BIOGRAPHICAL SKETCH

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NAME: **Harini Sampath**

eRA COMMONS USER NAME (credential, e.g., agency login): **SAMPATHH**

POSITION TITLE: **Associate Professor**

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of New Hampshire	BS	05/2002	Nutritional Sciences
University of Wisconsin-Madison	PHD	12/2008	Nutritional Sciences
Oregon Health and Science University	Postdoctoral training	06/2016	Oxidative stress and DNA damage

A. Personal Statement

The goal of my research program is to discover cellular and metabolic alterations that occur as a consequence of dysregulated lipid metabolism. In particular, we are focused on elucidating the role of the delta-9 lipid desaturase, stearoyl-CoA desaturase (SCD), in modulating lipid metabolism and overall metabolic health. Current studies are focused on a role for SCD isoforms in the gut in modulating intestinal lipid sensing and systemic metabolic health.

I have extensive training and expertise in studying the tissue-specific roles of delta-9 desaturases in modulating cellular signaling. My lab also has developed and demonstrated expertise in the use of novel mouse models to study aspects of lipid metabolism, inflammation, and the gut microbiome. In addition, I serve as the Scientific Director of the Lipidomics Core within the New Jersey Institute for Food, Nutrition, and Health.

1. Burchat N, Akal T, Ntambi JM, Trivedi N, Suresh R, and **Sampath H**. SCD1 is nutritionally and spatially regulated in the intestine and influences systemic postprandial lipid homeostasis and gut-liver crosstalk. *BBA-Mol Cell Biol Lipids.* 2022 1867:159195. PMID: **35718096.**
2. Sharma P, Silva C, Pfreundschuh S, Ye H, **Sampath H**. Metabolic protection by the dietary flavonoid 7,8-dihydroxyflavone requires an intact gut microbiome. *Frontiers in Nutrition*. 2022. 9. PMID: **36061902.**
3. Sharma P, Wu G, Kumaraswamy D, Burchat N, Ye H, Gong Y, Zhao L, Lam YY, **Sampath H**. Sex-dependent effects of 7,8-dihydroxyflavone on metabolic health are associated with alterations in the host gut microbiome. *Nutrients.* 2021*, 13*(2): 637 PMID: **33669347.**
4. Simon H, Vartanian V, Wong MH, Nakabeppu Y, Sharma P, Lloyd RS, Simon H, Vartanian V, Wong MH, Nakabeppu Y, Sharma P, Lloyd RS, **Sampath H**. OGG1 deficiency alters the intestinal microbiome and increases intestinal inflammation in a mouse model. *PLoS One.* 2020;15(1):e0227501. PMID: 31935236.

Ongoing and recently completed projects that I would like to highlight include:

<u>Ongoing projects</u>

American Heart Association 20CDA35310305
Sampath (PI)
7/1/202 - 6/30/2023
Regulation of lipid metabolism by intestinal desaturases

1R01DK126963
Sampath (PI)
7/1/2021-6/30/2026
The role of intestinal SCD1 in regulating metabolic health

Rutgers University Internal Grant
Sampath (PI)
11/21/2022-11/20/2025
Nutrition in Cancer Therapy and Prevention

Recently completed projects

R00DK100640
Sampath (PI)
9/1/16-8/31/20
Role of oxidative DNA damage in the onset and progression of metabolic syndrome

Citations:

5. Burchat N, Akal T, Ntambi JM, Trivedi N, Suresh R, and **Sampath H**. SCD1 is nutritionally and spatially regulated in the intestine and influences systemic postprandial lipid homeostasis and gut-liver crosstalk. *BBA-Mol Cell Biol Lipids.* 2022 1867:159195. PMID: 35718096.
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7. Sharma P, Wu G, Kumaraswamy D, Burchat N, Ye H, Gong Y, Zhao L, Lam YY, **Sampath H**. Sex-dependent effects of 7,8-dihydroxyflavone on metabolic health are associated with alterations in the host gut microbiome. *Nutrients.* 2021*,* 13(2): 637 PMID: 33669347**.**
8. Simon H, Vartanian V, Wong MH, Nakabeppu Y, Sharma P, Lloyd RS, Simon H, Vartanian V, Wong MH, Nakabeppu Y, Sharma P, Lloyd RS, **Sampath H**. OGG1 deficiency alters the intestinal microbiome and increases intestinal inflammation in a mouse model. *PLoS One.* 2020;15(1):e0227501. PMID: 31935236.

B. Positions, Scientific Appointments, and Honors

Positions

2023 - present	Faculty mentor for Cancer Institute of New Jersey Cancer Metabolism and Tumor-Host Interactions T32 grant
2022 – present	Associate Professor (tenured), Department of Nutritional Sciences, Rutgers University, New Brunswick, NJ
2019 – present	Editorial Board, BBA-Molecular and Cell Biology of Lipids
2018 - present	Director of Lipid Analytic Core, New Jersey Institute for Food, Nutrition, and Health, Rutgers University, New Brunswick, NJ
2016 - present	Full member of Cancer Institute of New Jersey, New Brunswick, NJ
2016 - present	Assistant Professor, Department of Nutritional Sciences, and Resident member of New Jersey Institute for Food, Nutrition, and Health, Rutgers University, New Brunswick, NJ
2014 - 2016	Staff Scientist, Oregon Health & Science University, Portland, OR
2011 – 2014	Senior Research Associate, Oregon Health & Science University, Portland, OR
2009 - 2011	Post-doctoral Researcher, Oregon Health & Science University, Portland, OR
2002 - 2008	Graduate Research Assistant, University of Wisconsin-Madison, Madison, WI

Scientific Appointments

2023	*Ad hoc* reviewer, NIH Study Section Nutrition and Metabolism in Health and Disease (NMHD), February 2023
2022	*Ad hoc* reviewer, NIH Study Section Nutrition and Metabolism in Health and Disease (NMHD), February 2022
2022 - present	Associate Editor, *Lipid and Fatty acid Research Section -Frontiers in Physiology*
2021-2022	Review Editor, *Lipid and Fatty acid Research Section -Frontiers in Physiology*
2019 - present	Elected member of Scientific Steering Committee of International Conference on the Bioscience of Lipids (ICBL)
2019	Early Career Reviewer, NIH study section Integrative Physiology of Obesity and Diabetes (IPOD), June 2019
2019	OASIS Leadership and Professional Development Program Fellow, Jan-May, 2019
2010 - 2014	Elected member of Publications Board, The Obesity Society
2009 - 2012	Invited member, Public Information Committee, American Society for Nutrition
2009 - 2010	Invited blogger, American Society for Nutrition

Honors

2022	NJ ACTS Academy of Mentors Invited Member
2022	Rutgers University Board of Trustees Research Fellowship for Scholarly Excellence Award
2020	American Heart Association Career Development Award
2014	NIDDK K99 Pathway to Independence Award
2012	ASBMB/JBC Best thematic poster 'Obesity' award , ASBMB
2012	Post-doctoral Fellow Excellence Award, Oregon Health & Science University
2012	American Society for Biochemistry Travel Award, ASBMB
2011	American Heart Association Post-doctoral Training Award
2011	American Society for Biochemistry Travel Award, ASBMB
2010	Tartar Trust Award, Oregon Health & Science University Foundation
2009	Tartar Trust Award, Oregon Health & Science University Foundation
2006	Young Speaker Award – first place, 47th ICBL, Pecs, Hungary , ICBL
2006	Wisconsin Distinguished Graduate Fellowship, University of Wisconsin-Madison
2005	American Society for Nutrition Travel Grant
2005	American Oil Chemists' Society Award
2004	American Heart Association Pre-doctoral Training Award
2002	Vilas Fellowship, University of Wisconsin-Madison

C. Contributions to Science

1. **Endogenously synthesized monounsaturated fatty acids (MUFAs) are required for *de novo* lipogenesis.**

I demonstrated that the delta-9 desaturase, stearoyl-CoA desaturase-1 (SCD1), regulates the differential effects of diet-derived and endogenously synthesized fatty acids on *de novo* lipogenesis. Endogenously synthesized MUFAs are required for optimal maturation of the transcription factor SREBP-1c and subsequent induction of hepatic *de novo* lipogenesis, since these fatty acids are compartmentalized differentially upon synthesis by SCD1 in the ER membrane. This work has implications to the understanding of human obesity and metabolic disease and is germane to the lipid metabolism and dietary intervention studies proposed in this application.

a. **Sampath H**, Miyazaki M, Dobrzyn A, Ntambi JM. *J Biol Chem*. 2007; 282(4):2483-93. PMID: 17127673.

b. Miyazaki M, Dobrzyn A, **Sampath H**, Lee SH, Man WC, Chu K, Peters JM, Gonzalez FJ, Ntambi JM. *J Biol Chem.* 2004; 279(33):35017-24. PMID: 15180999.

c. Miyazaki M, Flowers MT, **Sampath H**, Chu K, Otzelberger C, Liu X, Ntambi JM. *Cell Metab.* 2007; 6(6):484-96. PMID: 18054317.

2. **Oxidative DNA damage modulates metabolic health and the intestinal microbiome.**

My work identified a novel mediator of metabolic health, namely the base-excision repair pathway for maintaining genomic integrity. I discovered a role for two different DNA repair enzymes in the regulation of body weight and adiposity. Mice deficient in either NEIL1 or OGG1, DNA base excision repair glycosylases that recognize and repair oxidative DNA lesions, are predisposed to obesity and other features of the metabolic syndrome. Work from my independent lab at Rutgers has demonstrated that animals with mitochondrially-targeted overexpression of OGG1 are significantly protected from diet-induced and genetically-induced obesity, due to alterations in mitochondrial structure and function. Furthermore, we have demonstrated that mice with the inability to repair oxidative DNA damage have significant intestinal dysbiosis, corresponding with their worsened metabolic health and intestinal inflammation. This work has identified persistent DNA damage as a novel modulator of cellular metabolism and has served to bridge two previously disparate areas of research, namely DNA repair and metabolism. These publications represent seminal works in this novel area of research and demonstrate my expertise in assessments of intestinal dysbiosis and inflammation proposed in this application.

a. Komakula S, Tumova J, Kumaraswamy D, Burchat N, Vartanian V, Ye H, Dobrzyn A, Lloyd RS, and **Sampath H**. *Scientific Reports.* 2018; 8(1):14886. PMID: 30291284.

b. Simon H, Vartanian V, Wong MH, Nakabeppu Y, Sharma P, Lloyd RS, Simon H, Vartanian V, Wong MH, Nakabeppu Y, Sharma P, Lloyd RS, Sampath H. OGG1 deficiency alters the intestinal microbiome and increases intestinal inflammation in a mouse model. *PLoS One.* 2020;15(1):e0227501. PMID: 31935236.

c. Vartanian V, Tumova J, Dobrzyn P, Dobrzyn A, Nakabeppu Y, Lloyd RS, and **Sampath H**. *PLoS One*. 2017; 12(7):0181687. PMID: 28727777.

d. **Sampath H**, Batra AK, Vartanian V, Carmical JR, Prusak D, King IB, Lowell B, Earley LF, Wood TG, Marks DL, McCullough AK, R Stephen L. Am J Physiol Endocrinol Metab. 2011; 300(4):E724-34. PMID: 21285402.

3. **Contribution of cutaneous lipids and thermogenesis to body weight regulation.**

As the largest organ in the body, the skin serves a whole host of functions, the most important of which is to act as a protective barrier between the organism and the external environment. This barrier function has two separate components: the permeability barrier and the antimicrobial barrier. The permeability barrier function of skin prevents heat and water loss across the skin's surface, thereby preventing dehydration and maintaining body temperature in homeotherms. However, the role of the skin in regulation of body weight has been understudied, at best. In a novel study using a skin-specific knockout of the delta-9 desaturase, stearoyl-CoA desaturase-1, I demonstrated that loss of sebaceous lipids in the skin results in excessive heat loss across the skin barrier due to increased local inflammation but results in striking protection against diet-induced obesity. These studies have direct relevance to assessments of the role of endogenous and exogenous lipids in modulating tissue inflammation and are therefore germane to the current application.

a. **Sampath H**, Flowers MT, Liu X, Paton CM, Sullivan R, Chu K, Zhao M, Ntambi JM. *J Biol Chem.* 2009; 284(30):19961-73. PMID: 19429677.

b. **Sampath H**, Ntambi JM. *Dermatoendocrinol*. 2011; 3(2):62-4. PMID: 21695013.

c. **Sampath H**, Ntambi JM. *J Biol Chem.* 2014; 289(5):2482-8. PMID: 24356954.

My Bibliography: https://www.ncbi.nlm.nih.gov/myncbi/1DApA9WyIW9QA/bibliography/public/