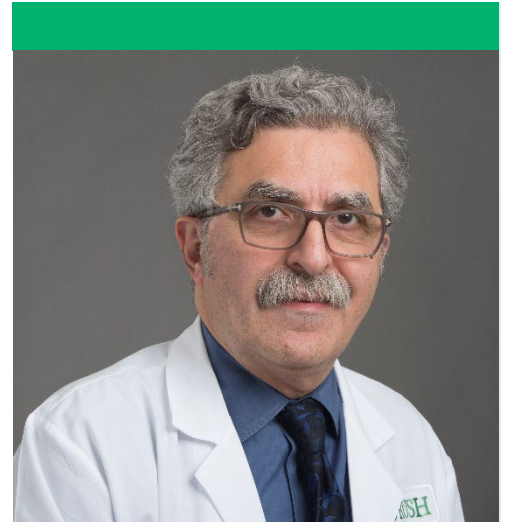




Ali Keshavarzian MD, FRCP, FACP, AGAF, MACG

The Josephine Dyrenforth Chair of
Gastroenterology



Advancement of Medicine

Since February 2021, I have been the director of the Rush Center for Integrated Microbiome and Chronobiology Research, a one-of-a-kind program that supports Rush's mission by integrating research, education, patient care and community partnerships.

The program promotes innovative research, collaboration, education, training and mentorship, develops pioneering approaches to patient care by employing a bench-to-bedside and bedside-to-bench approach, and conducts outreach programs to foster community partnerships that aid in clinical research and philanthropic efforts to sustain and grow the program.

Our innovative basic, translational and multidisciplinary research strategies help make Rush a leading academic health care system. We showed, for the first time, that patients with Parkinson's disease have leaky gut. We were one of the first to show that patients with Parkinson's disease and HIV and those who engage in excessive alcohol consumption have disruption of their intestinal microbiota, which could be responsible for disease progression in Parkinson's and HIV and organ damage in those who consume excessive alcohol.

We were the first to show modifying intestinal microbiota through prebiotics improved disease markers in patients with Parkinson's disease. We are one of the national leaders in showing the importance of circadian rhythm in management of patients with inflammatory bowel disease. Circadian and sleep hygiene are now part of our management of these patients, and other medical centers are following our lead. We are one of the world leaders in illustrating the importance of circadian rhythms on bone health.



Research

Our research resulted in 22 publications in 2023. We have another very important publication recently accepted that will bring the total for our program to 80 since February 2021. We received notice that one of our articles, published in 2022, was selected as the top downloaded paper on the topic of microorganisms. We had 11 abstracts accepted and presented at national and international conferences in 2023. These abstract presentations mainly cover projects carried out by fellows and students. These conferences provide valuable experiences for our future health care professionals.

Two PhD students, a post-doctoral fellow and a GI fellow rotated through our program during the 2023-24 academic year. Our GI fellow received funding to complete her master's degree and will carry out her project at the program. In addition, every week we welcome new master's students to our lab for a four-day rotation. Medical students can also shadow me in clinic and in endoscopy to determine if GI is a field they would like to pursue. If so, they can apply for summer research opportunities within our center's lab.

Clinical Trials

Your generosity supports our work toward publication in peer-reviewed journals, enables pilot studies where we collect data for grant submission, and gives the center's clinician-scientist faculty (Garth Swanson, MD, MS; Faraz Bishehsari, MD, PhD, AGAF; Robin Voigt-Zuwala, PhD; and myself) the protected time we need to continue with our research and teaching.

The program has 25 active grants and 12 pending grants. Funding received in 2023 is listed below:

- "Gut Microbiota-Mediated Inflammatory Interactions Between Alcohol Use Disorders and HIV Infection," NIH-NIAAA, 09/25/2023-8/31/2028.
- "Whole Food Fibers for Support of Key Gut Bacteria for Human Health," USDA-NIFA-AFRI, 05/01/2023-04/30/2026.
- "Personalized Organoid-Chip Model for Drug Testing in Pancreatic Cancer," NIH/NCI, 2/2023-2/2025.
- "Towards Precision Nutrition for Alzheimer's Dementia Prevention: A Prospective Study of Dietary Patterns, the Gut Microbiome and Cognitive Function," NIH/NIA, 2023-24.

- “The gut microbiome and personalized Mediterranean diet interventions for cardiometabolic disease prevention,” NIH/NIA, 2023-24.

Publication Highlights – Abbreviated

In 2023, our research was published in 22 major journals. My work has been cited over 40,000 times, according to Google Scholar. Below, we have listed our most cited works of 2023:

- “Gut microbiota dysbiosis in Parkinson disease: A systematic review and pooled analysis,” *European Journal of Neurology*.
- “Serotonin reduction in post-acute sequelae of viral infection,” *Cell*.
- “Colonic epithelial circadian disruption worsens dextran sulfate sodium-induced colitis,” *Inflammatory Bowel Diseases*.
- “Integrated multi-cohort analysis of the Parkinson's disease gut metagenome,” *Movement Disorders*.
- “An open label, nonrandomized study assessing a prebiotic fiber intervention in a small cohort of Parkinson’s disease participants,” *Nature Communications*.
- “The versatility and diagnostic potential of VOC profiling for noninfectious diseases,” *BME Frontiers*.

The Year Ahead: 2024 and Beyond

First, we will continue to complete studies outlined on our National Institutes of Health-funded projects. As noted, we have 25 current grants. Second, we will be carrying out a series of human studies/trials to leverage our basic science knowledge for Parkinson’s disease, colon/pancreatic cancer, HIV and COVID to determine whether gut-directed intervention can positively modify the clinical course of these diseases. Third, we will continue mentoring young faculty, GI fellows, and PhD, medical and master-level students rotating in our program. Finally, we will continue and expand our Parkinson’s/GI clinic (a unique clinic that manages our Parkinson’s patients with GI problems via a multidisciplinary team composed of Parkinson’s disease neurologists, a dietitian, a physiotherapist and myself).



With Gratitude

I want to express my thanks for your support. Your generosity has helped our group advance knowledge in the pathogenesis of multiple chronic diseases, such as Parkinson's, HIV and inflammatory bowel disease; several GI cancers (including pancreas and colon); and COVID-19. With your support, we saved lives through earlier diagnosis and prevention of complications associated with these diseases and improved patients' quality of life through better disease management. Our ability to generate critical pilot data to support our novel hypothesis led to successful submission of multiple grants. Our research is frequently cited in the most prestigious journals. The leadership role we play nationally and internationally is due, in large part, to the support provided by your endowment, which supports our basic, translational and clinical research. You help position our program as a national leader and enable my team to make new discoveries in diagnosing, treating and managing gastrointestinal conditions more effectively. These findings, as well as our other research projects, play a key role in enhancing our scientific understanding of gastroenterology.