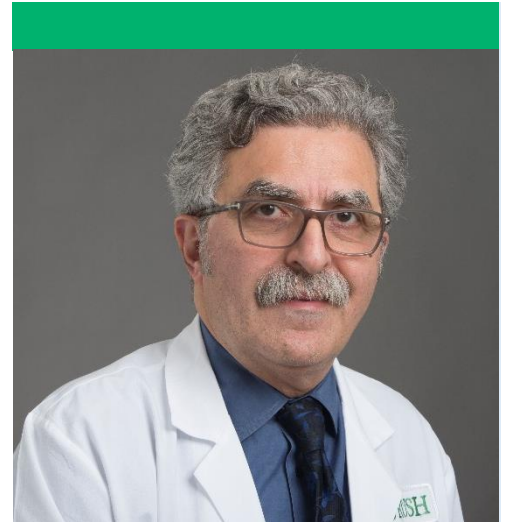




Ali Keshavarzian, MD, FRCP, FACP, MACG, AGAF

The Josephine Dyrenforth Professor
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, and education, training and mentorship. We develop pioneering approaches to patient care by employing a bench-to-bedside and bedside-to-bench approach. We also conduct 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. This disruption 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 that 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 inflammatory bowel disease. Circadian and sleep hygiene are now included in the treatment plan for 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 26 publications in 2024 and the first three months of 2025. We have another very important publication recently accepted that will bring the total for our program to 100 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 15 abstracts accepted and presented at national and international conferences in 2024. 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, one post-doctoral fellow, two master's-level students, and two GI fellows rotated through our program during the 2024-25 academic year. One medical student spent her dean-supported summer research rotation in our lab. Both GI fellows received funding to complete their master's degrees and carried out their projects in our center. In addition, every week we welcome new students to our lab for a four-day (for master's students) and 12-week (for PhD students) rotation. Medical students also shadow me in clinic and endoscopy to determine if GI is a field they would like to pursue. If so, they may apply for summer research opportunities within our 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 19 active grants and seven pending grants. Funding received in 2024 is listed below:

- "The Bidirectional Gut-Microbiota Axis in Parkinson's Disease: Integrating Mechanistic Biomarkers of Disease Severity and Progression." NIH-NIDDK, 08/15/2024-6/30/2029.
- "Center for Circadian Rhythms, Microbiota, Intestinal Barrier, and Alcohol-Induced Tissue Damage," NIH-NIAAA, 09/17/2024-06/30/2029.
- "The Microbiome-Gut-Brain Axis and Personalized Mediterranean Diet Interventions for Alzheimer's Dementia Prevention," NIH-NIA, 4/1/2024-3/31/2027.

- “Impact of Circadian-microbiome Interaction on Gut-Pancreas Axis in Aging,” NIH-NIA, 08/01/2024-03/31/2029.

Publication Highlights – Abbreviated

In 2024, our research was published in 26 major journals. My work has been cited over 40,000 times with an h-index of 106, according to Google Scholar. Below, we list our most cited works of 2024:

- “Distinct intestinal microbial signatures linked to accelerated systemic and intestinal biological aging,” *Microbiome*.
- “Outdoor nighttime light exposure (light pollution) is associated with Alzheimer’s disease,” *Frontiers in Neuroscience*.
- “Evidence that the loss of colonic anti-microbial peptides may promote dysbiotic Gram-negative inflammaging-associated bacteria in aging mice,” *Frontiers in Aging*.
- “Brain derived neurotrophic factor and treatment outcomes among veterans attending an intensive treatment program for posttraumatic stress disorder,” *Journal of Psychiatric Research*.
- “The Bidirectional Effects of Periodontal Disease and Oral Dysbiosis on Gut Inflammation in Inflammatory Bowel Disease,” *Journal of Crohn's and Colitis*.
- “Gut microbiome dysbiosis is associated with lumbar degenerative spondylolisthesis in symptomatic patients,” *JOR spine*.

The Year Ahead: 2025 and Beyond

First, we will continue to complete studies outlined on our National Institutes of Health-funded projects. As noted, we have 19 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 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 the 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.