

**BIOGRAPHICAL SKETCH**

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NAME: Edward L. Melanson

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POSITION TITLE: Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
The Ohio State University	B.S.	1984	Business Admin
University of Massachusetts	M.S.	1994	Exercise Science
University of Massachusetts	Ph.D.	1999	Exercise Science
University of Colorado Health Sciences Center	Post-Doc	09/98-05/03	Obesity/Metabolism

**A. Personal Statement**

I am a Professor of Medicine in the Division of Endocrinology, Metabolism, and Diabetes, with a joint appointment in the Division of Geriatric Medicine, at the University of Colorado Anschutz Medical Campus (CU AMC). For the Colorado Nutrition Obesity Research Center (NORC), I will serve as the Director of the NORC Enrichment Program and Associate Director of the NORC Energy Balance Assessment (EBA) core. As Associate Director of the NORC EBA core, I oversee operations of the room calorimeter and provides support for free-living energy expenditure assessment using the doubly labeled water method. I have substantial expertise in measuring energy metabolism, physical activity, and sedentary behavior in humans, using whole-room indirect calorimetry, doubly labeled water, and a variety of accelerometry-based physical activity monitors. I can provide unique transdisciplinary training to those interested in studying the metabolic aspects related to sleep and circadian physiology. Because of my experience in conducting clinical studies in humans, I will be able to provide guidance in research, from study design and selection of the most appropriate data collection tools/techniques to data entry and analysis. I have leadership experience with the Colorado Clinical and Translational Sciences Institute (CCTSI). For more than a decade, I have led the whole room calorimetry program of the CCTSI, and I currently serve as co-chair of the Scientific Advisory and Review Committee.

As Director of the NORC Enrichment Program, I foster learning opportunities (workshops and seminars) for trainees who are members of the NORC. I have extensive experience in mentoring junior scientists and was awarded the Colorado NORC Outstanding Mentor Award in 2018. I have served as a co-mentor or on the mentoring committees of 12 postdoctoral candidates and junior faculty, many of whom have successfully attained independent research funding and all of whom remain active in research through academic appointments or industry. I have served as the primary mentor for 2 pre-doctoral candidates (1 currently in his 3rd year of the PhD program) and 7 post-doctoral fellows. All my former trainees remain active in research-related careers, and several have established their own independent laboratories.

My research is focused on clinical research to study the effects of lifestyle interventions (physical activity, diet, and sleep), obesity, and aging on bioenergetics (energy and substrate metabolism, and physical activity). I have maintained consistent NIH funding since 2001 and have received continuous funding from the NIH as a principal investigator since 2007. I have been studying the effects of ovarian hormones on energy metabolism in women with for more than 10 years. We have demonstrated that suppression of ovarian hormones reduces energy expenditure, and that the replacement of estrogen attenuates this decrease. We have also recently shown that brown fat activity in women is regulated by estrogen.

## Relevant publications

**Melanson, E.L.**, J.P. Ingebrigtsen, A. Bergouignan, K. Ohkawara, W.M. Kohrt, and J.R. Lighton, *A new approach for flow-through respirometry measurements in humans*. *Am J Physiol Regul Integr Comp Physiol*, 2010. **298**: p. R1571-R1579. PMID 20200135

**Melanson, E.L.**, K.M. Gavin, K.L. Shea, P. Wolfe, M.E. Wierman, R.S. Schwartz, and W.M. Kohrt, *Regulation of energy expenditure by estradiol in premenopausal women*. *J Appl Physiol* (1985), 2015. **119**(9): p. 975-81. PMID 26338457

Blondin DP, Haman F, Swibas TM, Hogan-Lamarre S, Dumont L, Guertin J, Richard G, Weissenburger Q, Hildreth KL, Schauer I, Panter S, Wyland L, Carpentier AC, Miao Y, Shi J, Juarez-Colunga E, Kohrt WM, **Melanson EL**. *Brown adipose tissue metabolism is dependent on ovarian status*. *Am J Physiol Endocrinol Metab*, 2024, 326(5):E588-E601. PMID: 38477875

Chen, K.Y., S. Smith, E. Ravussin, J. Krakoff, G. Plasqui, S. Tanaka, P. Murgatroyd, R. Brychta, C. Bock, E. Carnero, P. Schoffelen, Y. Hatamoto, C. Rynders, and **E.L. Melanson**, *Room Indirect Calorimetry Operating and Reporting Standards (RICORS 1.0): A Guide to Conducting and Reporting Human Whole-Room Calorimeter Studies*. *Obesity* (Silver Spring), 2020. **28**(9): p. 1613-1625. PMID 32841524

## Ongoing projects:

U01 AR071124 (Kohrt)

12/06/2016–11/30/2025 Molecular Transducers of Physical Activity Consortium (MoTrPAC) – Colorado Clinical Center (CCC)

U54AG062319 (Kohrt)

09/20/2012-05/31/2024

Bioenergetic and Metabolic Consequences of the Loss of Gonadal Function

R01 DK126710 (Tang)

02/02/21 - 01/31/26

Dietary Influence on Infant Growth and The Gut Microbiota

R01 DK111622 (Catenacci)

09/15/2017-06/30/2024 Comparison of Weight Loss Induced by Intermittent Fasting Versus Daily Caloric Restriction in Individuals with Obesity: A 1-Year Randomized Trial

1U01NS11385 (Corcos)

09/25/2019-07/31/2024 Study in Parkinson's disease of exercise Phase III clinical trial: SPARX3

P30 DK048520 (MacLean)

01/01/1997–07/31/2025

Colorado Nutrition Obesity Research Center

## B. Positions, Scientific Appointments, and Honors

### Positions and Scientific Appointments

2023 – Co-Chair, Finance Committee, The Obesity Society

2023 - Chair, Clinical Measures Quality Control Committee, MoTrPAC Consortium

2019 – 2021 Member, NIH Kidney, Nutrition, Obesity and Diabetes (KNOD) Study Section

2019 – 2021 Member, NIH Lifestyle and Health Behaviors (LJB) Study Section

2019 - Director of Enrichment Programs, Executive Committee, Colorado Nutrition and Obesity Research Center (NORC)

2019 - Member, University of Colorado Physiology of Aging T32 Executive Committee

2019 - Member, University of Colorado Sleep and Circadian Physiology T32 Executive Committee

- 2016 - Professor, University of Colorado - Anschutz Medical Campus, Division of Endocrinology, Metabolism, and Diabetes, Aurora, CO
- 2016 - Professor, University of Colorado Anschutz Medical Campus, Division of Geriatric Medicine, Aurora, CO
- 2012 - 2019 Ad hoc Reviewer, NIH Kidney, Nutrition, Obesity and Diabetes (KNOD) Study Section
- 2008 - Co-chair, Recent Advances and Controversies in Measuring Energy Metabolism (RACMEM1)
- 2008 - 2016 Assistant Professor, University of Colorado - Anschutz Medical Campus, Division of Endocrinology, Metabolism, and Diabetes, Aurora, CO
- 2006 - Fellow, The Obesity Society
- 2006 - Assistant Director, Energy Balance Assessment Core of the Colorado Nutrition and Obesity Research Center (NORC)
- 2003 - Member, The American Physiological Association
- 2003 - 2008 Associate Professor, University of Colorado - Anschutz Medical Campus, Division of Endocrinology, Metabolism, and Diabetes, Aurora, CO
- 2002 - Fellow, American College of Sports Medicine
- 1998 - Member, The Obesity Society
- 1994 - Member, American College of Sports Medicine

### Honors

- 2018 Outstanding Mentor Award, Colorado Nutrition and Obesity Research Center (NORC)
- 1997 Doctoral Student Scholarship Award, New England Chapter of the American College of Sports Medicine
- 1997 American College of Sports Medicine Foundation Doctoral Student Research Grant , American College of Sports Medicine
- 1997 Life Fitness Academy Research Grants for Junior Investigators , Life Fitness Academy

### **C. Contributions to Science**

1. Menopause is associated with a gain and redistribution of body fat, such that post-menopausal women increase deposition of fat in the abdominal region, increasing their risk of metabolic dysfunction. Pre-clinical studies have shown that suppression of ovarian hormones reduces physical activity, energy expenditure, and fat oxidation and that these effects can be reversed with estradiol therapy. We use a pharmacological approach to suppress ovarian hormone secretion in women and then add back estradiol in a double-blinded manner to determine if the effects seen in rodents are also observed in women. We have also demonstrated that energy expenditure and physical activity are reduced in this model, and the effects are attenuated by estradiol therapy. One of the questions that arose from these studies is if loss of ovarian function leads to decreases in EE, what tissue(s) are affected? This led to a successful R01 application to Dr. Melanson (R01 DK112260) to study the effects of estrogen on brown fat activity in women. We have recently published the results of this study, which demonstrated that in women, brown fat activity is regulated by estrogen. This is the first study in humans to demonstrate that brown fat activity is regulated by endogenous hormones.

- a. **Melanson, E.L.**, K.M. Gavin, K.L. Shea, P. Wolfe, M.E. Wierman, R.S. Schwartz, and W.M. Kohrt, *Regulation of energy expenditure by estradiol in premenopausal women*. J Appl Physiol (1985), 2015. **119**(9): p. 975-81. PMC4628992 PMID 4628992
- b. Shea, K.L., K.M. Gavin, **E.L. Melanson**, E. Gibbons, A. Stavros, P. Wolfe, J.M. Kittelson, S.F. Vondracek, R.S. Schwartz, M.E. Wierman, and W.M. Kohrt, *Body composition and bone mineral density after ovarian hormone suppression with or without estradiol treatment*. Menopause, 2015. **22**(10): p. 1045-52. PMID 25783468 PMID 4760356
- c. **Melanson, E. L.**, K. Lyden, E. Gibbons, K. M. Gavin, P. Wolfe, M. E. Wierman, R. S. Schwartz and W. M. Kohrt (2018). Influence of Estradiol Status on Physical Activity in Premenopausal Women." *Med Sci Sports Exerc*. 2018. 50(8): p. 1704-1709. PMID 29509642 PMID 6045448
- d. Blondin DP, Haman F, Swibas TM, Hogan-Lamarre S, Dumont L, Guertin J, Richard G, Weissenburger Q, Hildreth KL, Schauer I, Panter S, Wyland L, Carpentier AC, Miao Y, Shi J, Juarez-Colunga E, Kohrt WM, **Melanson EL**. *Brown adipose tissue metabolism is dependent on ovarian status*. Am J Physiol Endocrinol Metab, 2024, 326(5):E588-E601. PMID: PMC11211003 PMID 38477875

2. I have studied the effects of exercise on fat balance, and have over fifteen years of experience in performing these studies using whole-room indirect room calorimetry. We have used room calorimetry to determine how exercise intensity, aging, and obesity affect substrate oxidation at the whole-body level.
  - a. **Melanson, E.L.**, T.A. Sharp, H.M. Seagle, T.J. Horton, W.T. Donahoo, G.K. Grunwald, J.T. Hamilton, and J.O. Hill, Effect of exercise intensity on 24-h energy expenditure and nutrient oxidation. *J Appl Physiol*, 2002. **92**(3): p. 1045-52.
  - b. **Melanson, E.L.**, W.T. Donahoo, G.K. Grunwald, and R. Schwartz, Changes in 24-h substrate oxidation in older and younger men in response to exercise. *J Appl Physiol*, 2007. **103**(5): p. 1576-82. Bergouignan, A., W.S. Gozansky, D.W. Barry, W. Leitner, P.S. Maclean, J.O. Hill, B. Draznin, and **E.L. Melanson**, Increasing dietary fat elicits similar changes in fat oxidation and markers of muscle oxidative capacity in lean and obese humans. *PLoS One*, 2012. **7**(1): p. e30164. PMC: 3257254
  - c. Sevits, K.J., **E.L. Melanson**, T. Swibas, S.E. Binns, A.L. Klochak, M.C. Lonac, G.L. Peltonen, R.L. Scalzo, M.M. Schweder, A.M. Smith, L.M. Wood, C.L. Melby, and C. Bell, Total daily energy expenditure is increased following a single bout of sprint interval training. *Physiol Rep*, 2013. **1**(5): p. e00131. PMC: 3841058
  - d. Chen KY, Smith S, Ravussin E, Krakoff J, Plasqui G, Tanaka S, Murgatroyd P, Brychta R, Bock C, Carnero E, Schoffelen P, Hatamoto Y, Rynders C, **Melanson EL**. Room Indirect Calorimetry Operating and Reporting Standards (RICORS 1.0): A Guide to Conducting and Reporting Human Whole-Room Calorimeter Studies. *Obesity (Silver Spring)*. 2020;28(9):1613-1625. PMC: 7526647
3. My early research was focused on developing and validating objective methods for measuring physical activity and energy expenditure in free-living humans. I developed the first model that used accelerometer data to distinguish different intensities of physical activity, and was a co-author on the seminal "Freedson Cutpoint" study that has been cited more than 3000 times. This line of research has remained one of my primary areas of interest, and has expanded to include the development of new methods to measure energy expenditure using whole-room indirect calorimetry, and the development and validation of new methods of measuring free-living energy expenditure. These studies include novel instrumentation, such as measures of heat flux as a means of measuring energy expenditure, and validation of a laser-based instrument to measure isotopic enrichments in urine samples. This latter line of research is aimed at developing and validating a novel approach to improve the precision of performing measurement of isotopic enrichments in urine (R43 DK09336, R44 DK093362). We have shown this instrument to be accurate compared to the gold-standard measurement of whole-room indirect calorimetry, as well as against an independent Isotope Ratio Mass Spectrometry Laboratory
  - a. Freedson, P.S., **E.L. Melanson**, and J. Sirard, Calibration of the Computer Science and Applications, Inc. accelerometer. *Med Sci Sports Exerc*, 1998. **30**(5): p. 777-81.
  - b. Berman, E.S., S.L. Fortson, S.P. Snaith, M. Gupta, I. Chery, S. Blanc, **E.L. Melanson**, P.J. Thomson, and J.R. Speakman, Direct analysis of delta(2)H and delta(18)O in natural and enriched human urine using laser-based, Off-Axis Integrated Cavity Output Spectroscopy. *Anal Chem*, 2012. PMC: 3517205
  - c. **Melanson, E. L.**, T. Swibas, W. M. Kohrt, V. A. Catenacci, S. A. Creasy, G. Plasqui, L. Wouters, J. R. Speakman and E. S. F. Berman (2017). "Validation of the doubly labeled water method using off-axis integrated cavity output spectroscopy and isotope ratio mass spectrometry." *Am J Physiol Endocrinol Metab*. 2018. 314(2): p. E124-130. PMID 5866416
  - d. Chen, K. Y., S. Smith, E. Ravussin, J. Krakoff, G. Plasqui, S. Tanaka, P. Murgatroyd, R. Brychta, C. Bock, E. Carnero, P. Schoffelen, Y. Hatamoto, C. Rynders, **E. L. Melanson**. Room Indirect Calorimetry Operating and Reporting Standards (RICORS 1.0): A Guide to Conducting and Reporting Human Whole-Room Calorimeter Studies. *Obesity (Silver Spring)* 2020;28:1613-25. PMID 7526647

#### Complete List of Published Work in MyBibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1Zsi8jvdJymkm/bibliographahy/47733317/public/?sort=date&direction=ascending>