CURRICULUM VITAE June 2018

David M. Thomson

Contact Information

Address: Department of Physiology and Developmental Biology

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Brigham Young University

Provo, UT 84602

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Professional Experience

Associate Professor Department of Physiology and Developmental Biology, Brigham Young University (September 2014-Present)

Assistant Professor Department of Physiology and Developmental Biology, Brigham Young University (April 2008-September 2014)

Education

Post-Doctoral Brigham Young University, Provo, UT

Department of Physiology & Developmental Biology

Post-doctoral fellow

Mentor: William W. Winder

(January 2006 – March 2008)

Ph.D. East Carolina University, Greenville, NC

Major: Bioenergetics. Mentors: Scott E. Gordon & G. Lynis Dohm

*Dissertation: Diminished Overload-induced Skeletal Muscle Growth With Age: Role of AMP-activated protein kinase in the Control of Translational Signaling.*

(December 2005)

M.S. Brigham Young University, Provo, UT

Major: Exercise Physiology

*Thesis: Strength Gains Associated With One Versus Two Days Per Week of Leg-Extension Exercise*

(July 2001)

B.S. Brigham Young University, Provo, UT

Major: Athletic Training

(April 1999)

**RESEARCH ACTIVITIES**

**Refereed Publications:**

Thomson, D.M. The role of AMPK in the regulation of skeletal muscle size, hypertrophy and regeneration. *Int J Mol Sci*, 19: 3125, 2018.

Parker, B.A., C.M. Walton, S.T. Carr, J.L. Andrus, E.C.K. Cheung, M.J. Duplisea, E.K. Wilson, C. Draney, D.R. Lathen, K.B. Kenner, D.M. Thomson, J.S. Tessem, B.T. Bikman. β-hydroxybutyrate elicits favorable mitochondrial changes in skeletal muscle. *Int J Mol Sci*, 19:2247, 2018.

Jackson, K.C., M.D. Tarpey, A.P. Valencia, M.R. Iñigo, S.J. Pratt, D.J. Patteson, J.M. McClung, R.M. Lovering, D.M. Thomson, E.E. Spangenburg. Induced Cre-mediated knockdown of Brca1 in skeletal muscle reduces mitochondrial respiration and prevents glucose intolerance in adult mice on a high-fat diet. *FASEB J*, 32:3070-3084, 2018.

Moore, T.M., X.M. Mortensen, C.K. Ashby, A.M. Harris, K.J. Kump, D.W. Laird, A.J. Adams, J.K. Bray, T. Chen, **D.M. Thomson**. The effect of caffeine on skeletal muscle anabolic signaling and hypertrophy. *Appl Phys Nutr Metab,* 42:621-629, 2017.

Chen, T., T.M. Moore, M.T. Ebbert, N.L. McVey, S.R. Madsen, D.M. Hallowell, A.M. Harris, R.E. Char, R.P. Mackay, C.R. Hancock, J.M. Hansen, J.S. Kauwe, **D.M. Thomson**. Liver kinase B1 inhibits the expression of inflammation-related genes post-contraction in skeletal muscle. *J Appl Physiol*, 120:876-888, 2016.

Weerasekara, V.K., D.J. Panek, D.G. Broadbent, J.B. Mortenson, A.D. Mathis, G.N. Logan, J.T. Prince, **D.M. Thomson**, J.W. Thompson, J.L. Andersen. Metabolic-Stress-Induced Rearrangement of the 14-3-3 Interactome Promotes Autophagy via a ULK1- and AMPK-Regulated 14-3-3 Interaction with Phosphorylated Atg9. *Mol Cell Biol,* 34:4379-4388, 2014.

Hardman, S.E., D.E. Hall, A.J. Cabrera, C.R. Hancock, **D.M. Thomson**. The effects of age and muscle contraction on AMPK activity and heterotrimer composition. *Exp Gerontol*, 55:120-128, 2014.

Jackson, K.C., E.K. Gidlund, J. Norrbom, A.P. Valencia, **D.M. Thomson**, R.A. Schuh, P.D. Neufer, E.E. Spangenbug. BRCA1 is a novel regulator of metabolic function in skeletal muscle. *J Lipid Res*, 55:668-680, 2014.

Tanner, C.B., S.R. Madsen, D.M. Hallowell, D.M.J. Goring, T.M. Moore, M.R. Heninger, D.R. Atwood, **D.M. Thomson**. Mitochondrial and performance adaptations to exercise training in mice lacking skeletal muscle LKB1. *Am J Physiol Endocrinol Metab,* 305:E1018-1029, 2013.

Henriksen, B.S., M.E. Curtis, N. Fillmore, B.R. Cardon, **D.M. Thomson** and C.R. Hancock. The effects of chronic AMPK activation on hepatic triglyceride accumulation and glycerol 3-phosphate acyltransferase activity with high fat feeding. *Diabetol & Metab Syndr*. 5:29, 2013.

Jeppesen, J., S.J. Maarbjerg, A.B. Jordy, A.M. Fritzen, C. Pehmøller, L. Sylow, A.K. Serup, N. Jessen, K. Thorsen, C. Prats, K. Qvortrup, J.R.B. Dyck, R.W. Hunter, K. Sakamoto, **D.M. Thomson**, P. Schjerling, J.F.P. Wojtaszewski, E.A. Richter, and B. Kiens. LKB1 regulates lipid oxidation during exercise independently of AMPK. *Diabetes*. 62:1490-1499, 2013.

Jackson K.C., Wohlers L.M., Lovering R.M., Schuh R.A., Maher A.C., Bonen A., Koves T.R., Ilkayeva O., **Thomson D.M.**, Muoio D.M., Spangenburg E.E. Ectopic lipid deposition and the metabolic profile of skeletal muscle in ovariectomized mice. *Am J Physiol Regul Integr Comp Physiol*. 304:R206-R217, 2013.

Merrill J.F., **Thomson D.M.**, Hardman S.E., Hepworth S.D., Willie S., Hancock C.R. Iron deficiency causes a shift in AMP-activated protein kinase (AMPK) subunit composition in rat skeletal muscle. *Nutr Metab.* 9:104, 2012.

**Thomson, D.M**., M.P. Ascione, J. Grange, C. Nelson, and M.D. Hansen. Phosphorylation of VASP by AMPK alters actin binding and occurs at a novel site. *Biochem Biophys Res Commun.* 414:215-219, 2011.

Smith, C.D., R.A. Compton, J.S. Bowler, J.T. Kemp, S.N. Sudweeks, **D.M. Thomson** and W.W. Winder. Characterization of the liver kinase B1 (LKB1)-mouse protein-25 (MO25)-ste-20 related adaptor protein (STRAD) complex in adult mouse skeletal muscle. *J Appl Physiol*. 111:1622-1628, 2011.

Frier, B.C. C.R. Hancock, J.P. Little, N. Fillmore, T.A. Bliss, **D.M. Thomson**, Z. Wan, D.C. Wright. Reductions in RIP140 are not Required for Exercise and AICAR Mediated Increases in Skeletal Muscle Mitochondrial Content. *J Appl Physiol.* 111:688-695, 2011.

Brown, J.D., C.R. Hancock, A.D. Mongillo, J.B. Barton, R.A. DiGiovanni, A.C. Parcell, W.W. Winder, **D.M. Thomson**. Effect of LKB1 deficiency on mitochondrial content, fiber type, and muscle performance in the mouse diaphragm. *Acta Physiol.* 201:457-466, 2011.

**Thomson, D.M**., C.R. Hancock, B.G. Evanson, S.G. Kenney, B. B. Mallan, A.D. Mongillo, J.D. Brown, S. Hepworth, N. Fillmore, A.C. Parcell, D.L. Kooyman, and W. W. Winder. Skeletal Muscle Dysfunction in Muscle-Specific LKB1 Knockout Mice. *J. Appl. Physiol.* 108:1775-1785, 2010.

Nakken, G.N., D. L. Jacobs, **D.M. Thomson**, N. Fillmore, and W.W. Winder. Effects of Excess Corticosterone on LKB1 and AMPK Signaling in Rat Skeletal Muscle. *J. Appl. Physiol.* 108: 298-305, 2010.

**Thomson, D.M**., J. D. Brown, N. Fillmore, S.K. Ellsworth, D.L. Jacobs, W.W. Winder, C.A. Fick and S.E. Gordon. AMP-activated protein kinase response to contractions and treatment with the AMPK activator AICAR in young adult and old skeletal muscle. *J Physiol.* 587: 2077-2086, 2009.

**Thomson, D.M**., W.W. Winder. AMP-activated protein kinase control of fat metabolism in skeletal muscle. *Acta Physiol*. 196:147-154, 2009.

Gordon, S. E., J. A. Lake, C. M. Westercamp, and **D. M. Thomson**. Does AMP-activated Protein Kinase Negatively Mediate Aged Fast-twitch Skeletal Muscle Mass? *Ex. Sport Sci. Rev.* 36:179-186, 2008.

Branvold D.J., D. R. Allred, D. J. Beckstead, H. J. Kim, N. Fillmore, B. M. Condon, J. D. Brown, S. N. Sudweeks, **D. M. Thomson**, W. W. Winder. Thyroid Hormones increase LKB1, STRAD, MO25, phospho-AMPK, phospho-CREB, and PGC-1alpha in Skeletal Muscle. *J. Appl. Physiol.* 105:1218-1227, 2008

**Thomson, D. M**., M. D. Hansen, W. W. Winder. Regulation of the AMPK-related protein kinases by ubiquitination. *Biochem. J.* 411:e9-e10, 2008.

**Thomson, D. M**., C. A. Fick, and S. E. Gordon. AMPK Activation Attenuates S6K1, 4E-BP1, and eEF2 Signaling Responses to High-frequency Electrically Stimulated Skeletal Muscle Contractions. *J. Appl. Physiol*. 104:625-632, 2008.

**Thomson, D. M**., S.T. Herway, N. Fillmore, H. Kim, J.D. Brown, J.R. Barrow, and

W. W. Winder. AMP-Activated Protein Kinase Phosphorylates Transcription Factors of the CREB Family. *J. Appl. Physiol*. 104:429-438, 2008.

**Thomson, D.M**., J.D. Brown, N. Fillmore, B. M. Condon, H. J. Kim, J. R. Barrow, W. W. Winder. LKB1 and the Regulation of Malonyl-CoA and Fatty Acid Oxidation in Muscle. *Am. J. Physiol. Endocrinol. Metab*. 293:E1572-E1579, 2007.

Winder, W. W. and **D. M. Thomson**. Cellular energy sensing and signaling by AMP-activated protein kinase . *Cell Biochem. Biophys.* 47:332-347, 2007.

**Thomson, D. M**., B. B. Porter, J. H. Tall, H. J. Kim, J. R. Barrow, and W. W. Winder. Skeletal muscle and heart LKB1 deficiency causes decreased voluntary running and reduced muscle mitochondrial marker enzyme expression in mice. *Am. J. Physiol. Endocrinol. Metab.* 292(1): E196-202, 2007.

Winder, W. W., E. B. Taylor, and **D. M. Thomson**. Role of AMP-activated protein kinase in the molecular adaptation to endurance exercise. *Med. Sci. Sports. Exerc.* 38(11):1945-9, 2007.

**Thomson, D. M**., and S. E. Gordon. Impaired overload-induced muscle growth is associated with diminished translational signaling in aged rat fast-twitch skeletal muscle. *J. Physiol. (London)*. 574 (Pt 1): 291-305, 2006.

**Thomson, D. M**., and S. E. Gordon. Diminished overload-induced hypertrophy in aged fast-twitch skeletal muscle is associated with AMPK hyperphosphorylation. *J. Appl. Physiol.* 98(2): 557-564, 2005.

**Professional Presentations**

Tsukamoto, J.J., M.S. Matsumura, Z. E. Olsen, E.K. Wilson, J.L. Chow, J.A. Arroyo, **D.M. Thomson**. Growth Arrest Specific 6 in Regeneration After Skeletal Muscle Injury. *Experimental Biology,* San Diego, CA, April 2018.

Wyson, B.M., M.S. Matsumura, M.R. Deyle, M.N. Knowlton, J.A. Arroyo, R.D. Hyldahl, D.M. Thomson. Activation of growth signaling in skeletal muscle by growth arrest specific-6. *Experimental Biology,* San Diego, CA, April 2018.

Cheung, E.C.K., T. Chen, J.T. Hill, **D.M. Thomson**. Skeletal muscle gene expression in high fat diet-fed LKB1 knockout mice. *Experimental Biology,* San Diego, CA, April 2018.

Wyson, B.M., M.S. Matsumura, M.R. Deyle, M.N. Knowlton, J.A. Arroyo, R.D. Hyldahl, D.M. Thomson. Activation of growth signaling in skeletal muscle by growth arrest specific-6. *Experimental Biology,* San Diego, CA, April 2018.

Wilson, E., J. Chow, M. Duplisea, N. Page, J. A. Arroyo, **D. M. Thomson.** Growth Arrest Specific 6 Activates Akt and ERK in Cultured Skeletal Muscle. *Experimental Biology*, Chicago, IL, April 2017.

Duplisea, M.J., E. K. Wilson, E.C.K. Cheung, B. A. Parker, S.T. Carr, C.K. Ashby, B.T. Bikman, **D.M. Thomson**. Effects of Ketogenic Diet in Young Adult and Old Rats. *Experimental Biology,* Chicago, IL, April 2017.

Chen, T., **D.M. Thomson**. Effect of Skeletal Muscle LKB1 Knockout on High Fat Diet-Induced Insulin and Glucose Tolerance. *Experimental Biology,* Chicago, IL, April 2017.

**Thomson, D.M.** Skeletal Muscle Aging – It’s a Gas(6)! *Brigham Young University Gerontology Program Conference,* Provo, UT. March 2017.

Cheung, E.C.K., S.G. Blackham, B.T. Colton, **D.M. Thomson**. AMPK-dependent attenuation of skeletal muscle protein synthesis by cooling. *Integrative Biology of Exercise,* Phoenix, AZ, November 2016.

Matsumura, M.S., T. Chen, **D.M. Thomson**. High-fat diet induces LKB1-dependent attenuation of skeletal muscle p70S6k phosphorylation by insulin. *Integrative Biology of Exercise,* Phoenix, AZ, November 2016.

Lyons, K.C., C. Alberts, **D.M. Thomson**. Effect of muscle cooling on AMPK and inflammatory proteins in skeletal muscle. *Southwest American College of Sports Medicine,* Costa Mesa, CA, October 2015.

Bray, J., C.K. Ashby, **D.M. Thomson**. Effect of caffeine on muscle cell differentiation. *Southwest American College of Sports Medicine,* Costa Mesa, CA, October 2015.

Ashby, C.K., J. Bray, R.T. Wilson, **D.M. Thomson**. Physiological concentrations of caffeine do not affect insulin stimulated mTOR pathway activation. *Southwest American College of Sports Medicine,* Costa Mesa, CA, October 2015.

Harris, A.M., A. Adams, M. Jensen, T.M. Moore, **D.M. Thomson**. The role of LKB1 on skeletal muscle inflammation signaling after downhill running. Integrative Physiology of Exercise, Miami, FL, September 2014.

Chen, T, A. Adams, M. Jensen, T.M. Moore, **D.M. Thomson**. LKB1 knockout increases exercise-induced cell membrane damage in skeletal muscle. Integrative Physiology of Exercise, Miami, FL, September 2014.

**D.M Thomson.** Regulation of contraction-induced inflammation and mitochondrial accretion by LKB1. *Southwest American College of Sports Medicine*, Newport Beach, CA, October 2013.

C.A. Grigg, T. M. Moore, X.M. Mortensen, **D.M. Thomson**. Effect of caffeine on NF-κB phosphorylation in hypertrophying skeletal muscle. *Southwest American College of Sports Medicine*, Newport Beach, CA, October 2013.

N.L. McVey, T. Chen, T.M. Moore, M.T.W. Ebbert, S.R. Madsen, D.M. Hallowell, J.S.K.Kauwe, **D.M. Thomson**. LKB1 regulates skeletal muscle inflammation after contractions. *Southwest American College of Sports Medicine*, Newport Beach, CA, October 2013.

Anderson, S.K., S.E. Hardman, B.J. Nelson, Z.P Oleskey, **D.M. Thomson**. Role of LKB1 in skeletal muscle regeneration after injury. *Integrative Biology of Exercise,* Denver, CO, October 2012.

Jacobs, M.B., S.E. Hardman, T.M. Moore, J. Lew, P.R. Reynolds, **D.M. Thomson**. RAGE and STAT3 signaling in chronic AICAR-treated young adult and old skeletal muscle. *Integrative Biology of Exercise,* Denver, CO, October 2012.

Hall D.E., S.E. Hardman, M.B. Jacobs, A.J. Mitchell, **D.M. Thomson**. The effects of aging on AMPK subunit expression and complex formation. *Experimental Biology*, San Diego, CA, April 2012.

Hardman, S.E., D.E. Hall, A.J. Mitchell, K.M. Black, R.A. Compton, **D.M. Thomson**. The effects of aging and muscle contraction on AMPK activity. *Experimental Biology*, San Diego, CA, April 2012.

Hallowell D.M., C.B. Tanner, M.R. Nuttall, S.K. Anderson, J.M. Bradshaw, S.R. Madsen, **D.M.**

**Thomson**. Exercise training-induced mitochondrial biogenesis is impaired in skeletal muscle-specific LKB1 knockout mice. *Experimental Biology*, San Diego, CA, April 2012.

**Thomson, D.M.**, C.R. Hancock, B.G. Evanson, S.G. Kenney, B.B. Malan, A.D. Mongillo, J.D. Brown, S. Hepworth, N. Fillmore, A.C. Parcell, D.L. Kooyman, W.W. Winder. Muscle-specific LKB1 knockout leads to skeletal muscle dysfunction. *FASEB Summer Research Conference- AMPK: Central Regulatory System in Metabolism & Growth*. Kyoto, Japan, October 2010.

**Thomson, D.M.**, B.B. Malan, T.A. Brough. Muscle-specific LKB1 knockout impairs overload-induced plantaris hypertrophy. *International Biochemistry of Exercise Meeting*, Guelph, Canada, June 2009.

**Thomson, D.M.**, N. Fillmore, S. K. Ellsworth, J. D. Brown, C. A. Fick, W. W. Winder, and S. E. Gordon. Contraction-induced AMPK activity is elevated in aged skeletal muscle. *FASEB Summer Research Conferences- AMPK: In Sickness To Health from Molecule to Man.* Copenhagen, Denmark, August 2008.

**Thomson, D.M**., J.D. Brown, H.J. Kim, D.G. Chesser, N.A. Fillmore, B.B. Porter, J.H. Tall, J.R. Barrow, W.W. Winder. LKB1 is Required for AICAR-induced Elevations In Hexokinase II Content in Skeletal Muscle. *American Diabetes Association 67th Scientific Sessions*, Chicago, IL, June 2007.

**Thomson, D. M.,** B. B. Porter, J. H. Tall, D. G. Chesser, H-J. Kim, J. R. Barrow, and W. W. Winder. LKB1 is essential for normal phosphorylation of AMPK and ACC in Skeletal muscle.*FASEB Summer Research Conferences- AMPK: Impact on Mammalian Metabolism And Disease*, Snowmass, CO, August 2006.

**Thomson, D. M**.., and S. E. Gordon. The Age-related Decline in Overload-induced Fast-twitch Skeletal Muscle Hypertrophy May be Related to Altered eEF2 Signaling. *Integrative Biology of Exercise*, Austin, TX, October, 2004.

**Thomson, D. M**., and S. E. Gordon. AMPK Phosphorylation During Skeletal Muscle Overload in Young and Old Rats. *Experimental Biology*, Washington D.C., April, 2004.

**Thomson, D. M**., and S. E. Gordon. AMPK Phosphorylation During Skeletal Muscle Overload in Young and Old Rats. *East Carolina University Graduate Student Research Day*, Greenville, NC, March, 2004.

Research Support

Thomson, D.M. and Hill, J. *Analysis of Global Gene Expression After injury in Old vs. Young Skeletal Muscle.* BYU Gerontology Research Grant, $10,000. 2018.

Thomson, D.M. and Aroyo, J. *Effects of Growth Arrest Specific 6 (Gas 6) on Regenerative Capacity of Aged Skeletal Muscle.* BYU Gerontology Research Grant. $10,000. 2016.

Thomson, D.M. *The Role of LKB1 in Obesity-induced Skeletal Muscle Inflammation and Insulin Resistance*. BYU Mentoring Environment Grant. $13,300. February 2015-January 2017.

Thomson, D.M. *Effect of Caffeine on Skeletal Muscle Growth*. BYU Mentoring Environment Grant, $20,000. February 2013-January 2015.

Thomson, D.M. *LKB1 Regulation of the Transcription Factor p53 in Skeletal Muscle.* BYU Mentoring Environment Grant, $20,000. February 2012-January 2014.

Thomson, D.M. and Reynolds, P. *The Role of AMPK and RAGE in Age-related Skeletal Muscle Atrophy and Dysfunction.* BYU Gerontology Research Grant. $10,000. 2012.

Thomson, D.M. *AMPK Activation In Aged Skeletal Muscle After Muscle Contraction*. BYU Mentoring Environment Grant. $20,000. February 2011-January 2013.

Thomson, D.M. *The Role of PAS-kinase In Skeletal Muscle Hypertrophy and Endurance Adaptation.* BYU Mentoring Environment Grant $20,000. February 2010-January 2012.

Thomson, D.M. *Regulation of the transcription factor CREB in Skeletal Muscle After Endurance Exercise*. BYU Mentoring Environment Grant. $20,000. February 2009 – January 2011.

**Community Outreach**

**Top of Mind, BYU Radio**. Participated in live interview on the process of aging and slowing it’s effects.

**TEACHING ACTIVITIES**

**Current Courses Taught**

PDBIO 305: Human Physiology

PDBIO 565: Endocrinology

PDBIO 601: Cellular and Molecular Physiology

PDBIO 494: Undergraduate Mentored Research

PDBIO 495: Undergraduate Advanced Mentored Research

PDBIO 550: Advanced Topics

**Previous Courses Taught**

EXSS 3805: Physiology of Exercise

**Mentoring: Undergraduate**

Undergraduate students are mentored in my laboratory for 1-4 years with the goal, depending on the student, of obtaining mentored research credit as required by their degree program, or to become an author on a published manuscript or abstract at a professional conference. Students mentored each year:

2018: 25

2017: 13 (sabbatical year)

2016: 19

2015: 21

2014: 23

2013: 26

2012: 31

2011: 24

2010: 23

Total Undergraduate Individuals Mentored in the Lab: 102

Undergraduate Honor’s Thesis

Kyle Lyons 2015-2016

Lisa McCoy 2012-2013

**Mentoring: Graduate**

Graduate Committee Chair

Marc Matsumura MS 2018-present

Ting Chen PhD 2014-2018

Timothy Moore MS 2012-2014

Shalene Hardman PhD 2010-2014

Jake Brown MS 2008-2010

Graduate Committee Member

Marry Vallecillo PhD 2018-present

Kyle Bills PhD 2017-present

Ashari Kannangara PhD 2017-present

Kai Li Ong PhD 2016-present

Brandon Rose PhD 2016-present

Jacob Sorensen PhD 2015-present

Michael Deyhle PhD 2015-present

Paul Hafen PhD 2014-present

Amy Crandall PhD 2012-present

Jeff Morensen PhD 2014-2015

Desi DeMille PhD 2011-2015

Melissa Hansen PhD 2011-2014

Bryan Badal MS 2012-2014

Brenda Benson MS 2011-2014

Paige Affleck MS 2010-2013

Michael Leavitt MS 2011-2013

Daniel Nelson MS 2011-2012

John Merrill MS 2010-2012

Cody Smith MS 2008-2009

Natasha Fillmore MS 2009