BIOGRAPHICAL SKETCH

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NAME: **Nagpal, Ravinder**

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

POSITION TITLE: **Assistant 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
Kurukshetra University, India	BS	4/2002	Life Sciences
Bundelkhand University, Jhansi, India	MS	5/2004	Microbiology
National Dairy Research Institute, Karnal, India	PhD	7/2008	Food & Dairy Microbiology
Juntendo University, Tokyo, Japan	Postdoctoral	5/2017	Pediatric Microbiome
Wake Forest School of Medicine, NC, USA	Postdoctoral	12/2020	Microbiome & Metabolism

A. Personal Statement

I am the director of The Gut Biome Lab at the Florida State University. My research investigates the role of the microbiome in aging-associated intestinal and neurocognitive health. Long-term goals are to identify dysbiotic pathobiome signatures (specific bacteria, fungi, metabolites) and discover novel nutritional/pharmacological interventions to prevent pathogenesis, foster homeostasis, and ameliorate gut health and neurodegenerative diseases including Alzheimer's disease. Besides, my research examines the role of early-life microbiome ontogenesis in long-term gut-brain health. I have >10-year experience in executing microbiome projects in murine models, non-human primates, as well as clinical cohorts of metabolic and neurocognitive disorders. I possess conceptual/technical expertise in high-throughput metagenomic/metabolomic workflows and downstream computational/statistical analyses. One of my fortes is my ability to team up multidisciplinary collaborations with experts in neuroscience, sepsis, gerontology, immunology, nutrition, and physiology, wherein I have altogether authored >110 peer-reviewed publications (>11,000 citations; h-index >50; i10-index >110) evidencing my aptitude to successfully manage microbiome-related projects. The current submission builds logically on my research program. My training, experience, and enduring research provides the expertise needed to accomplish the microbiome-related objectives, experiments and analyses proposed in this project.

Ongoing and recently completed projects:

Ongoing:

Florida Department of Health (FDOH #24A05)
Role: Principal Investigator Period: 3/1/2024–2/28/2026
Title: *Mechanisms of enteric pathobiome in Alzheimer's disease neuropathology*.

National Institute of Health NIH-NIAID (R01 AI173244-01A1)
Role: Co-Investigator (PI: Zafar MA) Period: 6/14/2023–5/31/2028
Title: *Mechanisms of Klebsiella pneumoniae gastrointestinal colonization*.

Florida Department of Health (23A02)
Role: Co-Principal Investigator (PI: Scheffler, J) Period: 2/1/2023–2/28/2027
Title: *A nutrition program to improve gut-brain health in older adults with mild cognitive impairment*.

United States Department of Agriculture (USDA-ARS #440658)
Role: Principal Investigator Period: 08/1/2021–12/31/2025
Title: *Prebiotic mechanisms of dietary pulses to ameliorate aging-associated dysbiosis*.

United States Department of Agriculture (USDA-ARS #447044)
Role: Principal Investigator Period: 09/1/2024–8/31/2027
Title: *Effects of dietary pulses on gut microbiome and metabolic health in young adults*.

US Environmental Protection Agency (EPA-G2023-STAR-C1)
Role: Co-Investigator (PI: Stanwood, G.) Period: 11/01/2023–10/31/2027
Title: The Bioecological Center for Rural Children's Health (BeRCH)

Florida Department of Health (24K08)
Role: Co-Principal Investigator Period: 3/1/2024–2/28/2027
Title: *Modulation of the gut-vascular axis by E-cigarette and menthol*.

Almond Board of California (USDA-regulated)
Role: Principal Investigator Period: 04/1/2022–7/31/2025
Title: *Effects of almond snacking on gastrointestinal health in adults with overweight or obesity*.

The Peanut Institute
Role: Principal Investigator Period: 08/1/2024–7/31/2026
Title: *Effects of peanut butter on gut and cardiometabolic health in school-age children*.

National Watermelon Board
Role: Principal Investigator Period: 06/1/2024–5/31/2026
Title: *Effects of watermelon intake on gut and cardiometabolic health in adults with overweight or obesity*.

United States Department of Agriculture (USDA)
Role: Co-Principal Investigator (PI: Cui, L) Period: 08/01/2023–07/31/2025
Title: *Impact of structural modification of pea (Pisum sativum L.) protein on human gut microbiota.*

United States Department of Agriculture (USDA)
Role: Co-Investigator (PI: Singh, P) Period: 09/01/2022–08/31/2026
Title: *VITEK-2 Compact to establish and enhance Microbiological and Antibiotic-Resistance Research.*

FSU Council for Research & Creativity (FSU-CRC)
Role: Co-Investigator (PI: Machin, D) Period: 01/01/2024–12/31/2025
Title: *The effect of probiotic supplementation on high-salt diet-induced arterial dysfunction*.

FSU Council for Research & Creativity (FSU-CRC)
Role: Co-Investigator (PI: Smith, K) Period: 06/01/2024–5/31/2025
Title: *Automated Hematology Analyzer to Enhance FSU's Biomedical Research Capabilities*.

<u>Recently Completed</u>:

Infectious Diseases Society of America (IDSA) Role: PI Period: 01/01/2022–6/30/2023
Title: *Microbial Pathogenesis in Alzheimer's Disease*.

Yakult Probiotics Research Laboratory (Tokyo, Japan) Role: PI Period: 01/01/2022–07/31/2023
Title: *Influence of maternal dietary patterns on neonatal gut microbiome and metabolic health*.

FSU Council on Research and Creativity (FSU-CRC) Role: PI Period: 06/15/2021–9/14/2022
Title: *Diet-microbiome-brain axis in Alzheimer's disease*.

Southern Shrimp Alliance (Florida, USA) Role: Co-I Period: 9/1/2021–12/31/2023
Title: *Microbiome-based methods for identification of the geographical region-of-origin of imported shrimp*.

Institute for Successful Longevity (FSU-ISL) Role: Co-I Period: 06/15/2021–09/14/2022
Title: *Effects of alcohol on aging-related sarcopenia: Role of the gut microbiome*.

B. Positions, Scientific Appointments, and Honors

Positions

2021 – Present Assistant Professor, Dept. of Health, Nutrition, & Food Sciences, Florida State University
2017 – 2020 Post-doctoral fellow, Wake Forest School of Medicine, Winston-Salem, NC
2012 – 2017 Research Fellow, Probiotics Research, Juntendo University School of Medicine, Tokyo
2011 – 2012 Assistant Professor (Microbiology), SUS College of Research & Technology, Mohali, India
2009 – 2011 Assistant Professor (Biotechnology), JMIT Institute of Engineering & Technology, India
2008 – 2009 Lecturer of Microbiology, Lovely Professional University, Jalandhar, Punjab, India

Scientific Appointments

2024 – Present Chair, Basic Science Research Group, FSU Institute for Successful Longevity (ISL)
2024 – Present Co-Director, FSU Center for Integrative Nutrition & Food Research (CINFR)
2023 – Present Affiliate, FSU Bioecological Center for Rural Children's Health (BeRCH)
2022 – Present Affiliate, UF Sepsis & Critical Illness Research Center (SCIRC)
2023 – Present Affiliate, Institute of Sports Science and Medicine (ISSM)
2021 – Present Visiting Associate Professor, Juntendo University School of Medicine, Tokyo, Japan

Society Membership

2021 – Present Infectious Diseases Society of America (IDSA)
2022 – Present The U.S. Shock Society
2019 – Present American Society for Nutrition (ASN)
2022 – Present International Union of Nutritional Sciences (IUCN)
2022 – Present International Association for Food Protection (IAFP)
2013 – Present International Scientific Association of Probiotics & Prebiotics (ISAPP)
2013 - Present International Probiotics Association (IPA)
2008 - Present Association of Microbiologists of India (AMI)
2016 - 2017 Japanese Societies for Developmental Origins of Health & Disease (J-DOHaD)
2015 - 2016 Pediatric Academic Societies (PAS)
2015 - 2017 European Society for Pediatric Gastroenterology, Hepatology and Nutrition
2009 - 2010 Asian Federation of Societies for Lactic Acid Bacteria (AFSLAB)

Ad-hoc Grant Reviewer

2022 - Present NIH National Institute of Environmental Health Sciences NIEHS
2022 - Present NASA National Postdoctoral Program
2022 - Present Czech Science Foundation (CSF)
2023 - Present Irish Research Council
2022 - Present National Science Foundation, Poland
2021 - Present Estonian Research Council (ERC)
2022 - Present Italian Science Fund (FIS)
2024 - Present National Research Foundation, France
2020 - 2021 Dutch Research Council (NWO)
2019 - 2021 Network for Canadian Oral Health Research (NCOHR)
2019 - 2021 Canadian Institutes of Health Research (CIHR)

Editorial Appointments

2024 - Present Associate Editor, *Frontiers in Microbiomes*
2022 - Present Associate Editor, *Frontiers in Nutrition*
2024 - Present Editorial Board, *Infection and Immunity*
2023 - Present Editorial Board, *BMC Microbiology*
2023 - Present Editor, *Microbiome Research Reports*
2021 - Present Scientific Reviewer, American Society for Nutrition (ASN)
2022 - Present Topical Advisory Board, *Nutrients*
2022 – 2023 Guest editor, *Molecular Psychology* (*Gut microbiome and the brain*)
2022 - 2023 Guest editor, *Nutrients* (*Pathways linking nutrition and aging with neurocognitive health*)
2021 - 2022 Guest editor, *Microorganisms* (*Diet-microbiome-brain axis in host health*)
2022 - Present Editorial Board, *Frontiers in Aging Neuroscience*
2019 - Present Editorial Board, *Frontiers in Systems Microbiology*
2018 - 2021 Editorial Board, *Antibiotics*
2017 - 2020 Editorial Board, *Recent Patents in Food, Nutrition & Agriculture*

Ad-hoc Journal Peer-Reviewer *(>175 manuscripts)*

Nature Communications; Cell Reports; Lancet Microbe; Gut Microbes; Microbiome; EBioMedicine; Advanced Science; Gut Microbiome; Annals of the New York Academy of Sciences; Journal of the American Medical Association (JAMA); Communication Biology; Journal of Alzheimer's disease; iScience; Clinical Nutrition; FEMS Microbiology; Scientific Reports; Clinical & Translational Medicine; mSystems; Nutritional Neuroscience; mBio; mSystems; Frontiers in Microbiomes; BMC Neuroscience; Translational Neurodegeneration; Molecular Neurodegeneration; mSystems.

Honors

2024 'Outstanding Graduate Teaching' Award nominee, Florida State University
2024 Young Investigator Travel Award, Infectious Diseases Society of America
2024 Dean's Circle Research Transition Incentive Award, Florida State University
2024 Dean's Academic Merit Award, Florida State University
2023 'Outstanding Undergraduate Advising' Award nominee, Florida State University
2023 Young Investigator Travel Award, Infectious Diseases Society of America
2022 Dean's Academic Merit Award, Florida State University
2022 Early Investigator Award, Almond Board of California
2022 Young Investigator Award, Infectious Diseases Society of America
2022 Nominated for the 'Outstanding Undergraduate Advising' Award, Florida State University
2022 Dean's Academic Merit Award, Florida State University
2021 Robert B. Bradley Library Research Award, Florida State University, Tallahassee, USA
2017 Paper of Distinction, European Society for Pediatric Gastroenterology, Hepatology & Nutrition, Prague
2016 Best Paper, European Society for Pediatric Gastroenterology, Hepatology & Nutrition, Greece
2012 Young Investigator Award, Yakult Microbiota and Probiotic Science Foundation, Bengaluru, India
2009 Best Paper Award, Indian Dairy Association, Goa, India.
2004-08 Senior Research (doctoral) Scholarship, Indian Council of Agricultural Research, India

C. Contributions to Science

1. **Dysbiosis, sepsis, and pathobiome in aging and Alzheimer's disease:** My research revealed microbiome markers that could help predicting Alzheimer's progression in patients with mild cognitive impairment and demonstrated benefits of a modified Mediterranean-ketogenic diet on gut as well as brain markers. Now, we are investigating how gut dysbiosis and its restoration may play a role in host aging-associated immune-senescence and neurocognitive decline.
   1. Park G, Kadyan S, Hochuli N, Salazar G, Laitano O, Chakrabarty P, Efron P, Zafar MA, Wilber A, **Nagpal R***. An enteric bacterial infection triggers neuroinflammation and neurobehavioral impairment in 3xTg-AD transgenic mice. *Journal of Infectious Disease* 2024; 230(Suppl_2):S95-S108 (PMID: 39255397).
   2. Park G, Munley J, Kelly L, Kannan K, Mankowski R, Sharma A, Upchurch G, Casadesus G, Chakrabarty P, Wallet S, Maile R, Bible L, Wang B, Moldawer L, Mohr A, Efron PA, **Nagpal R***. Gut Mycobiome Dysbiosis after Sepsis and Trauma. *Critical Care* 2024; 28(1):18 (PMID: 38212826).
   3. Munley JA, Park G, Kelly LS, Kannan KB, Mankowski RT, Casadesus G, Chakrabarty P, Wallet SM, Maile R, Bible LE, Wang B, Moldawer LL, Mohr AM, **Nagpal R***, Efron PA*. Persistence and sexual dimorphism of gut dysbiosis and pathobiome after sepsis and trauma. *Annals of Surgery* 2024; 280(3):491-503 (PMID: 38864230).
   4. Bouch RJ, Zhang J, Miller BC, Robbins CJ, Mosher TH, Li W, Krupenko SA, **Nagpal R**, Zhao J, Bloomfeld RS, Lu Y, Nikiforov MA, Song Q, He Z. Distinct inflammatory Th17 subsets emerge in autoimmunity and infection. *Journal of Experimental Medicine* 2023; 220(10):e20221911 (PMID: 37367944).

2. **Diet-Biome interactions in aging-associated gut and neurocognitive health:** Our research examines how specific dietary/nutritional factors modulate gut microbiome in preclinical models and clinical cohorts and how the modulation of this diet-microbe interface may ameliorate host intestinal and cardiometabolic health. In addition, I am investigating the molecular mechanisms underlying diet, microbiome and health interactions.
   1. Park G, Kadyan S, Hochuli N, Pollak J, Wang B, Salazar G, Chakrabarty P, Efron P, Sheffler J, **Nagpal R***. A modified Mediterranean-style diet enhances brain function via specific gut-microbiome-brain mechanisms. *Gut Microbes* 2024; 16(1):2323752 (PMID: 38444392).
   2. Dawson MA, Cheung SN, La Frano MR, **Nagpal R**, Berryman CE. Early time-restricted eating improves markers of cardiometabolic health but has no impact on intestinal nutrient absorption in healthy adults. *Cell Reports Medicine* 2024; 5(1):101363. (PMID: 38232698).
   3. Bray A, Broberg C, Hudson A, Vezina B, Hernandez G, **Nagpal R**, Wyres K, Wu W, Valencia J, Shahid F, Barnes A, Bennett E, Walker K, Young T, Ornelles D, Miller V, Zafar A*. Transposon mutagenesis screen reveals a critical role for the type VI secretion system of *Klebsiella pneumoniae* in overcoming microbiota-mediated colonization resistance. *Nature Communications, 2024* [Epub ahead of print].
   4. **Nagpal R**, Neth BJ, Wang S, Craft S, Yadav H. Modified Mediterranean-Ketogenic diet modulates gut microbiome and short-chain fatty acids in association with Alzheimer's disease markers in subjects with mild cognitive impairment. *EBioMedicine* 2020; 47:529-542 (PMID: 31477562).

3. **Microbiome-targeted prebiotic mechanisms of dietary fibers on cardiometabolic and neurocognitive health:** My research explores whether and how different prebiotics (fiber, resistant starch, and plant polysaccharides) alone or in combination with probiotics ('synbiotic' approach) may improve host health by ameliorating diet-induced gut dysbiosis, leaky gut, and intestinal and systemic inflammation.
    1. Kadyan S, Park G, Hochuli N, Miller K, Wang B, **Nagpal R***. Resistant starches from dietary pulses improve neurocognitive health via gut-microbiome-brain axis in aged mice. *Frontiers in Nutrition* 2024 11:1322201. doi: doi.org/10.3389/fnut.2024.1322201
    2. Kadyan S, Park G, Wang B, Singh P, Arjmandi B, **Nagpal R***. Resistant starches from dietary pulses modulate the gut metabolome in association with microbiome in a humanized murine model of ageing. *Scientific Reports* 2023; 13(1):10566 (PMID: 37386089).
    3. Kadyan S, Park G, Wang B, **Nagpal R***. Dietary fiber modulates gut microbiome and metabolome in a host sex-specific manner in a murine model of aging. *Frontiers in Molecular Biosciences*. 2023; 10:1182643 (PMID: 37457834).
    4. Kadyan S, Sharma A, Arjmandi BH, Singh P, **Nagpal R***. Prebiotic mechanisms of resistant starches from dietary beans and pulses on gut microbiome and metabolic health in a humanized murine model of aging. *Frontiers in Nutrition*; 2023, 10:1106463 (PMID: 36824174).

4. **Early-life elements of human microbiome ontogenesis:** My this line of research examines how early-life factors including mode of birth (vaginal versus C-section), mode of feeding (breast-feeding versus formula-feeding), antibiotics exposures and maternal dietary patterns influence neonatal microbiome and how these maternal-neonatal interactions further impact baby's gut health during childhood and adulthood.
    1. **Nagpal R***, Yamashiro Y. Gut microbiota composition in healthy Japanese infants and young adults born by C-Section. *Annals of Nutrition & Metabolism* 2018; 73: 4-11. (PMID: 30041174).
    2. **Nagpal R***, Tsuji H, Takahashi T, Nomoto K, Kawashima K, Nagata S, Yamashiro Y. Gut dysbiosis following C-section instigates higher colonization of toxigenic *Clostridium perfringens* in infants. *Beneficial Microbes* 2017; 8(3):353-365 (PMID: 28504574).
    3. **Nagpal R***, Kurakawa T, Tsuji H, Takahashi T, Kawashima K, Nagata S, Nomoto K, Yamashiro Y. Evolution of gut *Bifidobacterium* population in healthy Japanese infants over the first three years of life: a quantitative assessment. *Scientific Reports* 2017; 7(1):10097 (PMID: 28855672).
    4. **Nagpal R***, Tsuji H, Takahashi T, Kawashima K, Nagata S, Nomoto K, Yamashiro Y. Sensitive Quantitative Analysis of the Meconium Bacterial Microbiota in Healthy Term Infants Born Vaginally or by Cesarean Section. *Frontiers in Microbiology* 2016;7:1997 (PMID: 28018325).

5. **Probiotics to ameliorate gut dysbiosis and foster healthier aging:** Our research discovered novel probiotic strains from healthy infants and tested the effect of transplanting these strains into mouse models of aging and diet-induced obesity on host gut microbiome, intestinal permeability, insulin sensitivity, glucose tolerance and cognitive indices. In addition, we examined whether and how specific probiotic strains may influence host aging- and obesity-associated gut dysbiosis, leaky gut, inflammation and cognitive decline.
    1. Yadav H, Wang S, **Nagpal R.** 2023. Bacterial strain useful for treatment of age-related conditions. US Patent App. 16/947,866.
    2. Nataraj BH, Shashank Gowda BG, Kapila S, Arora S, Puniya AK, **Nagpal R**, Behare PV. Influence of exopolysaccharide EPSKar1-iron complexation on iron bioavailability and alleviating iron deficiency anaemia in Wistar rats. *Food & Function* 2023;14(10):4931-4947. PMID: 37158475
    3. Srivastava U, Nataraj BH, Kumari M, Kadyan S, Puniya AK, Behare PV, **Nagpal R***. Antioxidant and immunomodulatory potency of *Lacticaseibacillus rhamnosus* NCDC24 fermented milk-derived peptides. *Peptides* 2022; 155:170843 (PMID: 35878657).
    4. **Nagpal R**, Wang S, Ahmadi S, Hayes J, Gagliano J, Subashchandrabose S, Kitzman D, Becton T, Read R, Yadav H. Human-origin probiotic cocktail increases short-chain fatty acid production via modulation of mice and human gut microbiome. *Scientific Reports* 2018. 8(1):12649 (PMID: 30139941).

Complete List of Published Work in MyBibliography:

https://www.ncbi.nlm.nih.gov/myncbi/ravinder.nagpal.2/bibliography/public/