CURRICULUM VITAE

Name: Mitchell D. Knutson

Email: mknutson@ufl.edu

Work Address: Food Science & Human Nutrition Dept.
University of Florida
Gainesville, FL 32611

Phone Number: (352) 392-1991 X 204 (work); (352) 359-3507 (cell)

Website: http://knutsonlab.org/

Education:

1998-2003	Post-doctorate	Molecular Biology	Harvard University, Boston, MA
1998	Ph.D.	Nutrition	University of California, Berkeley, CA
1992	B.S.	Biochemistry	Iowa State University, Ames, IA

Experience:

2010-present Associate Professor of Nutritional Biochemistry
Food Science & Human Nutrition Dept., University of Florida, Gainesville, FL

2003-2010 Assistant Professor of Nutritional Biochemistry
Food Science & Human Nutrition Dept., University of Florida, Gainesville, FL

1998-2003 Postdoctoral Fellow
Department of Nutrition, Harvard School of Public Health, Boston, MA

1993-1998 Graduate Student
Department of Nutrition, University of California, Berkeley, CA

1992 Chemist
Microgenics Corporation, Concord, CA

Awards/Honors:

2009 Jack Wessel Excellence Award for Assistant Professors, University of Florida
2009 ILSI Future Leaders Award
2007 Elected member, Gamma Sigma Delta, the Honor Society of Agriculture
2004 Outstanding Mentor Award, University Scholars Program, University of Florida
1998 Ellsworth C. Dougherty Memorial Prize, Dept. of Nutrition, UC Berkeley
1997 George M. Briggs Memorial Award, Dept. of Nutrition, UC Berkeley

Leadership Activities:

2009-present Graduate coordinator, Nutritional Sciences Interdisciplinary Ph.D. Program

2006-2009 Chair, East Coast Iron Club. Annual meeting for iron researchers on the East Coast

2008 Chair, Nutrient-Gene Interactions Minisymposium. Experimental Biology Meeting, San Diego, CA

2008	Co-chair, Hepcidin Regulation of Iron Transport Symposium. Experimental Biology Meeting, San Diego, CA
2006-2007	Chair, Nutrient-Gene Interactions Research Interest Section, American Society of Nutrition (232 members)
2006	Chair, Iron Minisymposium. Experimental Biology Meeting, San Francisco, CA.

Service to the Profession:

2013	Guest Editor, Special Issue "Dietary Iron and Human Health, *Nutrients* http://www.mdpi.com/journal/nutrients/special_issues/dietary-iron-health
2008	Centrum Award jury, American Society for Nutrition
2007-Present	Contributing Editor, *Nutrition Reviews*
2006	*Ad-hoc* reviewer for NIH grants, National Institute of Aging (07/2006)
2003-Present	*Ad-hoc* reviewer for the following journals:

Journal of Biological Chemistry
Proceedings of the National Academy of Sciences
Blood
Haematologica
Journal of Cellular Biochemistry
Journal of Cellular Physiology
American Journal of Physiology
Biochimica et Biophysica Acta
Journal of Nutrition
Journal of Nutritional Biochemistry
Journal of Biological Inorganic Chemistry
Biometals
BMC Physiology
PLoS Genetics
PLoS One

Memberships:

2010- Present	American Society for Biochemistry and Molecular Biology
2003-Present	American Association for the Advancement of Science
2003-Present	International BioIron Society
2001-Present	American Society for Nutrition (ASN)
1996-1998	ASN, Subcommittee on the History of Nutrition, student member

Grant Support:

Current

NIH (R01-DK080706)
ZIP Proteins and Iron Metabolism
Principal Investigator 30% effort. 08/01/2008-07/31/2014 Total costs $1,436,887
The major goal of this project is to determine the function of ZIP proteins (metal-ion transporters) in iron transport and homeostasis.

ILSI Future Leader Award 07/01/2009 - 07/01/2011 Total costs $30,000
Molecular mechanisms of iron uptake by the liver and brain
Principal Investigator
The major goals of this project are to define the contribution of divalent metal transporter 1 (DMT1) to the uptake of iron by the liver and brain by using conditional knockout animals.

Completed

NIH Recovery Act Funds for Administrative Supplements 08/01/09 – 07/31/10 Total costs $67,839
ZIP Proteins and Iron Metabolism
Principal Investigator

University of Florida, IFAS 2008 Research Innovation Proposal
Role of the iron-regulatory and antimicrobial peptide hepcidin in preventing and mitigating bacterial foodborne infections
Co-Investigator (PI: Anita Wright) This project will investigate the antimicrobial activity of hepcidin in response to *Vibrio vulnificus*, a common cause of foodborne infections.

NIH (K01-DK065064)
Ferroportin and iron export from the macrophage.
Principal Investigator 75% effort. 12/01/2003 - 07/31/2008 Total costs $536,744
The major goal of this project is to investigate the function, subcellular distribution, and regulation of the iron transport protein, ferroportin, in the macrophage.

NIH (F32 -DK009998)
SFT expression in a mouse model of hemochromatosis
Principal Investigator 100% effort. 06/16/2000 - 09/30/2002 Total costs $79,512
The major goal of this project was to assess the expression of SFT (Stimulator of Fe Transport) in the Hfe-knockout mouse, an animal model of the iron-overload disorder hemochromatosis.

Peer-Reviewed Publications:

1. **Knutson MD**, Viteri FE. Concentrating breath samples using liquid nitrogen: a reliable method for the simultaneous determination of ethane and pentane. *Anal Biochem*. 1996; 242(1):129-35.

2. **Knutson MD**, Lim AK, Viteri FE. A practical and reliable method for measuring ethane and pentane in expired air from humans. *Free Radic Biol Med.* 1999; (5-6):560-71.

3. **Knutson MD**, Walter PB, Ames BN, Viteri FE. Both iron deficiency and daily iron supplements increase lipid peroxidation in rats. *J Nutr.* 2000; 130(3):621-8.

4. **Knutson MD**, Handelman GJ, Viteri FE. Methods for measuring ethane and pentane in expired air from rats and humans. *Free Radic Biol Med.* 2000; 28(4):514-9.

5. **Knutson MD**, Levy JE, Andrews NC, Wessling-Resnick M. Expression of stimulator of Fe transport is not enhanced in Hfe knockout mice. *J Nutr.* 2001; 131(5):1459-64.

6. Walter PB, **Knutson MD**, Paler-Martinez A, Lee S, Xu Y, Viteri FE, Ames BN. Iron deficiency and iron excess damage mitochondria and mitochondrial DNA in rats. *Proc Natl Acad Sci U S A.* 2002; 99 (4):2264-9.

7. **Knutson M**, Wessling-Resnick M. Iron metabolism in the reticuloendothelial system. *Crit Rev Biochem Mol Biol.* 2003; 38(1):61-88.

8. **Knutson MD**, Vafa MR, Haile DJ, Wessling-Resnick M. Iron loading and erythrophagocytosis increase ferroportin 1 (FPN1) expression in J774 macrophages. *Blood.* 2003; 102(12):4191-7.

9. **Knutson M**, Menzies S, Connor J, Wessling-Resnick M. Developmental, regional, and cellular expression of SFT/UbcH5A and DMT1 mRNA in brain. *J Neurosci Res.* 2004; 76(5):633-41.

10. **Knutson MD**, Oukka M, Koss LM, Aydemir F, Wessling-Resnick M. Iron release from macrophages after erythrophagocytosis is up-regulated by ferroportin 1 overexpression and down-regulated by hepcidin. *Proc Natl Acad Sci U S A.* 2005; 102(5):1324-8.

11. Liuzzi JP, Lichten LA, Rivera S, Blanchard RK, Aydemir TB, **Knutson MD**, Ganz T, Cousins RJ. Interleukin-6 regulates the zinc transporter Zip14 in liver and contributes to the hypozincemia of the acute-phase response. *Proc Natl Acad Sci U S A.* 2005; 102(19):6843-8.

12. Brain JD, Heilig E, Donaghey TC, **Knutson MD**, Wessling-Resnick M, Molina RM. Effects of iron status on transpulmonary transport and tissue distribution of Mn and Fe. *Am J Respir Cell Mol Biol.* 2006; 34(3):330-7.

13. Chlosta S, Fishman DS, Harrington L, Johnson EE, **Knutson MD**, Wessling-Resnick M, Cherayil BJ.The iron efflux protein ferroportin regulates the intracellular growth of Salmonella enterica. *Infect Immun.* 2006; 74(5):3065-7.

14. Liuzzi JP, Aydemir F, Nam H, **Knutson MD**, Cousins RJ. Zip14 (Slc39a14) mediates non-transferrin-bound iron uptake into cells. *Proc Natl Acad Sci U S A.* 2006;103(37):13612-13617.

15. Michael S, Petrocine SV, Qian J, Lamarche JB, **Knutson MD**, Garrick MD, Koeppen AH. Iron and iron-responsive proteins in the cardiomyopathy of Friedreich's ataxia. *Cerebellum.* 2006; 5(4):257-267.

16. Koeppen AH, Michael SC, **Knutson MD**, Haile DJ, Levi S, Santambrogio P, Qian J, Garrick MD, Lamarche JB. The dentate nucleus in Friedreich's ataxia. The role of iron-responsive proteins. *Acta Neuropathol.* 2007; 114(2):163-73.

17. Imrich A, Ning Y, Lawrence J, Coull B, Gitin E, **Knutson M**, Kobzik L: Alveolar macrophage cytokine response to air pollution particles: oxidant mechanisms. *Toxicol Appl Pharmacol.* 2007; 218(3):256-264.

18. **Knutson MD**. Steap proteins: implications for iron and copper metabolism. *Nutr Rev.* 2007; 65(7):335-40.

19. Hofer TH, Marzetti E, Xu J, Seo A, **Knutson MD**, Leeuwenburgh C, Dupont-Versteegden EE. Increased iron and RNA oxidative damage in skeletal muscle with aging and disuse atrophy. *Exp Gerontol.* 2008; 43(6):563-70.

20. King SM, Donangelo CM, **Knutson MD**, Walter PB, Ames BN, Viteri FE, King JC. Daily supplementation with iron increases lipid peroxidation in young women with low iron stores. *Exp Biol Med.* 2008; 233(6):701-707.

21. Gao J, Zhao N, **Knutson MD**, Enns C. HFE inhibits iron uptake via downregulation of Zip14 in HepG2 cells. *J Biol Chem.* 2008; 283(31):21462-8

22. Xu J, **Knutson MD**, Carter CS, and Leeuwenburgh C. Iron accumulation with age, oxidative stress and functional decline. *PLoS ONE.* 2008; 3(8):e2865.

23. **Knutson MD**, Leeuwenburgh C. Resveratrol and novel potent activators of SIRT1: effects on aging and age-related diseases. *Nutr Rev.* 2008; 66(10):591-6.

24. Seo AY, Xu J, Servais S, Hofer T, Marzetti E, Wohlgemuth, **Knutson MD**, Chung HY, Leeuwenburgh. Mitochondrial iron accumulation with age and functional consequences. *Aging Cell.* 2008; (5):706-16.

25. Collins JF, Wessling-Resnick M, **Knutson MD**. Hepcidin regulation of iron transport. *J Nutr.* 2008; 138(11):2284-8.

26. Aydemir F, Jenkitkasemwong S, Gulec S, **Knutson MD**. Iron loading increases ferroportin heterogeneous nuclear RNA and mRNA levels in murine J774 macrophages. *J Nutr.* 2009; 139(3):434-8.

27. Andriopoulos B, Corradini E, Xia Y, Faasse SA, Chen S, Grgurevic L, **Knutson MD**, Pietrangelo A, Vukicevic S, Lin HY, Babitt JL. BMP6 is a key endogenous regulator of hepcidin expression and iron metabolism. *Nat Genet*. 2009; 41(4):482-7.

28. **Knutson MD**. Into the matrix: Regulation of the iron regulatory hormone hepcidin by matriptase-2. *Nutr Rev*. 2009; *Nutr Rev.* 67:284-8.

29. Genter MB, Kendig EL, **Knutson MD**. Uptake of materials from the nasal cavity into the blood and brain: Are we finally beginning to understand these processes at the molecular level? *Ann N Y Acad Sci.* 2008; 1170:623-8.

30. Hepburn JJ, Arthington JD, Hansen SL, Spears JW, **Knutson MD**. Technical note: copper chaperone for copper, zinc superoxide dismutase: a potential biomarker for copper status in cattle. *J Anim Sci.*2009; 87:4161-6.

31. Koeppen AH, Morral JA, Davis AN, Qian J, Petrocine SV, **Knutson MD**, Gibson WM, Cusack MJ, Li D. The dorsal root ganglion in Friedreich's ataxia. *Acta Neuropathol*. 2009; 118:763-76.

32. Hansen SL, Ashwell MS, Moeser AJ, Fry RS, **Knutson MD**, Spears JW. High dietary iron reduces transporters involved in iron and manganese metabolism and increases intestinal permeability in calves. *J Dairy Sci*. 2010; 93:656-65.

33. Jenkitkasemwong S, Broderius M, Nam H, Prohaska JR, **Knutson MD**. Anemic copper-deficient rats, but not mice, display low hepcidin expression and high ferroportin levels. *J Nutr.* 2010; 140:723-30.

34. Collins JF, Prohaska JR, **Knutson MD**. Metabolic crossroads of iron and copper. *Nutr Rev.* 2010; 68:133-47.

35. **Knutson MD**. Iron-Sensing Proteins that Regulate Hepcidin and Enteric Iron Absorption. *Annu Rev Nutr*. 2010; 30:149-71.

36. Zhao N, Gao J, Enns CA, **Knutson MD**. ZRT/IRT-like protein 14 (ZIP14) promotes the cellular assimilation of iron from transferrin. *J Biol Chem.* 2010; 85(42):32141-50.

37. Pinilla-Tenas JJ, Sparkman BK, Shawki A, Illing AC, Mitchell CJ, Zhao N, Liuzzi JP, Cousins RJ, **Knutson MD**, Mackenzie B. Zip14 is a complex broad-scope metal-ion transporter whose functional properties support roles in the cellular uptake of zinc and nontransferrin-bound iron. *Am J Physiol Cell Physiol*. 2011; 301(4):C862-71.

38. Zhang Z, Zhang F, An P, Guo X, Shen Y, Tao Y, Wu Q, Zhang Y, Yu Y, Ning B, Nie G, **Knutson MD**, Anderson GJ, Wang F. Ferroportin1 deficiency in mouse macrophages impairs iron homeostasis and inflammatory responses. *Blood*. 2011; 118(7):1912-22.

39. Nam H, **Knutson MD**. Effect of dietary iron deficiency and overload on the expression of ZIP metal-ion transporters in rat liver. *Biometals*. 2012;25(1):115-24.

40. Xu J, Hwang JC, Lees HA, Wohlgemuth SE, **Knutson MD**, Judge AR, Dupont-Versteegden EE, Marzetti E, Leeuwenburgh C. Long-term perturbation of muscle iron homeostasis following hindlimb suspension in old rats is associated with high levels of oxidative stress and impaired recovery from atrophy. *Exp Gerontol*. 2012;47(1):100-8.

41. Jenkitkasemwong S, Wang CY, Mackenzie B, **Knutson MD**. Physiologic implications of metal-ion transport by ZIP14 and ZIP8.. *Biometals*. 2012; 25(4):643-55.

42. Xu J, Jia Z, **Knutson MD**, Leewenburgh C. Impaired Iron Status in Aging Research. *Int. J. Mol. Sci.* 2012, 13, 2368-2386.

43. Wang CW, Jenkitkasemwong S, Duarte S, Sparkman B, Shawki A, Mackenzie B, **Knutson MD**. ZIP8 is an iron and zinc transporter whose cell-surface expression is upregulated by cellular iron loading. *J Biol Chem*. 2012; 287(41); 34032-34043.

44. Nam H, Wang CY, Zhang L, Zhang W, Hojyo S, Fukada T, and **Knutson M**. ZIP14 and DMT1 in the liver, pancreas, and heart are differentially regulated by iron deficiency and overload: implications for tissue iron uptake in iron-related disorders. *Haematologica*. 2013 Jan 24. (Epub ahead of print)

45. Wang CY, **Knutson MD**. Hepatocyte divalent metal-ion transporter-1 is dispensable for hepatic iron accumulation and non-transferrin-bound iron uptake in mice. *Hepatology*. 2013 Mar 19. [Epub ahead of print]

46. Guo X, Zhang Z, Zhang F, Tao Y, An P, Wu Q, Wang CY, **Knutson MD**, Wang F. Fine-Mapping and Genetic Analysis of the Loci Affecting Hepatic Iron Overload in Mice. *PLoS One*. 2013 May 10;8(5):e63280.

Book Chapters:

1. **Knutson MD**, Handelman GJ, Viteri FE. Methods for measuring ethane and pentane in expired air from rats and humans. In *Bio-Assays for Oxidative Stress Status (BOSS)* (Pryor WA, ed.) Elsevier, Amsterdam. 74-79, 2001.

2. Hofer T, Marzetti E, Seo AY, Xu J, **Knutson MD**, Leeuwenburgh C. Mechanisms of iron regulation and oxidative stress in sarcopenia and neurodegenerative diseases. In *Free Radicals in Biology and Medicine*. (Gutiérrez-Merino C and Leeuwenburgh C, eds.) Research Signpost, T.C., Kerala, India, 2008.

Invited Talks:

1. **Knutson MD**. ZIP proteins—new players in iron transport and homeostasis. Wake Forest School of Medicine, Department of Biochemistry. February 2012.

2. **Knutson MD.** Molecular mechanisms of iron uptake by the liver. Academic Health Center, School of Medicine, University of Minnesota, Duluth, April 2010

3. **Knutson MD.** Molecular mechanisms of iron uptake by the liver and intestine: implications for health and disease. Gastroenterology/Hepatology Research Conference, Department of Medicine, University of Florida, Nov. 2008.

4. **Knutson MD**. Iron in older adults. Elder Nutrition and Food Safety Workshop. Gainesville, FL. May 2008.

5. **Knutson MD.** The emerging role of ZIP proteins in iron metabolism. University of California at Los Angeles and Children's Hospital Research Institute (CHORI), Oakland, CA. February 2008.

6. **Knutson MD.** Molecular aspects of iron metabolism: relevance to the anemia in the elderly. Interdisciplinary Research Seminar Series, Institute on Aging, College of Medicine, University of Florida, November 2006.

7. **Knutson MD**. Studying the role of macrophages in AI/ACD by using cell culture models. NIH Workshop on Anemias of Inflammation and Chronic Disease. Annapolis, MD. May 2006.

Invited Oral Presentations (Past 3 Years):

1. Jenkitkasemwong S (presenter), Wang C, Hojyo S, Fukada T, **Knutson MD**. Zip14 knockout mice exhibit altered iron metabolism and markedly impaired hepatic and pancreatic uptake of intravenously administered non-transferrin-bound iron. International BioIron Society Meeting. April 2013.London, UK.

2. **Knutson MD**, Wang CW, Jenkitkasemwong S. Potential roles of Zip14 and Zip8 in iron homeostasis (Keynote Lecture). Fourth International Workshop on Iron and Copper Homeostasis. December, 2011. Pucón, Chile.

3. **Knutson MD**. Iron transport and regulation of ZIP metal-ion transport proteins. International Society of Trace Element Research in Humans (ISTERH IX). October, 2011. Antalya, Turkey.

4. **Knutson MD**, Wang C, Nam H. Roles of DMT1 and ZIP14 in iron uptake by the liver. Trace Elements in Man and Animals (TEMA14). September, 2011. Enshi, China.

5. Zhao N (presenter) and **Knutson MD**. Transmembrane topology of the mammalian Zip14 metal-ion transporter. N. Zhao and M.D. Knutson. Experimental Biology Meeting, April 2010, Anaheim, CA.