

## BIOGRAPHICAL SKETCH

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NAME Walter, Glenn Adam	POSITION TITLE Associate Professor of Physiology and Functional Genomics		
eRA COMMONS USER NAME (credential, e.g., agency login) GAWALTER			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Franklin and Marshall College, Lancaster, PA	BA	1989	Biology/Physics
University of Pennsylvania, Philadelphia, PA	PhD	1997	Biophysics

**A. Personal Statement:** Throughout my career I have pushed cutting edge MR technology in order to answer clinical relevant physiology questions. In the past, my research has been based on diverse collaborations with investigators with tremendous different backgrounds (physiologist, cell biologist, engineers, biochemist, physicists, clinicians, etc) to successfully tackle a common problem. One of primary area of focus of my research is the development of translational noninvasive imaging and spectroscopy techniques for clinical applications. I am uniquely qualified to run this technology core on MRI/MRS measures of the metabolome in vivo and and perform the comprehensive analysis of tissues proposed in this center. I had the good fortune of performing my Ph.D. work focused on in vivo metabolism using MR under the guidance of the late Dr.s. Jack Leigh, Brit Chance, and Mildred Cohn at the University of Pennsylvania. With this basic training in biophysics and metabolism, my post-doctoral fellowship was performed with Dr Sweeney in the Dept of Physiology at the University of Pennsylvania. During my time as a post doctoral fellow I expanded my knowledge of MR to study the in vivo physiology and metabolism of dystrophic muscle prior to and following gene transfer of therapeutic and genes encoding for unique metabolic pathways (for example arginine kinase in mammalian muscle). Ever since then, I have been using these combined biophysics, MR, and physiology foundations to develop comprehensive ways to monitor and study metabolism in vivo. The University of Florida has provided me with a rich environment to further expand upon with UF being home to the National High Magnetic Field Laboratory (NHMFL), McKnight Brain Institute and the Powell Gene Therapy Institute. Currently, I am the director of a number of NIH imaging cores funded to study in vivo metabolism: prior to and following gene therapy in skeletal and cardiac muscle, study metabolic perturbations following throughout spinal cord, in vivo preclinical models of muscular and in subjects with muscular dystrophy throughout disease progression and therapeutic intervention.

Due to the interdisciplinary nature of this research both the predoctoral and postdoctoral fellows that I have mentored come from highly diverse backgrounds. In addition to mentoring MD/Ph.D. students, I have also mentored students from the Interdisciplinary Program in Biomedical Sciences, Chemistry, Materials Science, Bioengineering, Physical Therapy, Health and Human performance Ph.D. programs on the basics of Physiology and/or magnetic resonance techniques. I have also served as the Concentration Director for the Physiology concentration in the Interdisciplinary Program in Biomedical Sciences at UF and I am a currently a mentor on 3 NIH T32 Training Grants. In addition I provide education and outreach to the community at large through NSF and NIH funded workshops associated with the National High Magnetic Field Laboratory and the Senator Paul D. Wellstone Muscular Dystrophy Cooperative Research Centers.

### B. Professional Experience

#### Positions and Employment

1989-1990	Technician, Department of Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, PA
1990-1991	Research Assistant, Department of Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, PA
1991-1997	Pre-Doctoral Student, Department of Biochemistry and Biophysics, University of

Pennsylvania, Philadelphia, PA, Metabolic Magnetic Resonance Research and Computing Center, University of Pennsylvania, Philadelphia, PA

1997-1999 Postdoctoral Fellow, Department of Physiology, University of Pennsylvania, Philadelphia, PA

1999-2001 Instructor of Physiology Department of Physiology, University of Pennsylvania, Phila., PA

2001-2008 Assistant Professor, Department of Physiology and Functional Genomics, University of Florida, Gainesville, FL

2008- Associate Professor, Department of Physiology and Functional Genomics, University of Florida, Gainesville, FL

2009-2011 Associate Director, Advanced Magnetic Resonance and Imaging Facility, University of Florida

### **Honors**

1991-1993 Recipient of NIH training grant in biophysics

1997-1999 Recipient of NIH training grants in cardiology and physiology

1998 Young Investigator Award, Institute for Human Gene Therapy

1999 Young Investigator Award, Institute for Human Gene Therapy

2005-2009 Ad hoc Reviewer, NIH

2008 Reviewer American Heart

2007 Reviewer Muscular Dystrophy Associations England

2009 Reviewer Muscular Dystrophy Association France

2008 Reviewer Netherlands National Research Foundation

2008 Journal of Applied Physiology Editorial Board

2012 Reviewer Association Française contre les Myopathies and the DoD.

### **C. Selected Peer-reviewed Publications**

#### **Most relevant to the current application**

1. Arpan I, Willcocks RJ, Forbes SC, Finkel RS, Lott DJ, Rooney WD, Triplett WT, Senesac CR, Daniels MJ, Byrne BJ, Finanger EL, Russman BS, Wang DJ, Tennekoon GI, Walter GA, Sweeney HL, Vandeborne K. Examination of effects of corticosteroids on skeletal muscles of boys with DMD using MRI and MRS. *Neurology*. 2014 Sep 9;83(11):974-80. doi: 10.1212/WNL.0000000000000775. Epub 2014 Aug 6. PubMed PMID:25098537
2. Forbes SC, Willcocks RJ, Triplett WT, Rooney WD, Lott DJ, Wang DJ, Pollaro J, Senesac CR, Daniels MJ, Finkel RS, Russman BS, Byrne BJ, Finanger EL, TennekoonGI, Walter GA, Sweeney HL, Vandeborne K. Magnetic resonance imaging and spectroscopy assessment of lower extremity skeletal muscles in boys with duchenne muscular dystrophy: a multicenter cross sectional study. *PLoS One*. 2014 Sep 9;9(9):e106435. PMID:25203313.
3. Lott DJ, Forbes SC, Mathur S, Germain SA, Senesac CR, Lee Sweeney H, Walter GA, Vandeborne K. Assessment of intramuscular lipid and metabolites of the lower leg using magnetic resonance spectroscopy in boys with Duchenne muscular dystrophy. *Neuromuscul Disord*. 2014 Jul;24(7):574-82. doi: 10.1016/j.nmd.2014.03.013. Epub 2014 Apr 13. PubMed PMID: 24798221
4. Triplett WT, Baligand C, Forbes SC, Willcocks RJ, Lott DJ, DeVos S, Pollaro J, Rooney WD, Sweeney HL, Bönnemann C, Wang DJ, Vandeborne K, Walter GA. Chemical shift-based MRI to measure fat fractions in dystrophic skeletal muscle. *Magnetic Resonance in Medicine*, 2013 Sep 4. Epub ahead of print, PMID: 24006208.
5. Forbes SC, Walter GA, Rooney WD, Wang DJ, Devos S, Pollaro J, et al. Skeletal Muscles of Ambulant Children with Duchenne Muscular Dystrophy: Validation of Multicenter Study of Evaluation with MR Imaging and MR Spectroscopy. *Radiology*. 2013 Oct;269(1):198-207. PubMed PMID: 23696684.
6. Willcocks RJ, Arpan IA, Forbes SC, Lott DJ, Senesac CS, Senesac E, Deol J, Triplett W, Baligand C, Daniels MJ, Sweeney HL, Walter GA, Vandeborne K. Longitudinal measurements of MRI-T2 in boys with Duchenne muscular dystrophy: Effects of age and disease progression. *Neuromuscular Disorders*, (online 11 January 2014)

#### **Additional recent publications of importance to the field (in chronological order)**

1. Wang J, Fan Z, Vandeborne K, Walter G, Shiloh-Malawsky Y, An H, Kornegay JN, Styner MA. A computerized MRI biomarker quantification scheme for a canine model of Duchenne muscular dystrophy. *Int J Comput Assist Radiol Surg*. 2013 Sep;8(5):763-74. Epub 2013 Jan 9. PubMed PMID:23299128.

2. Pacak CA, Walter GA, Gaidosh G, Bryant N, Lewis MA, Germain S, et al. Long-term skeletal muscle protection after gene transfer in a mouse model of LGMD-2D. *Mol Ther.* 2007;15(10):1775-81. Epub 2007/07/27. PubMed PMID: 17653106.
3. Bengtsson NE, Brown G, Scott EW, Walter GA. lacZ as a genetic reporter for real-time MRI. *Magn Reson Med.* 2010;63(3):745-53. Epub 2010/02/11. PubMed PMID: 20146234.
4. Mathur S, Lott DJ, Senesac C, Germain SA, Vohra RS, Sweeney HL, et al. Age-related differences in lower-limb muscle cross-sectional area and torque production in boys with Duchenne muscular dystrophy. *Arch Phys Med Rehabil.* 2010;91(7):1051-8. PubMed PMID: 20599043.
5. Bengtsson NE, Kim S, Lin L, Walter GA, Scott EW. Ultra-high-field MRI real-time imaging of HSC engraftment of the bone marrow niche. *Leukemia.* 2011;25(8):1223-31. Epub 2011/04/16. PubMed PMID: 21494252.
6. Mathur S, Vohra RS, Germain SA, Forbes S, Bryant ND, Vandeborne K, et al. Changes in muscle T2 and tissue damage after downhill running in mdx mice. *Muscle Nerve.* 2011;43(6):878-86. PubMed PMID: 21488051; PMCID: PMC3101319.
7. Bish LT, Sleeper MM, Forbes SC, Morine KJ, Reynolds C, Singletary GE, et al. Long-term systemic myostatin inhibition via liver-targeted gene transfer in golden retriever muscular dystrophy. *Hum Gene Ther.* 2011;22(12):1499-509. PubMed PMID: 21787232; PubMed Central PMCID: PMC3237695.
8. Bish LT, Sleeper MM, Forbes SC, Wang B, Reynolds C, Singletary GE, et al. Long-term restoration of cardiac dystrophin expression in golden retriever muscular dystrophy following rAAV6-mediated exon skipping. *Mol Ther.* 2012;20(3):580-9. PubMed PMID: 22146342; PubMed Central PMCID: PMC3293605.
9. Akima H, Lott D, Senesac C, Deol J, Germain S, Arpan I, et al. Relationships of thigh muscle contractile and non-contractile tissue with function, strength, and age in boys with Duchenne muscular dystrophy. *Neuromuscul Disord.* 2012;22(1):16-25. Epub 2011/08/03. PubMed PMID: 21807516; PubMed Central PMCID: PMC3215817.
10. Arpan I, Forbes SC, Lott DJ, Senesac CR, Daniels MJ, Triplett WT, et al. T(2) mapping provides multiple approaches for the characterization of muscle involvement in neuromuscular diseases: a cross-sectional study of lower leg muscles in 5-15-year-old boys with Duchenne muscular dystrophy. *NMR Biomed.* 2013;26(3):320-8. PubMed PMID: 23044995; PubMed Central PMCID: PMC3573223.

#### **D. Research Support**

##### **Ongoing Research Support**

R01 AR056973

Vandeborne (PI)

04/01/10 - 03/31/15

NIH

“Magnetic Resonance Imaging and Biomarkers for Muscular Dystrophy”

The overall objective of this study is to validate the potential of noninvasive magnetic resonance imaging (MRI) and spectroscopy (MRS) to monitor disease progression and to serve as a surrogate outcome measure for clinical trials in Duchenne muscular dystrophy (DMD).

Role: Co-Investigator

U54AR052646

Sweeney (PI)

08/01/10 - 07/31/15

NIH

“Imaging of Failed Tissue Regeneration”

Develop and implement MRI measures of tissue fibrosis in skeletal and cardiac muscle of subjects with Duchenne Muscular Dystrophy, Congenital Muscular Dystrophy, Limb Girdle 2b.

Role: Site PI

MD110050

Walter (PI)

09/15/12 - 08/31/15

Department of Defense Office of the Congressionally Directed Medical Research Programs

“Optical Imaging of Dystrophic and Damaged Muscle”

Develop NIR optical imaging methods to monitor therapeutic intervention for muscular dystrophy

2R01HL056921-15

Raizada (PI)

02/28/12 - 02/28/16

NIH

“CVD Protection Mechanisms Involving ACE2/ANG-(1-7) Axis”

The overall objective of our investigation is to test a novel and innovative hypothesis that an imbalance in the vasodeleterious axis (ACE/Ang II/AT1R) and vasoprotective axis (ACE2/Ang-(1-7)/MasR) of the renin-

angiotensin system initiates a cascade of signaling events that result in endothelial dysfunction and lead to heart disease.

Role: Co-Investigator

R01AR065943-01 Walter (PI) 09/01/13 - 08/31/16

NIH/NIAMS

“The Relationship Between Genomic Variants And MRI/MRS Markers In DMD”

To determine the relationship between changes in MR biomarkers and polymorphisms in the osteopontin and/or LTBP-4 gene in boys with Duchenne muscular dystrophy.

NSF Edison (Site PI) 01/01/08 - 12/31/17

FSU subcontract to UF

“National High Magnetic Field Laboratory”

To support an external user program and develop new biological magnetic resonance technologies.

Role: Co-Investigator

U24 DK097209 Edison (PI) 09/01/13 - 08/31/18

NIH

“Regional Comprehensive Metabolomics Resource Cores”

To provide support for tissue based metabolomics using NMR and high-resolution-magic angle spectroscopy.

Role: Co-Investigator

### **Completed Research Support**

P01 HL59412 Muzyczka (PI) 07/01/08 - 06/30/14

NIH

“Gene Therapy Using Viral Vector for Lung and Cardiovascular Disease”

The long-range goal of this Program Project is to develop viral vector-based gene transfer strategies for treating genetic and acquired cardiopulmonary disorders.

Role: PI Imaging Core

P01 HD059751 (PI - Vandenberg) 09/30/2009 - 08/31/2012

NIH/NICHHD

Therapeutic Strategies to Augment Muscle Rehabilitation

Goal: The long-range goal of this Program Project is to develop therapeutic strategies that ameliorate muscle atrophy and augment muscle rehabilitation.

Role: PI Core C (Imaging)

P01 HL59412 (PI - Muzyczka) 07/01/2008 - 06/30/2013

NIH

Gene Therapy Using Viral Vector for Lung and Cardiovascular Disease

The long-range goal of this Program Project is to develop viral vector-based gene transfer strategies for treating genetic and acquired cardiopulmonary disorders.

Role: PI Imaging Core

R01 HL75258 (PI - Scott) 03/01/2006 - 02/28/2011

NIH

Adult Hemangioblast/HSC Recruitment and Maintenance

Goal: To define the mechanism of inducing HSC to produce EPC.

Role: Co-Investigator

R01 HL78670-01 (PI - Walter) 09/01/2004 - 08/31/2009

NIH

Noninvasive Monitoring and Tracking of Muscle Stem Cells

Aim of this project is to develop magnetic resonance method to noninvasively evaluate cell based therapies in skeletal and cardiac myopathies.