope tracers."* Presented at Mayo Clinic Metabolomics Symposium, Mayo Clinic, Oct 2016.

2. *"Dissociation between training gains in insulin sensitivity and mitochondrial respiration following 12-weeks of high-intensity aerobic interval, resistance, or combined training in 18-30 and 65-80 year old humans."* Presented at Mayo Clinic-Karolinska Institutet 21th Annual Meeting, Karolinska Insitutet, Stockholm Sweden, Sept 2015.

3. *"Insulin Sensitivity and Mitochondrial Respiration Following 12-weeks of High-Intensity Aerobic Interval, Resistance, or Combined Training in 18-30 Year Old Humans."* Presented at Minnesota Diabetes Research Meeting, Mayo Clinic, May 2015.

4. *"Short-term insulin deprivation activates skeletal muscle autophagy but not proteasome activity in streptozotocin diabetic mice."* Presented at Mayo Clinic-Karolinska Institutet 20th Annual Meeting, Mayo Clinic, Sept 2014.

5. *"Short-term insulin deprivation activates skeletal muscle autophagy but not proteasome activity in streptozotocin diabetic mice."* Presented at Minnesota Diabetes Research Meeting, Mayo Clinic, May 2014.

6. *"Synthesis of Muscle Protein Sub-fractions with Insulin and Essential Amino Acids."* Presented at Endocrine Research Unit Seminar, Mayo Clinic, March 2014.

7. "*Molecular Regulation of Skeletal Muscle Protein in Response to an Aerobic, Resistance or Combined Exercise Program."* Presented at Molecular Basis of Proteins in Human Health and Performance Symposium, Iowa State University Ames IA, May 2013.

8. *"Skeletal Muscle Protein Turnover in Response to Insulin and Amino Acids."* Presented at Endocrine Research Unit Seminar, Mayo Clinic, April 2013.

9. *"Application of D_2O labeling in aging research."* Presented at Aging Research Seminar Series, University of Minnesota Medical School, Sept 2010.

10. *"D_2O consumption to determine muscle protein synthesis rates in response to post-exercise nutrition in adults".* Presented at the Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, Golden Colorado 2010.

11. *"How can we assess and slow muscle loss with age?"* Presentation on the use of labeled water to measure long-term synthesis processes for the Annual Meeting for Grant Makers in Aging, Denver, Colorado 2009.

12. "*What else can we measure? An exercise physiologist's toolbox*." Lectures on methodology presented for HES405 Exercise Testing and Instrumentation at Colorado State University.

13. "*Effect of acute resistance exercise on collagen breakdown in human skeletal muscle using microdialysis*" Presented at the Winter Meeting for the Rocky Mountain Chapter of the American College of Sports Medicine, Estes Park, Colorado 2008.

14. "*The Effect of Omega-3 Fatty Acid Supplementation on a Novel Marker of Inflammation In Healthy Adults*." Presented at the 2007 Epidemiological Exchange, Denver, Colorado 2007.

Media Appearances

Print/Online

- New York Times: The Best Exercise for Aging Muscles (March 2017)
- CBC News: 'Get out of your comfort zone:' Interval training benefits extend to aging (March 2017)
- CNN: Interval training exercise could be a fountain of youth (March 2017)
- Optimizing Mitochondrial Production (April 2017)
- Age Stronger: Age Reversal – Doing What's Difficult. (March 2017)

Radio

- Canadian Broadcast Corporation: Quirks and Quarks (March 2017)
- KVMR Radio: Best of Health (April 2017)

TEACHING EXPERIENCE

Colorado State University

2009	HES476	Exercise and Chronic Disease, Lectures on Aging
2005-2009	HES405	Exercise Testing Instrumentation Laboratory
2005-2009	HES403	Exercise Physiology Laboratory
2005-2007	EX332F	Techniques of Teaching Weight Training
2005-2006	EX240	First Aid and Emergency Care
2005	EX123	Health and Wellness Laboratory

Oregon State University

2016	KIN533	Energetics and Biochemistry of Exercise
2016	KIN324	Exercise Physiology

MENTORING EXPERIENCE

2012	Nicholas Warren, BS. Summer Undergraduate Research Fellow at Mayo Clinic. Project involved determining regulation of autophagy during insulin deprivation. Currently at PhD student at Dartmouth
2014	Erica G. Otero Cárdenas, BS. Undergraduate Research Fellow. Project involved identifying mitochondrial morphology and autophagy with aging. Currently Medical Student at University of Puerto Rico.
2014	Gabriel Marrero-Rivera, BS. Undergraduate Research Fellow. Project involved determining skeletal muscle autophagy and mitochondrial function during insulin deprivation. Currently Medical Student at University of Puerto Rico.
2015	Alicia L Hansson. Medical student with Karolinska Institute, Stockholm, Sweden. Project involved identification of novel atrophy/hypertrophy genes in response to exercise training.
2016	Sarah Erhlicher, MS. Nutrition Phd candidate at Oregon State University.
2016	Harrison Stierwalt, MS. Kinesiology PhD candidate at Oregon State University
2016	Emily Burney. Undergraduate Research Project Mentor.

METHODOLOGY

Laboratory Techniques

- Stable isotope methods for in-vivo kinetic measures (protein synthesis, whole body degradation, glucose kinetics)
- Use of $^{2}H_2O$ for long-term DNA and protein synthesis
- Mitochondria isolation from skeletal muscle
- Real-time polymerase chain reaction
- Western blot
- Agarose gel electrophoresis
- Enzyme-linked immunosorbent assays
- Colorimetric endpoint assays
- High-Resolution Respirometry
- Confocal microscopy

Clinical Research Techniques

- Percutaneous skeletal muscle biopsy (over 250 biopsies performed as of May 2017)
- Hyperinsulinemic-euglycemic clamp
- Exercise testing (12-lead ECG, indirect calorimetry, Wingate testing)
- Body composition (DEXA, hydrostatic weighing, skinfold)
- Phlebotomy (venous blood draws, intravenous catheters)
- In-vivo microdialysis techniques
- Sterile compounding for intravenous infusion

REFERENCES

K. Sreekumaran Nair, M.D. Ph.D. **(Post Doc Mentor)**
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