BIOGRAPHICAL SKETCH

NAME:	W. Timothy Garvey, MD
eRA COMMONS USER NAME:	GARVEYT
POSITION TITLE:	Professor

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
Washington University, St. Louis, MO	B.A.	1974	Biology
St. Louis University, St. Louis MO	M.D.	1978	Medicine
Washington University/Barnes Hospital	Residency	1981	Internal Medicine
U of Colorado and U of California San Diego	Fellowship	1984	Endocrinology & Metab

A. Personal Statement

Dr. Garvey is an internationally recognized expert in insulin resistance, adipocyte and muscle cell biology, obesity, Metabolic Syndrome, and Type 2 Diabetes. He has brought basic technologies to the study of humans, and his work has covered a broad translational range. His laboratory has advanced our understanding of cardiometabolic disease, the role of the glucose transport system in insulin resistance, and effective strategies for diabetes prevention. Dr. Garvey has been a dedicated mentor for clinicians, basic scientists, and physician scientists, having mentored 13 junior faculty with NIH K01, NIH K23, RWJF, Fogarty, and COBRE awards; 15 post-doctoral fellows on NIH T32 and other training grants; 9 clinical fellows; 3 MD/PhD students; 22 graduate students as primary mentor. He is also proven himself as an effective academic and scientific leader; he initiated Project SuGAR (diabetes/obesity genetics study involving Gullah-speaking African Americans), led a 10-year NHLBI program project that featured collaborations with national trials (DCCT, VA Diabetes Trial), and is founding PI of the NIH-funded Diabetes Research Center at UAB.

B. Positions and Honors

Positions and Employment

1984 - 1989 Instructor & Assistant Professor, Department of Medicine, University of California, San Diego
1989 - 1994 Associate Professor and Professor of Medicine, Physiology and Biophysics, Indiana University and Chief, Section of Endocrinology, Indianapolis VAMC, Indianapolis, IN
1994 - 2003 Director, Division of Endocrinology, Diabetes, and Medical Genetics, Medical University of South Carolina, and Staff Physician at Charleston VAMC
2003 -present Chairman and Professor, Department of Nutrition Sciences, University of Alabama at Birmingham, and Staff Physician/GRECC investigator at Birmingham VAMC
2008 -present Director, UAB Diabetes Research Center (DRC)

Other Experience and Professional Memberships

Member: ADA, Endocrine Society, TOS, AACE, AHA, FASEB, ASCI; AAP. Study Sections: ADA 1992-1995 and 2005-2008; JDRF 1994-1997; American Federation for Aging Research 2004-2012; VA Merit Review Endocrine Section 1996-2000; NIH Metabolism Study Section 1998-2002; member and chairman of multiple NIH ad hoc; Chairman, DSMB for NHLBI Vascular SCCOR 2005-2015; Chair ADA Sci & Med Mtgs Oversight Com 2006-8; AACE Board of Directors 2013-2016; Chair AACE Obesity Scientific Committee 2013-present

Honors and Awards

Alpha Omega Alpha Honor Medical Society, 1977; Alpha Sigma Nu Jesuit Honor Society, 1978; Wendell Griffith Prize in Biochemistry, St. Louis U., 1978; Pfizer Postdoctoral Fellowship Award, 1984; Pfizer Scholars Award, 1987; 1988; American Society for Clinical Investigation, 1994; Pfizer Visiting Professor, 1999-2000, Association of American Physicians, 2002. Charles E. Butterworth, Jr.,MD, Professorship at UAB, 2006. UAB Excellence in Mentoring Award, 2011; FACE designation from the Amer Assoc Clin Endocrinologists, 2014.

C. Contribution to Science (selections from over 200 publications)
http://www.ncbi.nlm.nih.gov/pubmed/?term=garvey+wt

I. Glucose Transport. By studying molecular parameters in muscle and fat tissue from metabolically characterized individuals, the Garvey laboratory has made important observations regarding the pathogenesis of human insulin resistance. He has been a principle contributor to our understanding of the role of the glucose transport system and glucose transporter proteins in human insulin resistance. In cultured cell and rodent models, and in human muscle and adipose biopsies, he has elucidated defects in glucose transporter expression and in GLUT4 vesicle trafficking and translocation as causes for insulin resistance.

Garvey WT, Huecksteadt TP, Birnbaum MJ. Suppression of an insulin-responsive glucose transporter gene in diabetes mellitus. Science 125-2341-2349, 1989.

Garvey, W.T., L. Maianu, T.P. Huecksteadt, M.J. Birnbaum, J.M. Molina, and T.P. Ciaraldi. Pretranslational suppression of a glucose transporter protein causes cellular insulin resistance in non-insulin-dependent diabetes mellitus and obesity. J Clinical Investigation. 87:1072-1081, 1991.

Garvey WT, Maianu L, Zhu J-H, Brechtel-Hook G, Wallace P, Baron AD. Evidence for defects in the trafficking and translocation of GLUT4 glucose transporters in skeletal muscle as a cause of human insulin resistance. J Clin Investigation 101: 2377-86, 1998. PMCID:PMC508827

Garvey, W.T., L. Maianu, J-H. Zhu, J.A. Hancock, A.M. Golichowski. Multiple defects in the adipocyte glucose transport system cause cellular insulin resistance in gestational diabetes: Heterogeneity in the number and a novel abnormality in subcellular localization of GLUT 4 glucose transporters. Diabetes. 42:1773-1785, 1993.

Bao S, Smith RM, Jarett L, **Garvey WT**. The effects of Brefeldin A on the glucose transport system in rat adipocytes: Implications on the intracellular locus of insulin-sensitive GLUT4. J Biol Chem, 270:30199-204, 1995.

Fu Y, Luo L, Luo N, Zhu X, **Garvey WT**. NR4A Orphan Nuclear Receptors Modulate Insulin Action and the Glucose Transport System: Potential Role in Insulin Resistance. J Biol Chem 282:31525-31533, 2007.

Lara-Castro C, Newcomer BR, Rowell J, Wallace P, Shaughnessy SM, Munoz AJ, Shiflett AM, Rigsby DY, Lawrence JC, Bohning DE, Buchthal S, **Garvey WT**. Effects of short-term very low calorie diet on intramyocellular lipid and insulin sensitivity in nondiabetic and type 2 diabetics. Metabolism 57:1-8, 2008

Ingram KH, Hill HS, Moellering DR, Lara-Castro C, Hill BG, Newcomer B, Brandon LJ, Ingalls CP, Penumetcha M, Rupp JC, **Garvey WT**. Skeletal muscle lipid peroxidation and insulin resistance in humans. Journal of Clinical Endocrinology and Metabolism, 97:E1182-E1186, 2012 PMCID:PMC3387404

II. Glucose-Induced Insulin Resistance and Role of Tribbles Homolog 3. The Garvey lab pioneered in the demonstration that high glucose induces insulin resistance in human patients and in cultured cell models. Working with Dr. Steve Marshall, there was the demonstration that glucose-induced insulin resistance required glucose metabolism via the hexosamine biosynthetic pathway; however, until recently the mechanisms by which flux through this pathway mediated insulin resistance were unknown. More recently the lab identified TRIB3 in microarray analyses as differentially expressed in human muscle and that levels of this pseudokinase, which binds and blocks phosphorylation of AKT, are correlated with fasting glucose and insulin resistance. In cultured cells and mice, TRIB3 is induced by glucose with dependency on the hexosamine pathway, impairs insulin-stimulated glucose transport, and modulates glucose toxicity in STZ diabetic mice.

Garvey, W.T, J.M. Olefsky, J. Griffin, R.F. Hamman, and O.G. Kolterman. The effect of insulin treatment on insulin secretion and insulin action in Type II diabetes mellitus. Diabetes. 34:222-234, 1985.

Garvey WT, Olefsky JM, Matthaei S, Marshall S. Glucose and insulin co-regulate the glucose transport system in primary cultured adipocytes: A new mechanism of insulin resistance. J Biol Chem 262:189-197, 1987.

Liu J*, Wu X*, Franklin JL, Messina JL, Martin M, **Garvey WT**. Mammalian Tribbles Homolog TRB3 Impairs Insulin Action in Skeletal Muscle: Possible Role in Glucose-Induced Insulin Resistance. American Journal of Physiology, 298:E565-E576, 2010 PMCID:PMC2838520

Liu J, Zhang W, Chuang GC, Hill HS, Tian L, Fu Y, Moellering DR, **Garvey WT**. Role of TRIB3 in Regulation of Insulin Sensitivity and Nutrient Metabolism during Short-term Fasting and Nutrient Excess. American Journal of Physiology, 303:E908-E916, 2012 PMCID: PMC3469620

Zhang W, Liu J, Tian L, Liu Q, Fu Y, **Garvey WT**. TRIB3 Mediates Glucose-Induced Insulin Resistance Via a Mechanism that Requires the Hexosamine Biosynthetic Pathway. Diabetes. 62:4192-4200, 2013

Zhang W, Wu M, Kim T, Jariwala RH, Garvey WJ, Luo N, Kang M, Ma E, Tian L, Steverson D, Yang Q, Fu Y, Garvey WT. Skeletal Muscle TRIB3 Mediates Glucose Toxicity in Diabetes and High Fat Diet-Induced Insulin Resistance. **Diabetes.** 65(8):2380-2391, 2016

Steverson D Jr, Tian L, Fu Y, Zhang W, Ma E, Garvey WT. Tribbles homolog 3 Promotes Foam Cell Formation Associated with Decreased Pro-Inflammatory Cytokine Production in Macrophages: Evidence for Reciprocal Regulation of Cholesterol Uptake and Inflammation. **Metabol Syndr Rel Disord** 14(1):7-15, 2016

III. Role of Adiponectin in Cardiometabolic Disease. The Garvey lab has elucidated the role of adiponectin in both the metabolic and vascular components of cardiometabolic disease. The lab first discovered that it was the large molecular weight complex of adiponectin (duodecamer) rather that the smaller complexes (hexamers and trimers) that was most highly correlated with insulin resistance, lipids, and abdominal fat in humans. In cultured cells and genetically-manipulated mice, the lab proved that adiponectin functions as an autocrine/paracrine factor in adipose tissue to modulate insulin-sensitive glucose transport, lipid storage capability, and inflammatory status. Dr. Fu and Dr. Garvey showed that adiponectin also impaired macrophage foam cell formation by inducing genes that promote lipid efflux and suppressing genes that mediate lipid uptake. In mice, augmentation of adiponectin action in macrophages, by macrophage-specific overexpression of adiponectin R1 receptors, produced a lean, diabetes-resistant, atherosclerosis-resistant model with diminished macrophage infiltration in adipose. The data indicate that adiponectin action in macrophages links metabolic and vascular disease in insulin resistant patients.

Lara-Castro C, Luo N, Wallace P, Klein RL, **Garvey WT**. Adiponectin multimeric complexes and the metabolic syndrome trait cluster. Diabetes 55:249-259, 2006. PMID:16380500

Fu Y, Luo N, Klein RL, **Garvey WT**. Adiponectin Promotes Adipocyte Differentiation, Insulin Sensitivity, and Lipid Accumulation: Potential Role in Auto-Regulation of Adipocyte Metabolism and Adipose Mass. J Lipid Res 46:1369-1379, 2005. PMID:15834118

Tian L, Luo N, Klein RL, Chung BH, **Garvey WT**, Fu Y. Adiponectin Reduces Lipid Accumulation by in Macrophage Foam Cells. Atherosclerosis, 202:152-161, 2009. PMCID:PMC2630479

Luo N, Liu J, Chung BH, Yang Q, Klein RL, **Garvey WT**, Fu Y. Macrophage adiponectin expression improves insulin sensitivity and protects against inflammation and atherosclerosis. Diabetes 59:791-799, 2010

Luo N, Wang X, Chung BH, Lee M-H, Klein R, W. **Garvey WT**, Fu Y. Effects of Macrophage-Specific Adiponectin Expression on Lipid Metabolism in Vivo. Amer J Physiol 301:E180-E186, 2011

Tian L, Luo N, Zhu X, Chung BH, **Garvey WT**, Fu Y. Adiponectin-AdipoR1/2-APPL1 signaling axis suppresses human foam cell formation: Differential ability of AdipoR1 and AdipoR2 to regulate inflammatory cytokine responses. Atherosclerosis, 221:66-75, 2012

Luo N, Chung B-H, Wang X, Klein RL, Tang C-K, **Garvey WT**, Fu Y. Enhanced adiponectin actions by overexpression of adiponectin receptor 1 in macrophages. Atherosclerosis,228:124-135,2013 PMC3640696

IV. Genetics of Diabetes and the UCP3 Gene Mutation Affecting Substrate Metabolism. Dr. Garvey has participated in genetic studies of diabetes, obesity, and cardiovascular disease risk in the Pima Indians, T1DM patients in the DCCT, and in Gullah-Speaking African Americans lining on the Sea Islands of South Carolina. In the Gullahs, he led Project SuGAR, and demonstrated extremely low Caucasian admixture, and went on to identify chromosomal markers linked to diabetes, obesity, and lipid/lipoprotein subclasses measured by NMR spectroscopy. He discovered a UCP3 polymorphism present in 10% of Gullahs that altered fuel preference towards carbohydrate and away from fat as a metabolite for resting energy expenditure. This polymorphism would predictably promote fat storage under conditions of a high fat diet, and was associated with severe obesity in the Gullahs. The Garvey lab has also examined differential gene expression in muscle using cDNA microarrays in comparing insulin sensitive and resistant humans.

Argyropoulos G, Brown AM, Willi SM, Zhu J-H, He Y, Reitman M, Gevao SM, Spruill I, **Garvey WT**. Effects of mutations in the human uncoupling protein 3 gene on the respiratory quotient and fax oxidation in severe obesity and type 2 Diabetes. J Clin Invest 102: 1345-51, 1998. PMCID:PMC508981

Argyropoulos, G., Brown, A.M., Peterson, R., Likes, C.E., Watson, D.K., **Garvey, W.T**. Structure and organization of the human uncoupling protein 2 gene and identification of a common biallelic variant in caucasian and african-american subjects. Diabetes. 47:685-687, 1998.

Sale MM, Lu L, Spruill I, Fernandes J, Lok KH, Divers J, Langefeld CD, **Garvey WT.** A genome-wide linkage scan in Gullah-speaking African American families with type 2 diabetes: The Sea Islands Genetic African American Registry. Diabetes, 58:260-267, 2009 PMCID:PMC2606883

Divers J, Sale MM, Lu L, Chen WM[3,6], Lok KH, Spruill IJ[8], Fernandes JK, Langefeld CD, **Garvey WT**. The genetic architecture of lipoprotein subclasses in Gullah-speaking African American families enriched for type 2 diabetes: The Sea Islands genetic African American registry (project SuGAR). Journal of Lipid Research, 51:586-597, 2010

Wu X, Page GP, Wang J, Maianu L, Rhees B, Rosinski J, So V, Willi SM, Osier MV, Hill HS, Allison DB, Martin M, **Garvey WT**. The Effect of Insulin on Expression of Genes and Biochemical Pathways in Human Skeletal Muscle. Endocrine 31:5-17, 2007

Hanson, R.L., Ehm, M.G., Pettitt, D.J., Prochazka, M., Thomson, D.B, Timberlake, D., Foroud, T., Kobes, S., Baier, L., Burns, D.K., Almasy, L., Blangero, J., **Garvey, W.T**., Bennett, P.H., and Knowler, W.C. An autosomal genomic

scan for loci linked to type II diabetes mellitus and body mass index in Pima Indians: an obesity-diabetes locus at 11q23-25. American Journal of Human Genetics: 63:1130-1138, 1998.

Klein RL, McHenry MB, Lok KH, Hunter SJ, Le N-A, Jenkins AJ, Zheng D, Brown WV, Lyons TJ, **Garvey WT**, and DCCT/EDIC Research Group. Apolipoprotein C-III Protein Concentrations and Gene Polymorphisms in Type 1 Diabetes: Associations with Lipoprotein Subclasses. Metabolism 53:1296-1304, 2004.

Munoz J, Lok KH, Gower BA, Fernandez JR, Hunter GR, Lara-Castro C, De Luca M, **Garvey WT**. A polymorphism in the transcription factor 7-like 2 (TCF7L2) gene is associated with reduced insulin secretion in non-diabetic women. Diabetes, 55:3630-3634, 2006.

Monda KL, Chen GK, Taylor KC,…Garvet WY,…Haiman CA. A meta-analysis identifies new loci associated with body mass index in individuals of African ancestry. **Nature Genetics**, 45:690-696, 2013

Liu CT, Monda KL, Taylor K…Garey WT…FozCS. Genome-wide Association of Body Fat Distribution in African Ancestry Populations Reveals Evidence for New Loci. **PLoS Genetics**. Aug;9(8):e1003681, 2013

V. Diabetes Prevention and Medical Models of Obesity Management. Dr. Garvey has conducted clinical trials involving new weight loss medications, and this has led to an appreciation that these new tools now enable a more robust medical model for obesity management. Dr. Garvey was a leading contributor and author in the AACE Position Statement designating Obesity as a disease and the proposition to the AMA which designated Obesity as a disease in May, 2013. Dr. Garvey was the chief architect of the Complications-Centric Model for Care of the Overweight/Obese Patient, an algorithm that emphasizes the use of weight loss therapy to treat obesity-related complications as the primary goal of treatment, as opposed to the BMI as the main determinant of treatment indications and success. Dr. Garvey developed Cardiometabolic Disease Staging, which allows clinicians to quantitatively assign risk for Type 2 Diabetes and cardiovascular disease mortality as a guide for intensity of weight loss therapy, within the context of a complications-centric approach. This work is widely applicable and relevant to policy-making regarding the prevention of diabetes. In 2016, he led the development of the evidence-based AACE guidelines for the meducal management of obesity. Thus, Dr. Garvey is a national leader in the development of medical models for the management of obesity and diabetes prevention.

Garvey WT, Ryan DH, Henry R, Bohannon NJ, Toplak H, Schwiers M, Troupin B, Day WW. Prevention of Type 2 Diabetes in Subjects With Prediabetes and Metabolic Syndrome Treated with Phentermine and Topiramate Extended-Release. Diabetes Care, 37:912-921, 2014

Garvey WT. New Tools for Weight Loss Therapy Enable a More Robust Medical Model for Obesity Treatment: Rationale for a Complications-Centric Approach. Endocrine Practice, 6:1-31, 2013

Guo F, Moellering DR, **Garvey WT.** The Progression of Cardiometabolic Disease: Validation of a New Cardiometabolic Disease Staging System Applicable to Obesity. Obesity, 22:110-118, 2014 PMC3866217

Guo F, Garvey WT. Cardiometabolic Disease Risk in Metabolically Healthy and Unhealthy Obese: Stability of Metabolic Health Status in Adults. **Obesity**, 24(2):516-525, 2016

Mechanick JI, Garber AJ, Handelsman Y, **Garvey WT**. American Association of Clinical Endocrinologists' position statement on obesity and obesity medicine. Endocrine Practice, 18(5):642-648, 2012

Garvey WT, Garber AJ, Mechanick JI, Bray GA, Dagogo-Jack S, Einhorn D, Grunberger G, Handelsman Y, Hennekens CH, Hurley DL, McGill J, Palumbo P, Umpierrez G, On Behalf Of The AACE Obesity Scientific Committee. American Association of Clinical Endocrinologists and American College of Endocrinology position statement on the 2014 advanced framework for a new diagnosis of obesity as a chronic disease. Endocrine Practice. 20:977-989, 2014

Garvey WT, Ryan DH, Bohannon NJ, Kushner RF, Rueger M, Dvorak RV, Troupin B. Weight-loss therapy in type 2 diabetes: effects of phentermine and topiramate extended release. Diabetes Care 37:3309-16, 2014

Garvey WT, Mechanick JI, Brett EM, Garber AJ, Hurley DL, Jastreboff AM, Nadolsky K, Pessah-Pollack R, Plodkowski R; Reviewers of the AACE/ACE Obesity Clinical Practice Guidelines. American Association of Clinical Endocrinologists and American College of Endocrinology Clinical Practice Guidelines for Comprehensive Medical Care of Patients with Obesity. **Endocrine Practice**. 22(7):842-884, 2016.

Mechanick J, Hurley D, **Garvey WT**. Adiposity-based chronic disease as a new diagnostic term; AACE Position Statement. Endocrine Practice, Epub Dec 14, 2016

D. Research Support

ACTIVE

Merit Review Research Grant, Garvey (PI) 04/01/15 to 03/31/19
Department of Veterans Affairs "Mechanisms of Insulin Resistance in Diabetes"

This proposal assesses molecular mechanisms contributing to glucose-induced insulin resistance in diabetes with an emphasis of the role of tribbels homolog 3 in insulin action and systemic metabolism

Strategically Focused Research Center SFRN33570038, Garvey (PI) 04/1/17 to 03/31/21
American Heart Association "Intergenerational Transmission of Obesity and Cardiometabolic Disease"
This is a program project involving 3 projects: mouse models of in utero stress (Garvey), mother-neonate pairs (L Harper), and mother-child dyads (P Chandler-Laney) assessing ability of in utero exposure to maternal obesity, Metabolic Syndrome, and Gestational Diabetes to influence traits and epigenetic modifications that produce obesity and diabetes in the offspring. Role: Garvey is overall PI and PI of a Project

R01DK096388-01A1 Gower (PI) 09/19/13 to 06/30/18
NIH/NIDDK "Race Adiposity Interactions Regulate Mechanism Determining Insulin Sensitivity"
This study explores mechanisms underlying race/ethnicity differences in metabolism including differences in hepatic insulin sensitivity and mitochondrial function. Role: Garvey is Co-Investigator

P60 DK-079626, Garvey (PI) 03/01/13 to 02/28/18
NIH/NIDDK "UAB Diabetes Research Center"
This center grant enhances infrastructure for diabetes related research by funding core facilities and pilot projects, through programs in community based research and disease prevention and control, and by promoting enrichment activities and training programs relevant to diabetes.

P30 DK-056336, Allison (PI) 06/01/12 to 05/31/17
NIH/NIDDK "Nutrition and Obesity Research Center"
This center grant enhances infrastructure for nutrition related research by funding core facilities and pilot projects. Dr. Garvey does not receive funds that directly support his individual research from this center grant.
Role: Dr. Garvey is Associate Director of the center.

U01 DK098246 George Washington U, Lachin (PI), Garvey (site PI) 04/01/12 to 03/31/20
The Glycemia Reduction Approaches for Diabetes: A Comparative Effectiveness (GRADE) Study.
This is a multi-center, NIDDK-sponsored clinical trial with Dr. Garvey as PI at the UAB site

R25 DK113652, M Fouad and WT Garvey (co-PIs) 04/01/17 to 03/31/22
NIH/NIDDK "UAB STEP-UP: Promoting Diversity through Mentored Research Experiences"
This program has national reach and will provide undergraduate students with an emphasis on minorities a summer research experience with lab mentors at DRC and NORC institutions, an online curriculum in diabetes that extends through college, and a jointly attended symposium. Role: Garvey is co-PI

Duke University (DCRI)/Astra Zeneca , Garvey (PI). 04/26/10 to 03/26/17
BCB109. EXCSEL Study. A Randomized, Placebo Controlled Clinical Trial to Evaluate Cardiovascular Outcomes After Treatment with Exenatide Once Weekly in Patients with Type 2 Diabetes Mellitus.
This is an industry-initiated clinical trial. Role: Garvey is PI at the UAB site.

Pfizer/Merck B1521021, Garvey (PI) 01/22/15 to 01/21/19
Randomized, Double-Blind, Placebo-Controlled. Parallel-Group Study to Assess Cardiovascular Outcomes Following Treatment with Ertugliflozin (MK-8835/PF-04971729) in Subjects With Type 2 Diabetes Mellitus and Established Vascular Disease. This is an industry-initiated clinical trial. Role: Garvey is PI at UAB site.

Lexicon LX4211-1-309-T1DM, Garvey (PI) 07/13/15 – 07/12/17
Phase 3, Randomized, Double-Blind, Placebo-Controlled, Parralel-Group, Multicenter Study to Evaluate Efficacy, Safety, and Tolerability of LX4211 as Adjunct Therapy in Adult Patients with Type 1 Diabetes"

Novo Nordisk NN9535-4101, Garvey (PI) 08/12/15 to 09/20/17
Dose-Finding of Semaglutide Administered Subcutaneously Once Daily Versus Placebo and Liraglutide in Subjects with Type 2 Diabetes". This is an industry-initiated trial with Dr. Garvey as site PI.

Novo Nordisk NN9931, Garvey (PI) 02/07/17 to 02/06/21
Investigation of Efficacy and Safety of Three Doses of Subcutaneous Semaglutide Once Daily Versus Placebo in Subjects with Non-alcoholic Steatohepatitis. An industry-initiated trial with Dr. Garvey as site PI.

COMPLETED

RO1 DK083562, Garvey (PI). 08/01/09 – 07/31/13
NIH/NIDDK "NR4A Orphan Receptors and Insulin Resistance"
This proposal examined the role of NR4A orphan nuclear receptors in modulating insulin sensitivity.

OVERLAP. The funding does not constitute any scientific or budgetary overlap.