Medical Xpress

Study identifies genetic link between inflammatory bowel disease and Parkinson's disease

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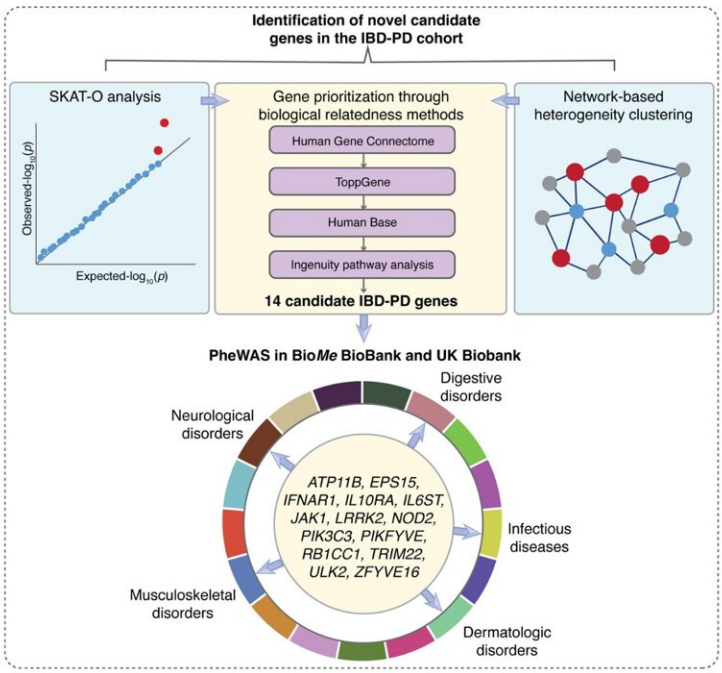

A new study from Mount Sinai identifies genomic mechanisms underlying both inflammatory bowel disease and Parkinson's disease. Credit: As published in Kars EM, Wu Y, Stenson PD, Cooper DN, Burisch J, Peter I , Itan Y. The landscape of rare genetic variation associated with inflammatory bowel disease and Parkinson's disease comorbidity. *Genome Medicine*, 2024;16:66. DOI: 10.1186/s13073-024-01335-2

Researchers at the Icahn School of Medicine at Mount Sinai have made a significant discovery, identifying genetic connections between inflammatory bowel disease (IBD) and Parkinson's disease (PD). Published in *Genome Medicine* on May 14, their study highlights the potential for joint therapeutic strategies to target these two challenging disorders. The paper is titled, "The landscape of rare genetic variation associated with inflammatory bowel disease and Parkinson's disease comorbidity."

The team, led by Meltem Ece Kars, MD, Ph.D., a postdoctoral researcher at The Charles Bronfman Institute for Personalized Medicine; Yuval Itan, Ph.D., Associate Professor of Genetics and Genomic Sciences; and Inga Peter, Ph.D., Professor of Genetics and Genomic Sciences at Icahn Mount Sinai, used advanced genomic analysis techniques to investigate the genetic overlap between IBD and PD.

Their findings point to mutations in the LRRK2 gene as a common element linking both conditions and identify novel genes that are likely to be affected in people experiencing both IBD and PD.

Dr. Kars explained, "We've found that IBD and PD are caused by certain shared genetic factors, including variants in LRRK2 and other genes previously unknown for this combined condition. This could dramatically change our approach to these diseases, allowing for therapies that target both conditions simultaneously."

The study analyzed data from the Mount Sinai BioMe BioBank, the UK Biobank, and a cohort of 67 patients diagnosed with both IBD and PD from the Danish National Biobank. This combined dataset enabled the researchers to explore high-impact rare genetic variants and identify new genes and biological pathways that contribute to the IBD-PD comorbidity.

"Our research not only links these two diseases genetically but also sets the stage for new forms of treatment, and potentially prevention strategies, that could lessen the burden of these diseases on patients," Dr. Kars said.

The researchers used a variety of computational methods to uncover significant associations between the LRRK2 gene variants and the co-occurrence of IBD and PD, including the network-based heterogeneity clustering approach, which they have demonstrated to be highly effective for gene discoveries in small cohorts that cannot be analyzed by traditional gene association methods.

Their analysis also revealed several pathways related to immunity, inflammation, and autophagy, the body's cellular recycling system, that are involved in both conditions.

These insights have potential implications across multiple areas of medicine, suggesting that understanding genetic factors could lead to better-targeted therapies. The study underscores the importance of genetic research in developing personalized medicine approaches that could improve treatment for patients with both IBD and PD.

The promise of these findings extends beyond current treatment paradigms. "By pinpointing the genetic underpinnings common to both IBD and PD, we pave the way for innovative treatments, whether through the development of novel drug targets or the repurposing of existing drugs, that could potentially tackle the root causes of these conditions," Dr. Kars said.

The results of this study could also influence future research directions, encouraging a more integrated approach to studying diseases that may appear unrelated but share common genetic pathways.

More information: Meltem Ece Kars et al, The landscape of rare genetic variation associated with inflammatory bowel disease and Parkinson's disease comorbidity, *Genome Medicine* (2024). DOI: 10.1186/s13073-024-01335-2

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