

Kevin W. Huggins, Ph.D.

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Education

- 1993 – 1999 Wake Forest University, Winston-Salem, NC
Degree: Ph.D. (Molecular and Cellular Pathobiology)
Major Professor: John S. Parks, Ph.D.
- 1987 – 1992 University of North Florida, Jacksonville, FL
Degree: B.S. (Biology)

Professional Experience

- 2010 – present Associate Professor, Department of Nutrition, Dietetics, and Hospitality
Mgmt
- 2003 – 2010 Assistant Professor, Department of Nutrition and Food Science, Auburn
University, AL
- 1999 – 2003 Postdoctoral Fellow, Department of Pathology and Laboratory Medicine,
University of Cincinnati College of Medicine, Cincinnati, OH
- 1992 – 1993 Chemistry Laboratory Instructor, Department of Natural Sciences,
University of North Florida, Jacksonville, FL

2. Assigned Duties/Allocation of Time

Year	Teaching (%)	Research (%)	Outreach (%)	Service (%)
2014	56	39	0	5
2013	56	39	0	5
2012	56	39	0	5
2011	56	39	0	5
2010	50	45	0	5
2009	60	35	0	5
2008	60	35	0	5
2007*	35	55	0	10
2005-2006	40	55	0	5
AVERAGE	49	45	0	6

*denotes the shift from academic year to calendar year appointments.

Areas of Expertise:

Teaching: general nutrition, nutritional genomics, research methods, and biochemical and molecular techniques. Research: metabolic diseases, phospholipase A₂ action and regulation, dietary lipid absorption, mechanisms of insulin resistance, insulin signal transduction, lipoprotein metabolism, oxidative stress and inflammatory gene expression and metabolism in animal models of obesity, type 2 diabetes, and transgenic/knockout mice.

Research:

The candidate's research is in the area of diabetes. Specifically, the candidate's research is focused on understanding the molecular mechanisms of insulin resistance. This condition is characterized by the peripheral tissues inability to respond to insulin. This condition is central to the development of type 2 diabetes. The candidate's research group is studying this process through dietary and molecular approaches (see Section 4B.5a)

Teaching:

Courses taught:

NTRI 2000: Nutrition and Health

NTRI 2010: Basic Sports Nutrition

NTRI 4820: Macronutrients

NTRI 4930: Undergraduate Research and Study

NTRI 5830: Nutritional Genomics

NTRI 7520: Macronutrients

NTRI 7050/7056: Methods of Research/Distance Education Methods of Research

NTRI 7990/8990: Research Thesis/Dissertation

NTRI 8970: Advanced Topics in Nutrition – Nutritional Genomics

The candidate currently serves as Graduate Level Faculty 2 in the Department of Nutrition and Food Science. The candidate has graduated 3 graduate students (2 Ph.D., 1 M.S.) as major professor/advisor and 18 as a committee member (9 Ph.D., 9 M.S.). In addition, the candidate currently serves as major professor/advisor to 1 graduate student (Ph.D.) majoring in Nutrition.

Anticipated date of graduation for this student is Spring 2011. The candidate has also served as outside reader for 9 Ph.D. dissertations. The candidate has served as a Cellular and Molecular Biosciences Undergraduate Research Fellowship mentor to 2 undergraduate students and served as a mentor to 1 undergraduate student for the Auburn University Undergraduate Research Fellowship Program.

Extension/Outreach:

The candidate does not have a formal extension/outreach appointment. However, the candidate has participated in extension/outreach-related activities in the area of Nutrition and Food Science including serving as an invited speaker at the Alabama Nutrition and Physical Activity Coalition and Teaching Life Skills to Foster Children in the State of Alabama sponsored by the Alabama Department of Human Resources (see Section 4D.c).

Service:

The candidate currently serves on the following committees:

Faculty Research Committee (2013-present)

Faculty Senate (2013 – present)

The candidate has completed service on the following committee:

Biogrant Committee (2004-2007). See section 4Da.1

Competitive Research Grant Committee (2009-2012)

Senate Faculty Welfare Committee (2007-2010)

Undergraduate Summer Research Fellowship Committee for the Cellular and Molecular Biosciences Program (2004 – present). See section 4Da.1

3. HONORS AND AWARDS

2011 Named to Editorial Board of *Frontiers in Nutrigenomics*

2007 Nominated as SGA “Outstanding Teacher” by the Department of Nutrition and Food Science, Auburn University

2000 – 2003 National Research Service Award, National Institutes of Health

1998 – 1999 Wake Forest University Graduate Fellowship

Membership in Professional Organizations

Member, American Society of Nutrition

Member, International Society for the Study of Fatty Acids and Lipids

4. SCHOLARLY CONTRIBUTIONS

A. TEACHING

1. Courses Taught

* denotes graduate level teaching

Term and Year	Course	Lecture Hours	Laboratory Hours	Enrollment
Fall 2014	NTRI 2010: Basic Sports Nutrition	3	0	48
	NTRI 4890: Undergraduate Research	0	1	2
	NTRI 5830: Nutritional Genomics	3	0	12
Summer 2014	NTRI 2000: Nutrition and Health	3	0	18
	*NTRI 6620: Sports Nutrition	3	0	9
	*NTRI 7050: Methods of Research (team-taught)	1	0	5
Spring 2014	NTRI 4820: Macronutrients	3	0	66
	NTRI 7520: Macronutrients (team-taught)	3	0	10
	NTRI 4930: Undergraduate Research	0	1	1
Fall 2013	NTRI 2010: Basic Sports Nutrition	3	0	64
	NTRI 4090: Professional Issues in Dietetics and Nutrition	1	0	6
	*NTRI 7050: Methods of Research	2	0	9
Summer 2013	NTRI 2000: Nutrition and Health	3	0	21
	NTRI 5620/6620: Sports Nutrition	3	0	10
Spring 2013	NTRI 4820: Macronutrients	3	0	58
	*NTRI 7520: Macronutrients (team-taught)	3	0	10
Fall 2012	NTRI 2010: Basic Sports Nutrition	3	0	34
	*NTRI 7050/7056: Methods of Research	2	0	6

Summer 2012	NTRI 2000: Nutrition and Health	3	0	15
	NTRI 4930: Undergraduate Research	0	2	1
	*NTRI 7520: Macronutrients (team-taught)	2	0	9
Spring 2012	NTRI 2000: Nutrition and Health	3	0	137
	*NTRI 8990: Research and Dissertation	1	0	1
Fall 2011	NTRI 2010: Basic Sports Nutrition	3	0	35
	*NTRI 7050: Methods of Research	2	0	13
	*NTRI 7056: Methods of Research (Distance)	2	0	6
	*NTRI 8990: Research and Dissertation	0	1	1
Summer 2011	NTRI 2000: Nutrition and Health	3	0	
	*NTRI 7050: Methods of Research	2	0	8
Spring 2011	NUFS 2000: Nutrition and Health	3	0	161
	*NUFS 7520: Macronutrients (team-taught)	2	0	13
	NUFS 4930: Undergraduate Research	0	2	1
	*NUFS 8990: Research and Dissertation	0	1	1
Fall 2010	NUFS 2000: Nutrition and Health	3	0	142
	NUFS 2000: Nutrition and Health	3	0	142
	NUFS 4930: Undergraduate Research	0	2	1
	*NUFS 8990: Research and Dissertation	0	1	1
Summer 2010	NUFS 2000: Nutrition and Health	3	0	38
	NUFS 8990: Research and Dissertation	0	1	1
Spring 2010	NUFS 2000: Nutrition and Health	3	0	142
	NUFS 2000: Nutrition and Health	3	0	142
	*NUFS 7050: Methods of Research	2	0	6
	*NUFS 8990: Research and Dissertation	0	3	1
Fall 2009	NUFS 2000: Nutrition and Health	3	0	142
	NUFS 2000: Nutrition and Health	3	0	142
	*NUFS 7930: Advanced Independent Study	3	0	1
Summer 2009	NUFS 2000: Nutrition and Health	3	0	44
	*NUFS 7050/7056: Methods of Research	2	0	8
	*NUFS 8990: Research and Dissertation	0	2	2
Spring 2009	NUFS 2000: Nutrition and Health	3	0	142
	*NUFS 8990: Research and Dissertation	0	2	2
Fall 2008	NUFS 2000: Nutrition and Health	3	0	142
	NUFS 2000: Nutrition and Health	3	0	142
	NUFS 4930: Undergraduate Research and Study	0	3	1
	*NUFS 8990: Research and Dissertation	0	2	1
Summer 2008	NUFS 2000: Nutrition and Health	3	0	21
	NUFS 4930: Undergraduate Research and Study	0	2	1
	*NUFS 8970: Advanced Topics in Nutrition – Nutritional Genomics	2	0	4
	*NUFS 8990: Research and Dissertation	0	3	3
Spring 2008	NUFS 2000: Nutrition and Health	3	0	140
	*NUFS 7050/7056: Methods of Research	2	0	11

	*NUFS 8990: Research and Dissertation	0	2	2
Fall 2007	NUFS 2000: Nutrition and Health	3	0	139
	NUFS 4930: Undergraduate Research and Study	0	2	1
	*NUFS 8990: Research and Dissertation	0	2	3
Summer 2007	NUFS 2000: Nutrition and Health	3	0	42
	*NUFS 7990: Research and Thesis	0	1	1
	*NUFS 8990: Research and Dissertation	0	2	2
Spring 2007	* NUFS 7050/7056: Methods of Research	2	0	17
	*NUFS 7990: Research and Thesis	0	1	1
	*NUFS 8990: Research and Dissertation	0	1	1
Fall 2006	NUFS 2000: Nutrition and Health	3	0	134
	*NUFS 7990: Research and Thesis	0	1	1
Summer 2006	*NUFS 7280: Laboratory Research Methods in Nutrition and Food Science (team-taught)	1	1	5
	*NUFS 7990: Research and Thesis	0	1	1
	*NUFS 8970: Advanced Topics in Nutrition – Nutritional Genomics	2	0	9
Spring 2006	NUFS 2000: Nutrition and Health	3	0	141
	*NUFS 7050/7056: Methods of Research (team-taught)	1	0	9
	*NUFS 7990: Research and Thesis	0	1	1

NUFS 2000: *Nutrition and Health* – Introductory course in nutrition. Part of the core curriculum for students in the College of Human Sciences; elective for many students from a variety of disciplines; required course for pre-nursing and medical technology students.

NUFS 7050/7056: *Methods of Research in Human Sciences* – graduate level course. Required for all Master’s level graduate students in Nutrition, Food Science and Hotel and Restaurant Management programs. In addition, the course is a distance education class (NUFS 7056) which is made up of students majoring in Hotel and Restaurant Management.

NUFS 7280: *Laboratory Methods in Nutrition and Food Science* – graduate level course. Required for PhD students in Nutrition and Food Science, but also taken by Master’s students. Course is team-taught. Each instructor teaches ~ 2 weeks on a specific topic. My topics are spectrophotometry and molecular biology. (Note – The lecture and laboratory hours listed above only represent the candidate’s contribution to the course.)

NUFS 8970: *Advanced Topics in Nutrition and Food Science – Nutritional Genomics* – graduate level course developed by the candidate (see *Section 4A.5*)

NUFS 4930: *Undergraduate Research and Study* – undergraduate students are exposed to research dealing with molecular regulation of insulin resistance and diabetes. Students in the Department of Nutrition and Food Science (Human Sciences) and Biological Sciences (COSAM) have actively worked in the candidate’s laboratory.

2. Graduate Students Completed

a. Major Professor (Doctoral)

<u>Name</u>	<u>Thesis Title</u>	<u>Year</u>
Yinghui Rong		2012
Juan Yang	Role of Calcium-Independent Phospholipase A ₂ in Insulin-Stimulated Glucose Uptake in 3T3-L1 Adipocytes	2009
Current Position:	Research Associate, School of Public Health, University of California at Berkeley, Berkeley, CA	
Lance Ratcliff	Resting Metabolism and Metabolic Responses to Solid and Liquid Meals in Sedentary and Exercising College-Age Males	2008
Current Position:	President, Cox College, Springfield, MO.	

b. Major Professor (Master of Science)

<u>Name</u>	<u>Thesis Title</u>	<u>Year</u>
Brandon Willingham	Vitamin D and Athletic Performance (Non-Thesis)	2014
Current Position:		
Emily Jenkins	The Effect of Ketogenic Diets on Athletic Performance (Non-Thesis)	2013
Current Position:	Dietetic Intern	
Meghan Phillips	Do branched-chain amino acids decrease muscle breakdown following exercise? (Non-Thesis)	2013
Current Position:		
Mary Kate Kirby	A Review of the Effects of Creatine Supplementation In Brain and Muscle (Non-Thesis)	2012

Current Position: Sports Dietician, North Carolina St. University

Kathryn E. Colbert Influence of Dietary Starches Differing in Glycemic Index on Pro-Oxidant and Anti-Oxidant Gene Expression and Insulin Sensitivity in a Mouse Model 2007

Current position: Post-Doctoral Fellow, UT-Southwestern, Dallas, TX

c. Committee Member

<u>Name</u>	<u>Degree (Department)</u>	<u>Year</u>
Taylor Rodick	M.S. (Nutrition, Dietetics, & Hosp. Mgmt)	2014
Andrea Carter	M.S. (Nutrition, Dietetics, & Hosp. Mgmt)	2014
Ty-Anne Tench	M.S. (Nutrition, Dietetics, & Hosp. Mgmt)	2014
Gauri Desai	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	2014
Guang Ren	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	2014
Maja Ahuja	Ph.D. (Pharmacal Sciences)	2013
Derris Burnett	Ph.D. (Animal Sciences)	2013
Kristen E. Rowland	M.S. (Nutrition, Dietetics, & Hosp. Mgmt)	2013
Seul Gi Park	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	2013
Manuj Ahuja	Ph.D. (Pharmacal Sciences)	2013
Sruthi Kumar	M.S. (Nutrition, Dietetics, & Hosp. Mgmt)	2013
Kariharan Thiruchelvan	Ph.D. (Pharmacal Sciences)	2012
Denali Lord	M.S. (Nutrition, Dietetics, & Hosp. Mgmt)	2012
Desiree Saunders	Ph.D. (Anatomy, Physiology, & Pharmacology)	2012
Albert Zhang	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	2012
Chenchen Yu	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	2012
Frank Newell	M.S. (Nutrition, Dietetics, and Hosp. Mgmt.)	2011
Paul Harrington	M.S. (Nutrition and Food Science)	2009
Senthilkumar S. Karuppagounder	Ph.D. (Pharmacal Sciences)	2009
Yi-feung Du	Ph.D. (Biological Sciences)	2009
Brian Shonesy #	Ph.D. (Pharmacal Sciences)	2009
Subramaniam Uthayathas	Ph.D. (Pharmacal Sciences)	2008
Desiree Saunders	M.S. (Nutrition and Food Science)	2008
Parameshwaran	Ph.D. (Pharmacal Sciences)	2008
Kodeeswaran#		
Shalini Kaushik	M.S. (Nutrition and Food Science)	2008
Carmen Teodorescu#	Ph.D. (Nutrition and Food Science)	2007
Catrina Sims	Ph.D. (Pharmacal Sciences)	2007
Julie T. Baker	M.S. (Nutrition and Food Science)	2007
Maryanne G. Gragg	M.S. (Nutrition and Food Science)	2007

Jason Patten	M.S. (Nutrition and Food Science)	2007
Brenda White	M.S. (Nutrition and Food Science)	2007
Nayana Wijayawardhane	Ph.D. (Pharmacal Sciences)	2007
James Papizan	M.S. (Nutrition and Food Science)	2007
Ling Tang	Ph.D. (Animal Sciences)	2006
Carmen Teodorescu	M.S. (Nutrition and Food Science)	2005
Lance Ratcliff	M.S. (Nutrition and Food Science)	2004

d. Outside Reader

<u>Name</u>	<u>Degree (Department)</u>	<u>Year</u>
Kasturi Pawar	Ph.D. (Pharmacal Sciences)	2013
Bessy Thrash	Ph.D. (Pharmacal Sciences)	2009
Brandi K. Brunson	Ph.D. (Anatomy, Physiology, & Pharm.)	2007
Deepa Bedi	Ph.D. (Anatomy, Physiology, & Pharm.)	2007
Ruletha D. Baker	Ph.D. (Chemistry)	2006
Cornelius L. Varnado	Ph.D. (Chemistry)	2006
Patrick M. Kanju#	Ph.D. (Pharmacal Sciences)	2005
Thirumalini Subramaniam#	Ph.D. (Pharmacal Sciences)	2005
Kristen Clarke	Ph.D. (Anatomy, Physiology, & Pharm.)	2005
Shawn McNulty	Ph.D. (Fisheries & Allied Aquacultures)	2004

#Represents students who were trained by the candidate in various techniques in the candidate's laboratory for work that was included in the student's dissertation.

Patrick Kanju, Thirumalini Subramaniam, and Parameshwaran Kodeeswaran were trained by the candidate in various techniques including isolation of proteins from brain preparations, quantitation of protein concentrations, analysis of specific protein expression in control and experimentally-treated samples via Western blot analysis and analysis of phosphorylated proteins in brain samples.

Carmen Teodorescu was trained in the candidate's laboratory in experimental techniques dealing with a portion of her PhD thesis on the generation of oxidative stress in cardiac and hepatic tissues in animals exposed to dietary n-3 polyunsaturated fatty acids and/or methylmercury. The candidate oversaw all aspects of this part of the student's thesis work. This research involved measuring protein oxidation via the analysis of protein carbonyl levels in tissues. In addition, the candidate trained the student in the analysis of pro-oxidative and anti-oxidative enzymes gene expression via real-time polymerase chain reaction. These techniques are routinely performed in the candidate's laboratory.

3. Graduate Students Presently Serving

a. Major Professor

<u>Name</u>	<u>Degree (Department)</u>	<u>Progress to Date</u>
Yueru Li	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	Research

b. Committee Member

<u>Name</u>	<u>Degree (Department)</u>	<u>Progress to Date</u>
Jessica-Lauren Newby	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	Research
Chen Zheng	Ph.D. (Nutrition, Dietetics, & Hosp. Mgmt)	Coursework

4. Undergraduate Students Mentored/Currently Mentoring

<u>Name</u>	<u>Degree Program (College)</u>	<u>Year</u>
Bishop Cunningham	Nutrition, Dietetics, & Hosp. Mgmt (Hum. Sci.)	2014
Olivia Demarta	Nutrition, Dietetics, & Hosp. Mgmt (Hum. Sci.)	2014
Kathryn Whitehead	Nutrition, Dietetics, & Hosp. Mgmt (Hum. Sci.)	2014
Taylor Hicks	Nutrition, Dietetics, & Hosp. Mgmt (Hum. Sci.)	2014
Dana Woods	Biomedical Sciences (COSAM)	2010
M. Elise McClanahan	Biomedical Sciences (COSAM)	2008
Michelle Bushnell	Biomedical Sciences (COSAM)	2008
Virginia Planz	Biomedical Sciences (COSAM)	2008
Stephanie Qualls	Nutrition and Food Science (Human Sciences)	2007
Michael Carra	Biomedical Sciences (COSAM)	2005
Taylor McCain	Biomedical Sciences (COSAM)	2005
Kathryn Colbert	Nutrition and Food Science (Human Sciences)	2004

Stephanie Qualls was a recipient of an Auburn University Undergraduate Research Fellowship (2006-2007). Ms. Qualls' work during the fellowship period was part of her Honor's Thesis ("Influence of dietary glycemic index on macrophage accumulation in adipose tissue of normal C57BL/6 mice") submitted to the Honor's College in May 2007.

Taylor McCain (2005) and Kathryn Colbert (2004) were recipients of the CMB Undergraduate Summer Research Fellowship.

5. Courses and Curricula Developed

NUFS 2000: Nutrition and Health. This course was offered prior to the candidate's arrival at Auburn. The candidate contributed to the improvement of the course by introducing the use of classroom response units (i.e. "clickers"). This technology allows students to respond to in-class questions in the form of quizzes or verbal discussions. Students are able to see their responses and to know immediately if they got the question right or wrong. This greatly improves student's

ability to test their knowledge on a given topic and helps them focus on areas where they need improvement. Since inception of the “clickers” in Spring 2008 semester, attendance and in-class participation has improved significantly.

NUFS 7280: Laboratory Methods in Nutrition and Food Science. This course was offered prior to my arrival at Auburn. The candidate contributed to the improvement of the course by including a series of lectures and labs on molecular biology and spectrophotometric techniques that are routinely used in the candidate’s laboratory. The new topics included are polymerase chain reaction, cloning, utilization of gene knockout technology, and fluorescence spectroscopy.

NUFS 7050/7056: Research Methods in Human Sciences. This course was offered prior to the candidate’s arrival at Auburn. The candidate contributed to the improvement of the course by including a component on Ethics in Research in the class. This topic focuses on defining plagiarism, fabrication of research data, and ethics in animal and human research studies. In addition, the candidate discusses “real-world” scenarios in terms of choosing and interacting with major professors, who should be included as an author on manuscripts, and the ethics of manuscript and grant reviews.

NUFS 8970: Advanced Topics in Nutrition – Nutritional Genomics. The candidate developed this course to introduce graduate students to the field of nutritional genomics. This course aims to identify the genetic variations that account for why some individuals react differently to dietary components. Understanding these diet-gene interactions raises the possibility of individualizing nutritional intake for optimal health and disease prevention on the basis of an individual’s genome. Topics covered include transcription factors and gene expression, phytoestrogens, epistasis and gene interactions, molecular mechanisms of longevity and calorie restriction, maternal nutrition and disease development, epigenetics, and green tea polyphenols and gene regulation. The class was organized in a Journal Club format with the candidate presenting a summary of the topic discussed on that day followed by a student presentation of a chosen published work from the current literature that was used as a discussion for the chosen topic. Journal articles used for class discussion were chosen by the instructor.

6. Other Contributions to Teaching

a. Academic Advising

Currently, I have 6 undergraduate advisees in the Nutrition Science option. The majority of these students meet with me on a semester basis to discuss their schedules for the following term. The candidate has prepared several letters of recommendation as part of their applications for scholarships and/or professional schools. In addition, the candidate has written numerous letters of recommendations from students in his NUS 2000 class for applications to nursing, pharmacy, and graduate school.

b. Guest Lectures

The candidate was invited to serve as guest lecturer in BCHE 3180 (Nutritional Biochemistry) and in NUFS 7520: Macronutrients (Topic: Nutritional Genomics; Summer 2007). In addition, the candidate provided a guest lecture for the Auburn University's Cellular and Molecular Biosciences Teaching Enhancement Program in Summer 2006 (Topic: Heart Disease).

c. Journal Club

While at Auburn University, the candidate has participated in a weekly journal club with faculty in the Boshell Diabetes and Metabolic Diseases Research Program and graduate and undergraduate students to discuss recently published articles in the area of diabetes, obesity and nutrition research. This journal club provides the ability to stay abreast of recent advances in the candidate's research field as well as to enhance the critical thinking skills of students involved in this research area.

d. Student Achievements

The candidate has assisted his graduate and undergraduate students in receiving funding and/or awards for their research projects as shown below:

2nd Annual Boshell Diabetes and Metabolic Diseases Research Day Poster Presentation Award (2009): Awarded to Juan Yang, graduate student, for poster entitled "Localization of adiponectin receptor-1 to lipid raft plasma membrane domains in 3T3-L1 adipocytes". Role: Mentor. Total Award: \$100

Department of Nutrition and Food Science Graduate Research Award (2009): Awarded to Yinghui Rong, graduate student, for research proposal entitled "Influence of dietary fatty acids and lipid rafts on Toll-like receptor 4-mediated inflammation in macrophages". Role: Mentor. Total Award: \$1,000 – research supplies.

8th International Conference of the International Society for the Study of Fatty Acids and Lipids New Investigator Award (2008): Awarded to Juan Yang, graduate student to present research findings at the 8th International Conference of the International Society for the Study of Fatty Acids and Lipids in Kansas City, KS, May 17-22, 2008. Role: Mentor. Total Award: \$1,000 – complimentary registration and reduced hotel room rate.

Auburn University Graduate Student Research Day Poster Presentation Award (2008): First place, awarded to Juan Yang, graduate student, for poster entitled "Inhibition of phospholipase A2 decreases insulin-stimulated glucose uptake in 3T3-L1 adipocytes". Role: Mentor. Total Award: \$150

Jim Fyffe Travel Grant (2008): Awarded to Juan Yang, graduate student, to present her research findings at the Keystone Symposia on Diabetes Mellitus, Insulin Action, and Resistance, Breckenridge, CO, January 22-27, 2008. Role: Mentor. Total Award: \$1,500

Auburn University Undergraduate Research Fellowship (2006): Awarded to Stephanie Qualls, undergraduate student – NUFS (May 2006 – April 2007). Role: Mentor. Total Award: \$3,400 (Fellowship: \$2,000, Project Funds: \$1,400)

Auburn University Cellular and Molecular Biosciences Summer Undergraduate Research Fellowship (2005): Awarded to Taylor McCain, undergraduate student - COSAM (May – July 2005). Role: Mentor. Total Award: \$5,000 (Fellowship: \$3,000, Project Funds: \$2,000)

Auburn University Cellular and Molecular Biosciences Summer Undergraduate Research Fellowship (2004): Awarded to Kathryn Colbert, undergraduate student - NUFS (May – July 2004). Role: Co-Mentor (Dr. Margaret C. Craig-Schmidt, Co-Mentor). Total Award: \$5,000 (Fellowship: \$3,000, Project Funds: \$2,000)

7. Teaching Philosophy and Self-Assessment

a. Philosophy

My teaching philosophy is centered on the principal that teaching and contributing to the growth of a new generation of leaders is one of the most important tasks that is bestowed upon someone. Therefore, teaching should be taken with a sense of mission and responsibility to share with students the best of our knowledge and ideas. My goal as a teacher is to not only provide students with information but to also provide them with the inspiration to learn both in and outside the classroom. To accomplish this I have developed a teaching philosophy that attempts to challenge students to do their best both at the undergraduate and graduate level. Depending on the level of the student (undergraduate versus graduate), I have developed specific teaching styles to better incorporate this overall philosophy. However, both styles focus on being well-organized, demonstrating enthusiasm, and providing a learning environment where all students are treated with respect and given an equal opportunity to reach their full potential.

In the undergraduate setting, I strive to provide a firm foundation of knowledge in the area of nutrition to the students so that they can have a sound knowledge base on what nutrition is and why it is important in determining the overall health of an individual. My NUFS 2000 class is taken by many students who will not be majoring in nutrition. I see this as an opportunity to provide a learning experience for students that can impact their life in a positive way by providing them with information that they can use for the rest of their life. Therefore, I communicate my knowledge not only through formal lectures but through the use of real-world examples of how nutrition can impact their everyday life. Most of this is done by assimilating the latest research information and disseminating it in a way that students can understand and relate it to basic practices for eating a healthy diet. I also strive to eliminate certain misconceptions related to nutrition or nutrition advice. These concepts are illustrated through “test your nutrition knowledge” quizzes and interactive discussions on recent research findings found in the media.

I credit my experience in undergraduate research as the single most influential factor in my career as a scientist and teacher. I believe strongly in providing undergraduate opportunities in my laboratory for students who want to participate in a research project. I provide students with background knowledge of various laboratory techniques and then give them hands on experience as part of a research project so that they can see these techniques in an actual research setting. In addition, I try to provide as much detail about the research process so that these students can truly understand what is involved in performing research. I have mentored two undergraduate students in the AU Cellular and Molecular Biosciences Undergraduate Research Fellowship and one student has received the AU Undergraduate Research Fellowship Award.

My approach to graduate teaching takes a different approach focusing on critical thinking and reasoning skills. While still building a firm foundation on fundamental knowledge and concepts, I also emphasize the concept of critical thinking by helping students to be able to identify a question and designing a series of methods to help answer or address the question. Through one-on-one mentoring, I foster graduate student's critical thinking and reasoning skills by emphasizing thorough analysis of the published literature, development of effective and testable hypotheses, understanding limitations of research studies, and providing constructive criticism related to their research projects. I also emphasize that students be able to communicate effectively both orally and through written work.

b. Self-Assessment

I am very committed to the concept of self-assessment in continuing to strive to become a better instructor. For my teaching style in the classroom, feedback from the students is my greatest source of information to try and improve the courses that I teach. This usually comes from the end-of-semester evaluations. These are useful in knowing what I am doing well in the class and what needs to be improved. In addition, I also get student feedback about the course by giving my own end-of-semester questionnaire so that I can get more specific feedback about course content, course textbook and overall topics discussed in the course. I also ask "what did you like most and least about the course"? I constantly update my courses every semester to incorporate these changes. Immediate feedback about students learning and knowledge of particular course concepts is determined by using the classroom response units in my NUFS 2000. These provide me with the ability to "quiz" students on a particular topic to test their knowledge. If I find that the students are having problems with a particular concept, I can go back and re-introduce the concept to help students understand better. Though peer evaluation of teaching I have taken the recommendations from faculty from within my department to help improve and clarify my teaching in the classroom setting.

c. Peer-Evaluation of Teaching

Peer-teaching evaluations were conducted by two tenured faculty members in the Fall semester 2006. A full summary of the feedback offered as a result of these evaluations is included in the *"Information Provided by the Department Head"*.

B. RESEARCH/CREATIVE WORK

The candidate's primary research is in the field of diabetes, obesity, and heart disease. Specifically, the candidate is focused on how nutrients influence the development and or prevention of these conditions. The candidate is primarily focused on the role adipocytes play in these processes. This work has led to a total of 20 peer-reviewed journal articles and conference papers. In addition, the candidate has 6 manuscripts that are currently under review for publication. Details for these manuscripts can be found in Section *B.2b*. It is expected that these manuscripts will be published within 3 – 6 months.

In addition to the research described below, the candidate is currently involved in an exciting new area of research pertaining to the potential anti-obesity and anti-diabetic effects of a botanical n-3 polyunsaturated fatty acid (n-3 PUFA) known as stearidonic acid (SDA). Numerous health benefits have been associated with increased intake of n-3 PUFA from marine sources. However, concerns over safety, shelf-life, palatability, and sustainability have made the search for alternative sources of these marine-based n-3 PUFA necessary. SDA is an n-3 PUFA found in botanical sources such as echium oil and currant seed oil. SDA has been shown to have similar health benefits as those reported for marine n-3 PUFA. Most of these studies have focused on tumor formation, inflammation, and plasma lipids. The effect of SDA on the development of obesity, insulin resistance, and diabetes is currently unknown.

We have initiated studies in the candidate's lab to investigate the effects of SDA on fat cell development and function. Preliminary studies have shown that SDA can limit lipid accumulation and decrease inflammation in fat cells. These studies suggest that SDA may be beneficial in preventing obesity and insulin resistance. Therefore, we hypothesize that SDA has anti-obesity and anti-diabetic effects. Future studies in our lab will focus on these effects of SDA in cell-culture systems as well as in mouse dietary feeding studies. The ultimate goal is to translate these studies into humans to show that SDA can act as a surrogate for marine n-3 PUFA in the prevention of obesity, insulin resistance, and diabetes.

Commercial applications: This project has significant commercial applications due to the increased demand for alternative sources of n-3 PUFA. Utilization of a botanical source of n-3 PUFA that has similar biological effects to the marine n-3 PUFA is an industry priority. This would allow for the development of specialized vegetable oils containing SDA that could be incorporated into food products to be used as a surrogate for marine n-3 PUFA for health promotion and disease prevention.

This work is currently being funded by an AAES Hatch Project.

2. Publications:

Student contributions are marked with an asterisk (*), students who have been trained in my laboratory for work that was included in their theses and dissertations is marked with an asterisk (#), and the percent contribution of the candidate is noted in parentheses after each citation, including role and nature of the contribution. **Significance of author order on publications - last authorship denotes the laboratory in which the work was performed and is designated as the corresponding author.**

a. Refereed Journal Articles

- Rege S, Kumar S, Wilson D, Tamura L, Geetha T, Mathews ST, **Huggins KW**, Broderick TL, Jeganathan RB. Resveratrol protects the brain of obese mice from oxidative damage. *Oxidative Medicine and Cellular Longevity*. 2013; 2013:419092. doi: 10.1155/2013/419092
- Symon G, Nanayakkara G, Boncher T, Acevedo O, Wyble J, Patel S, Patel A, Shane ME, Bonokowski B, Wieczorek J, Rong Y*, **Huggins K**, Smith F, Amin RH. Design, development and evaluation of novel dual PPAR δ /PPAR γ agonists. *Bioorganic & Medicinal Chemistry Letters* 23:873-879, 2013
- Gropper SS, Newell FH, Zaremba-Morgan A, Keiley MK, White BD, **Huggins KW**, Simmons KP, Connell LJ, Ulrich PV. The impact of physical activity on body weight and fat gains during the first 3 years of college. *International Journal of Health Promotion and Education* 50:296-310, 2012
- Shonesy BC, Thiruchelvam K, Parameshwaran K, Rahman EA, Karuppagounder SS, **Huggins KW**, Pinkert CA, Amin R, Dhanasekaran M, Suppiramaniam V. Central insulin resistance and synaptic dysfunction in intracerebroventricular-streptozotocin injected rodents. *Neurobiol Aging* 33:430.e15-18, 2012
(contribution 10%, assisted in data analysis, revised manuscript)
- Tzou YM, Huang TS, Singh N, **Huggins KW**, Chin BA. Tobacco osmotin expression in *Escherichia coli*, purification, and antimicrobial assay. *Biotech Letters* 33:539-543, 2011
(contribution 15%, assisted in data analysis, revised manuscript)
- Ratcliff L*, Gropper SS, White, BD, Shannon D, **Huggins KW**. Resting metabolism and metabolic responses to solid and liquid meals in sedentary and exercising college-age males. *International Journal of Sport Nutrition and Exercise Metabolism* 21:11-18, 2011
(contribution 40%, helped design experiments, provided funding, assisted in data collection and analysis, revised manuscript)
- Colbert KE*, **Huggins KW**. Dietary glycemic index increases adipose tissue mass but does not influence pro-oxidant and anti-oxidant gene expression in normal C57BL/6 mice. *Nutrition Research* 30:141-150, 2010

(contribution 50%, designed experiments, obtained funding, assisted in data collection and analysis, revised manuscript)

Wang J, Wernette CM, Judd RL, **Huggins KW**, White BD. Guanethidine treatment does not block the ability of central leptin administration to decrease blood glucose concentrations in streptozotocin-induced diabetic rats. *Journal of Endocrinology* 198:541-548, 2008 (contribution 15%, assisted with collection of samples and edited manuscript)

Kanju P#, Parameshwaran K, Vaithianathan T, Sims C, **Huggins K**, Bendiske J, Ryzhikov S, Bahr BA, Suppiramaniam V. Lysosomal dysfunction produces distinct alterations in synaptic α -amino-3-hydroxy-5-methylisoxazolepropionic acid and N-methyl-d-aspartate currents in hippocampus. *Journal of Neuropathology and Experimental Neurology* 66:779-788, 2007 (contribution 25%, trained student (PKJ) in my lab in protein isolation and western blotting, assisted with designing experiments, interpreted data, and edited manuscript)

Labonte ED, Kirby RJ, Schildmeyer NM, Cannon AM, **Huggins KW**, Hui DY. Group 1B phospholipase A₂-mediated lysophospholipid absorption directly contributes to postprandial hyperglycemia. *Diabetes* 55: 935-941, 2006 (contribution 20%, assisted with designing experiments, performed experiments, interpreted data, and edited manuscript)

Huggins KW, Camarota LM, Howles PN, Hui DY. Pancreatic triglyceride lipase deficiency minimally affects dietary fat absorption but dramatically decreases dietary cholesterol absorption in mice. *Journal of Biological Chemistry* 278: 42899-42905, 2003 (contribution 80%, designed experiment, obtained funding, collected samples, performed assays, wrote manuscript)

Huggins KW, Boileau AC, Hui DY. Protection against diet-induced obesity and obesity-related insulin resistance in group 1B phospholipase A₂ deficient mice. *American Journal of Physiology* 283: E994-E1001, 2002 (contribution 90%, designed experiment, collected samples, performed assays, wrote manuscript)

Huggins KW, Colvin PL, Burleson ER, Kelly K, Sawyer JK, Barrett PHR, Rudel LL, Parks JS. Dietary n-3 polyunsaturated fat increases the fractional catabolic rate of medium-sized high density lipoprotein particles in African green monkeys. *Journal of Lipid Research* 42: 1457-1466, 2001 (contribution 80%, designed experiments, collected samples, performed assays, wrote manuscript)

Richmond BL, Boileau AC, Zheng S, **Huggins KW**, Granholm NA, Tso P, Hui DY. Compensatory phospholipid digestion is required for normal cholesterol absorption in pancreatic phospholipase A₂ gene-targeted mice. *Gastroenterology* 120: 1193-1202, 2001 (contribution 20%, assisted with sample collection and editing manuscript)

Parks JS, **Huggins KW**, Gebre AK, Burleson ER. Phosphatidylcholine fluidity and structure affect lecithin:cholesterol acyltransferase activity. *Journal of Lipid Research* 41: 546-553, 2000

(contribution 40% designed experiments, collected samples, performed assays, helped write revised manuscript)

Huggins KW, Burleson ER, Sawyer JK, Kelly K, Rudel LL, Parks JS. Determination of the tissue sites responsible for the catabolism of large high density lipoprotein in African green monkeys. *Journal of Lipid Research* 41: 384-394, 2000

(contribution 80%, designed experiments, collected samples, performed assays, wrote manuscript)

Huggins KW, Curtiss LK, Gebre AK, Parks JS. Effect of long chain polyunsaturated fatty acids in the sn-2 position of phosphatidylcholine on the interaction with recombinant high density lipoprotein apolipoprotein A-I. *Journal of Lipid Research* 39: 2423-2431, 1998.

(contribution 85%, designed experiments, collected samples, performed assays, wrote manuscript)

b. Manuscripts under Review

Rong, Y*, Amin, R, Ren, G. and **Huggins KW**. Stearidonic acid suppresses adipocyte differentiation by decreasing adipogenic gene expression. Submitted

Arsiwalla D, Lord D, **Huggins KW**, Simmons KP, Ulrich PV, Gropper SS. Associations among eating regulation and body mass index, weight, and body fat in college students: the moderating role of gender. Submitted

c. Manuscripts in Preparation

d. Published Abstracts

Ratcliff L*, Gropper SS, Shannon DM, **Huggins KW**. Resting metabolism and meal-induced metabolic responses in sedentary and exercising college-age males. *FASEB Journal* 23: 911.4, 2009

(contribution 40%, helped design experiments, provided funding, assisted in data collection and analysis, revised abstract)

- Huggins KW**, Colbert KE*. Dietary glycemic index does not influence prooxidant and antioxidant gene expression in adipose tissue of C57BL/6 mice. *FASEB Journal* 22: 1088.6, 2008
(contribution 50%, designed experiments, obtained funding, assisted in data collection and analysis, revised abstract)
- Craig-Schmidt MC, Teodorescu CA#, Colbert KE*, Newland MC, **Huggins KW**. Opposing effects of methylmercury and n-3 long-chain polyunsaturated fatty acids on oxidative status. *FASEB Journal* 22: 1093.1, 2008
(contribution 40%, trained student – CAT, designed experiment, analyzed data, revised abstract)
- Yang J*, **Huggins KW**. Inhibition of calcium-independent phospholipase A₂ results in decreased insulin-stimulated glucose uptake in 3T3-L1 adipocytes. *Keystone Symposia on Diabetes Mellitus, Insulin Action, and Resistance*, Breckenridge, CO, January 22-27, 2008. #351/p.106, 2008
(contribution 60%, designed experiments, analyzed data, revised abstract)
- Wijayawardhane NK#, Vaitianathan T, Pandiella TN, Colbert K*, **Huggins KW**, Breese CR, Vaglenova J, Suppiramaniam V. Postnatal aniracetam treatment ameliorates learning and memory deficits in rat offspring exposed to prenatal ethanol. *Neuroscience Meeting Planner, #10.4, Atlanta, GA: Society for Neuroscience*, 2006
(contribution 25%, trained student – NKW, designed experiments design, analyzed data analysis, revised abstract)
- Huggins KW**, Young SC, Hui DY. Decreased cholesterol absorption in pancreatic triglyceride lipase-deficient mice. *Gastroenterology* 124 (Suppl. 1): A-435, 2003
(contribution 90% effort, designed experiments, collected and analyzed data, prepared abstract)
- Huggins KW**, Hui DY. Decreased postprandial fat absorption in pancreatic phospholipase A₂ deficient mice consuming a high fat diet. *Gastroenterology* 122 (Suppl. 1): A-58, 2002
(contribution 90%, designed experiments, collected and analyzed data, prepared abstract)
- Riddle TM, Schildmeyer NM, **Huggins KW**, Phan C, Hui DY. HIV protease inhibitor therapy increases hyperlipidemia via increased lipoprotein synthesis in the liver. *FASEB Journal* 16: A398, 2002
(contribution 20%, collected and analyzed data collection, revised abstract)
- Huggins KW**, Boileau AC, Hui DY. Resistance to diet-induced obesity in female mice lacking the pancreatic phospholipase A₂ gene. *Gastroenterology* 120: (Suppl. 1): A-42, 2001
(contribution 80%, designed experiments, collected and analyzed data, prepared abstract)

Huggins KW, Wang JC, Gebre AK, Tansey EP, Parks JS. Trans fatty acids reduce lecithin:cholesterol acyltransferase reactivity. *Circulation* 96: I-659, 1997
(contribution 60%, designed experiments, collected and analyzed data, prepared abstract)

Huggins KW, Gebre AK, Parks JS. Long chain polyunsaturated fatty acids (PUFA) decreased apoA-I-phosphatidylcholine (PC) interaction. *Circulation* 94: I-97, 1996
(contribution 75%, designed experiments, collected and analyzed data, prepared abstract)

e. Conference Proceedings

Zaremba Morgan, A., Keiley, M.K., Gropper, S.S., Connell, L.J., Simmons, K.P., Ulrich, P.V. Newell, F.H., White, B.D., & **Huggins, K.W.** (2013, February). *Strength training may reduce or prevent percent body fat and weight gains for females during the college years.* Poster presented at the joint 2013 Annual Conference of the Southeastern Council on Family Relations (SECFR) and the Alabama Association for Marriage and Family Therapy (ALAMFT), Birmingham, AL.

Rong Y*, **Huggins KW**. Suppression of adipocyte differentiation by stearidonic acid through decreased adipogenic gene expression. 3rd Annual Boshell Diabetes and Metabolic Diseases Research Day, Auburn, AL, March 2010

Abdel-Rahman EA, Shonesy BC, Thiruchelvam K, Parameshwaran K, **Huggins KW**, Amin R, Dhanasekaran M, Suppiramaniam V. Insulin signaling, synaptic deficits and Alzheimer's disease: A role for integrin linked kinase. 3rd Annual Boshell Diabetes and Metabolic Diseases Research Day, Auburn, AL, March 2010

Yang J*, **Huggins KW**. Localization of adiponectin receptor-1 to lipid raft plasma membrane domains in 3T3-L1 adipocytes. 2nd Annual Boshell Diabetes and Metabolic Diseases Research Day, Auburn, AL, March 2009
(contribution 60%, designed experiments, assisted in data collection and analysis, revised abstract)

Yang J*, **Huggins KW**. A potential novel role for calcium-independent phospholipase A₂ in insulin-stimulated glucose transport in 3T3-L1 adipocytes. 8th International Conference of the International Society for the Study of Fatty Acids and Lipids Conference, Kansas City, Kansas, May 2008
(contribution 60%, designed experiments, assisted in data collection and analysis, revised abstract)

Shonesy BC, Karikaran T, Karuppagounder SS, Parameshwaran K, **Huggins KW**, Suppiramaniam V. Brain specific insulin resistance and synaptic plasticity. 18th Annual Graduate Research Forum, Auburn University, AL. March 2008
(contribution 15%, assisted in designing experiments, analyzed data, revised abstract)

Colbert KE*, **Huggins KW**. Dietary glycemic index does not influence pro-oxidant and anti-oxidant gene expression in adipose tissue of C57BL/6 mice. 1st Annual Boshell Diabetes Research Symposium, Auburn, AL, March, 2008
(contribution 50%, designed experiments, assisted in data collection and analysis, revised abstract)

Yang J*, **Huggins KW**. Inhibition of phospholipase A2 decreases insulin-stimulated glucose uptake in 3T3-L1 adipocytes. 1st Annual Boshell Diabetes Research Symposium, Auburn, AL, March 2008
(contribution 60%, designed experiment, assisted in data collection and analysis, revised abstract)

Teodorescu CA#, Colbert KE*, Craig-Schmidt MC, **Huggins KW**. Dietary fish oil reduces oxidative stress in rats. 2007 Diet and Optimum Health Conference, Portland, OR, May 2007
(contribution 50%, trained student – CAT, designed experiments, analyzed data, revised abstract)

Huggins KW, Hui DY. Dietary regulation of intestinal ATP-binding cassette transporter-1. FASEB Summer Research Conference, Saxtons River, VT, July 2002
(contribution 90%, designed experiments, collected and analyzed data, prepared abstract)

Huggins KW, Burluson ER, Sawyer JK, Kelly K, Rudel LL, Parks JS. Tissue sites responsible for the catabolism of large high density lipoprotein in African Green monkeys. Arteriosclerosis, Thrombosis, and Vascular Biology 1st Annual Conference, Denver, CO, May 2000
(contribution 60%, designed experiments, collected and analyzed data, prepared abstract)

Huggins KW, Moriguchi E, Colvin PL, Rudel LL, and Parks JS. Metabolism of high-density lipoprotein subfractions. 7th Annual South East Lipid Research Conference, Lake Lanier, GA, September 1998
(contribution 50%, designed experiments design, analyzed and collected data, prepared abstract)

3. Papers and Lectures

a. Papers at Professional Meetings

1. Presentations with Abstracts

Published abstracts listed above with candidate as first author represent either an oral or poster presentation at a national meeting. Student contributions are marked with an asterisk.

b. Invited Symposium Lectures

Invited Speaker: Targeting Obesity Conference. *Which Diet is Right For You – A Critical Analysis*. Organized by the Healthy Alabama Nutrition and Fitness Coalition and the Alabama Cooperative Extension System, Birmingham, AL, October 2004. Attended by over 100 delegates comprising health care workers, dietitians, social workers, county agents, and lay individuals.

c. Other Universities

University of Florida, Department of Food Science and Human Nutrition, Invited Speaker. *Resistance to diet-induced obesity in pancreatic phospholipase A₂-deficient mice*. March 2001. Attended by over 30 undergraduate students, graduate students, and faculty.

University of North Florida, Department of Natural Sciences, Invited Speaker. *Trans fatty acids and LCAT reactivity*. November 1997. Attended by over 20 undergraduate students and faculty.

d. Invited Departmental/Organization Seminars

Auburn University Cellular and Molecular Biology Teaching Enhancement Award, Guest Lecture. *Nutrition and Heart Disease*. June 2009. Attended by 14 students and 2 faculty members.

Auburn University Cellular and Molecular Biology Teaching Enhancement Award, Guest Lecture. *Heart Disease*. July 2006. Attended by 6 students and 4 faculty members.

4. Grants

a. Grants Funded

Diabetes Education and Research Foundation: Huggins KW. Stearidonic acid as a potential nutritional therapy for obesity and type 2 diabetes. January 1, 2013 – December 31, 2013. Role: PI, \$15,000

Animal Health Grant-College of Veterinary Medicine, Auburn University. Omega-3 stearidonic acid as an experimental prevention therapy for prostate cancer.. STATUS-FUNDED, \$50,000. Funding period: 10/1/12 - 9/30/14. Role - co-PI; PI - Mahmoud Mansour (Auburn University)

Alabama Agricultural Experiment Station Competitive Hatch Grant: **Huggins KW.** Anti-obesity and anti-diabetic actions of stearidonic acid. October 1, 2011 – September 30, 2013. Role: PI, \$50,000

Diabetes Education and Research Foundation: Judd RL and **Huggins KW.** Diabetes Research Day. 2010. Role: Co-PI. - \$5,000

Alabama Agricultural Experiment Station Hatch Proposal: **Huggins KW** and Craig-Schmidt MC. Lipid rafts and regulation of diet-induced inflammation and oxidative stress. October 1, 2008 – September 30, 2012. Role: Principal Investigator - ~ \$5,000/year

Auburn University Competitive Research Grant: Genetic ablation of calcium-independent phospholipase A₂ in adipocytes: **Huggins KW.** Implications for insulin resistance and diabetes. May 1, 2008 – April 30, 2009. Role: Principal Investigator - \$7,500

Alabama Agricultural Experiment Station Equipment Grant: Craig-Schmidt MC, **Huggins KW.** Request for gas chromatograph. 2008. Role: Co-Investigator - \$11,264

Alabama Agricultural Experiment Station Foundation Grant: **Huggins KW,** Mathews ST, Judd RL. Influence of a high glycemic diet on oxidative stress and glucose metabolism. October 1, 2005 – September 30, 2007. Role: Principal Investigator - \$107,590

Alabama Agricultural Experiment Station Competitive Request for Funds FY '07: White BD, Mathews ST, **Huggins KW.** Lack of central leptin and insulin resistance: a potential connection between obesity and type 2 diabetes. January 1, 2007 – September 30, 2007. Role: Co-Investigator, \$45,365

Alabama Agricultural Experiment Station Hatch Project: Craig-Schmidt MC, Newland MC, Schwartz D, **Huggins KW.** Maximizing maternal and infant nutrition. October 1, 2004 – September 30, 2009. Role: Cooperator, ~ \$5,000/year

Alabama Agricultural Experiment Station Hatch Project: White BD, **Huggins KW,** Mathews ST. Lack of central leptin and insulin resistance: A potential connection between obesity and type 2 diabetes. October 1, 2004 – September 30, 2007. Role: Co-Investigator - ~ \$10,000/year

Auburn University Biogrant Program: **Huggins KW,** Judd RL. Role of PLA₂-1B in insulin-stimulated glucose transport. May 1, 2004 – April 30, 2006. Role: Principal Investigator \$42,000

National Institutes of Health: Role of pancreatic lipase in dietary lipid absorption. **Huggins KW**. June 1, 2000 – May 31, 2003. Role: Principal Investigator, \$109,164

b. Grants not funded

Level III IGP, Auburn University. Plant-based stearidonic acid versus marine-based fatty acids as therapy for prostate cancer. STATUS - NOT FUNDED. Role - co-investigator; PI - Mahmoud Mansour (Auburn University)

Diabetes Action and Research Education and Foundation, Impact of lipid rafts on dietary fatty acid induced inflammation and oxidative stress. Role of candidate: PI. 1/1/09 – 12/31/09 - \$33,000.

Alabama Agricultural Experiment Station, Agricultural Initiative Grant. A Novel Role for Calcium-Independent Phospholipase A2 Beta in Insulin-Stimulated Glucose Uptake. Role of candidate: PI. 10/1/07 - 9/30/09, \$82,613.

Foundation Grant, Alabama Agricultural Experiment Station, Influence of Sugar Intake on the Progression of Familial and Sporadic Alzheimer's Disease. Role of candidate: Co-PI, PI - Dr. Marie Wooten (Biological Sciences). 11/06 - 10/09, \$120,000.

National Institutes of Health, Synaptic glutamatergic dysfunction in diabetes mellitus. Role of candidate: Co-PI, PI - Dr. Vishnu Suppiramaniam (Pharmaceutical Sciences). 10/06 - 9/08, \$365,000.

General Mills Institute of Health and Nutrition (Innovative Nutrition Research), Impact of a high glycemic diet on cognitive function. Role of candidate: PI, Co-PIs-Dr. Vishnu Suppiramaniam (Pharmaceutical Sciences) and Dr. Muralikrishnan Dhanasekaran (Pharmaceutical Sciences). 6/06 – 5/07, \$50,000.

5. Scholarly Program

a. Description or Research Program

There is a severe epidemic of diabetes currently in the United States with the state of Alabama having the highest incidence of this disease when adjusted for population size. The key pathogenic parameter in the pathogenesis of the most common form of diabetes (Type 2) is the development of insulin resistance. This condition, in which insulin fails to function properly in maintaining normal blood glucose levels, occurs many years before the onset of the clinical symptoms of diabetes. Therefore, it has become imperative to identify potential new therapeutic targets to improve insulin sensitivity in people at risk for diabetes. *The candidate's laboratory is*

currently focusing on molecular and dietary approaches to understanding the mechanisms leading to insulin resistance and diabetes.

Role of calcium-independent phospholipase A₂ in adipocytes: Recent studies have focused on the role adipose tissue plays in regulating glucose homeostasis and the development of insulin resistance and type 2 diabetes. It has been established that adipose tissue plays a critical role in lipid storage; increased dietary fat consumption results in increased adipose tissue mass resulting in obesity and insulin resistance. However, evaluation of recent data has shown that adipocytes are also directly involved in the regulation of insulin sensitivity (how well insulin works in regulating blood glucose levels). These regulatory actions in adipocytes are believed to be mediated by a number of proteins produced by adipocytes. One potential target in adipocytes that may be important in regulating glucose metabolism is the intracellular phospholipase, calcium-independent phospholipase A₂ (iPLA₂). PLA₂s are a class of enzymes that catalyze the hydrolytic removal of the sn-2 fatty acid from membrane phospholipids resulting in the generation of free fatty acid and lysophospholipid. iPLA₂ is expressed in many different tissues and has a wide-array of functions depending on cell type. Recently, iPLA₂ has been found to be highly expressed in adipocytes. However, the exact physiological role that iPLA₂ plays in adipocytes is not known. ***Data from our laboratory suggests a possible novel function for iPLA₂ in regulating glucose transport into adipocytes.*** We have shown that chemical inhibition of iPLA₂ results in decreased insulin-stimulated glucose uptake via reduced translocation of the glucose transporter, GLUT4, to the plasma membrane. We are currently studying the molecular mechanisms by which iPLA₂ functions in this process. The significance of this research is that it suggests a novel target in which to develop possible therapeutic applications to aid in the treatment and/or prevention of insulin resistance and type 2 diabetes. **This research area is completely independent of work done by the candidate as a post-doctoral fellow and graduate student.**

Dietary glycemic index and oxidative stress and inflammation: Another research area of focus in the candidate's laboratory is the influence of carbohydrates differing in glycemic index on oxidative stress and inflammatory gene expression in a mouse model. Carbohydrates with a high glycemic index (refined carbohydrates) are characterized by rapid absorption resulting in large postprandial spikes in blood glucose. This results in an increased insulin demand, triggering hypersecretion of insulin from the pancreas. Several human and animal studies have correlated high glycemic index diets with an increased risk of coronary heart disease, metabolic syndrome, insulin resistance, and type 2 diabetes. ***We hypothesize that one possible mechanism for this action may be due to increased oxidative stress and inflammation in body tissues in animals consuming a high glycemic form of carbohydrate.*** Oxidative stress and inflammation have been shown to be involved in the development of the diseases listed above. Therefore, the significance of this research will be to recommend replacing high glycemic index carbohydrates with low glycemic index carbohydrates may result in decreased oxidative stress and inflammation in the body leading to decreased risk for certain metabolic diseases. **This research area is completely independent of work done by the candidate as a post-doctoral fellow and graduate student.**

Collaborative Research Efforts

The candidate has worked closely with Dr. Margaret Craig-Schmidt in the Department of Nutrition and Food Science on her project dealing with the interaction between methylmercury and dietary n-3 polyunsaturated fat consumption in experimental animals. The candidate's role in the project was to determine the interactive effects of methylmercury and n-3 polyunsaturated fatty acids on oxidative stress generation and the expression of various pro-oxidative and anti-oxidative enzyme gene expression. The candidate's contribution was to supervise the direction of this part of the project by training Dr. Craig-Schmidt's graduate student (Carmen Teodorescu) (see Section 4A.2) in various experimental techniques routinely performed in the candidate's laboratory.

In addition to the research described above, the candidate has established collaboration with Dr. Vishnu Suppiramaniam, Associate Professor, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University. Dr. Suppiramaniam's research focus is on the electrophysiological, biochemical and molecular approaches to understanding glutamate receptor channel behavior and effects of nootropic compounds. The candidate has trained several of Dr. Suppiramaniam's graduate students in his laboratory in the techniques of real-time polymerase chain reaction, western blotting, DNA/RNA isolation, and enzyme-linked immunosorbent assays. In addition, the candidate currently serves on Dr. Suppiramaniam's graduate students committees.

These research efforts have generated grant funding from Auburn University's Biogrant program, Alabama Agricultural Experimental Grants program, and Auburn University's Competitive Research program totaling over \$200,000.

C. OUTREACH

The candidate does not have an appointment directly related to Outreach, but has addressed the public and media on nutrition-related issues (see section 4D.c)

D. SERVICE

a. University service

1. Service to the University

Member, Faculty Research Committee (2013-2016)

Ad hoc grant proposal reviewer, Animal Health and Disease Research Program, College of Veterinary Medicine, Auburn University, October 2009

Member, Competitive Research Grant Committee (2009-2012)

Member, Undergraduate Summer Fellowship Research Committee for the CMB Peak of Excellence (2004-present)

Reviewed 30-40 undergraduate applications for 9-10 summer fellowships in which students perform research in a CMB faculty's laboratory.

Co-Chair, 5th Annual Boshell Diabetes and Metabolic Diseases Research Day, March 2012

Co-Chair, 4th Annual Boshell Diabetes and Metabolic Diseases Research Day, March 2011

Co-Chair, 3rd Annual Boshell Diabetes and Metabolic Diseases Research Day, March 2010

Co-Chair, 2nd Annual Boshell Diabetes and Metabolic Diseases Research Day, March 2009

Co-Chair, 1st Annual Boshell Diabetes and Metabolic Diseases Research Day, March 2008

This conference was conceived and developed by the candidate to bring together leading researchers in the field of diabetes and obesity in the southeast to interact and present their research findings with faculty at Auburn University. In association with Dr. Robert L. Judd, Director, Boshell Diabetes and Metabolic Diseases Research Program and Associate Professor, Department of Anatomy, Physiology, and Pharmacology, College of Veterinary Medicine, Auburn University, this conference was held at the Hotel at Auburn University and Dixon Conference Center in March 2008. Over 100 participants attended the one day conference. Attendees included Auburn University faculty, graduate and undergraduate students from Auburn University, and faculty and graduate students from Vanderbilt University, University of Alabama at Birmingham, University of Georgia, and East Tennessee State University. In addition, several lay individuals from the surrounding community also attended the conference.

Member, Senate Faculty Welfare Committee (2007-2010)

Faculty Mentor, Teaching Enhancement Award Program (2006)

Program involved having a high school student and a partner teacher work in the candidate's laboratory for a 3-week period to learn techniques that can be taken back to demonstrate to high school science students

Member, Biogrant Committee, (2004-2007), College of Human Sciences representative

Reviewed 40-50 pre-proposals and 15-20 full proposals for research projects of a biological nature over a three year period. Projects were submitted from many different disciplines and colleges across campus.

Discussion leader, AU-CMB Program Review (2003)

2. Service to the College

2005 – present: Ad-hoc grant proposal reviewer: I reviewed the following Hatch proposals for the College of Human Sciences:

- Role of sequestosome 1 in insulin signaling. PI: RB Jeganathan, Department of Nutrition, Dietetics, and Hospitality Management, April 2011
- Nutrition and physical activity practices of after-school programs: Do they promote healthy behaviors? PI: SS Gropper, Department of Nutrition, Dietetics, and Hospitality Management, April 2011
- Dietary, lifestyle/behavioral and psychosocial factors associated with body weight, composition and size/shape changes among children and teens/young adults: Can intervention prevent excessive gains? PI: SS Gropper, Department of Nutrition and Food Science, April 2010
- Utilization of tagatose in foods to provide improved nutritional health. PI: LN Bell, Department of Nutrition and Food Science, April 2009
- Characterization of fetuin-A in insulin action and glucose homeostasis. PI: ST Mathews, Department of Nutrition and Food Science, August 2008
- How does central leptin normalize blood glucose concentrations in STZ-induced diabetic rats? PI: B. Douglas White, Department of Nutrition and Food Science, April 2008
- Dietary, environmental, and lifestyle factors associated with weight status among college students and other at risk populations. PI: SS Gropper and CA Zizza, Department of Nutrition and Food Science, April 2005

3. Service to the Department of Nutrition, Dietetics, and Hospitality Management

2004: Member, Department of Nutrition and Food Science Faculty Search Committee

2011: Member, Department of Nutrition, Dietetics, and Hospitality Management Faculty Search Committee (HRMT position)

2012-13: Member, Department of Nutrition, Dietetics, and Hospitality Management Faculty Search Committee (HRMT position)

2012 – present: Nutrition Science Undergraduate Program Coordinator

2013-present: Elected Senator

2013: Member, Department of Nutrition, Dietetics, and Hospitality Management Faculty Search Committee (DPD Director position)

2013: Chair, Department of Nutrition, Dietetics, and Hospitality Management Faculty Search Committee (ISSPY Director and Clinical Instructor position)

2014: Chair, Faculty Scholarship Committee

2014: Chair, Department of Nutrition, Dietetics, and Hospitality Management Faculty Search Committee (ISSPY Director and Clinical Instructor position)

b. Professional Service

1. Manuscript review

Ad Hoc Reviewer: The candidate has reviewed articles for the following journals:

- Lipids
- Journal of Lipid Research
- Journal of Food Science
- Nutrition Research
- American Journal of Cardiology

2006: Member, Nutrition Analysis Software and Media Focus Group, McGraw-Hill, Inc.
Reviewed diet analysis software and ancillary materials for McGraw Hill.

2006: Reviewer, textbook for McGraw-Hill, Inc. *Contemporary Nutrition, 7th ed.* by Wardlaw and Smith

2005: Reviewer, textbook for Pearson Education, Inc. *Nutrition: An Applied Approach* by Thompson and Manore

b. Community Service

Spokesperson, interviewed by *The Auburn Plainsman* concerning the effects of soft drink consumption and obesity, July 2011

Spokesperson, interviewed by *The Auburn Plainsman* concerning the effects of smoking on the body, June 2009

Spokesperson, interviewed by *The Auburn Plainsman* concerning multivitamin supplements, June 2009

Spokesperson, interviewed on WANI 1400 AM, a commercial News/Talk radio station serving the Auburn/Opelika area, concerning the 2nd Annual Boshell Diabetes and Metabolic Diseases Research Day, March 2009

Spokesperson, interviewed by *The Auburn Plainsman* concerning healthy choices at fast food restaurants, July 2008

Spokesperson, interviewed by *The Auburn Plainsman* concerning healthy eating choices at fast food restaurants, March 2008

Spokesperson, interviewed by *The Auburn Plainsman* concerning the 1st Annual Boshell Diabetes Research Symposium, March 2008

Guest speaker, presented educational seminar to the Auburn/Opelika Mended Hearts chapter, the seminar was entitled “Inflammation: the link between obesity, diabetes, and heart disease?” May 2007

Guest Speaker, presented educational seminar to the Independent Living Conference, Teaching Life Skills for Foster Children in the State of Alabama. Conference was sponsored by the Alabama Department of Human Resources. The seminar was entitled “Understanding Food Labels”, Auburn, AL, June 2006. The candidate was assisted by his graduate students, Kathryn E. Colbert and Lance Ratcliff

Guest Speaker, presented educational seminar to the Auburn District of the American Dietetics Association, the seminar was entitled “Fad Diets”, Auburn, AL, September 2004.

Spokesperson, interviewed by *The Auburn Plainsman* concerning the incidence of obesity in the United States, October 2003

