Researchers target gene to treat inflammatory bowel disease

21 June 2017, by Becky Freemal

Treatments targeting a gene known as NLRX1 could help provide relief to the estimated 1.6 million Americans currently suffering from inflammatory bowel disease. Credit: Virginia Tech

Researchers at the Biocomplexity Institute of Virginia Tech have discovered a new therapeutic target for inflammatory bowel disease—and it's right inside our immune cells.

The research at the Nutritional Immunology and Molecular Medicine Laboratory (NIMML), at the Biocomplexity Institute of Virginia Tech, targeted the gene known as NLRX1 as one that has potential therapeutic effects to aid in the treatment of gastrointestinal inflammation.

This investigation into how immunology and metabolism interface may hold critical answers for next generation nutritional immunology. The findings from the team's most recent research were published in the *Journal of Immunology*.

It's this sort of discovery that has the potential to customize healthcare for the individual, from personalized nutrition to precision medicine. The team uncovered new mechanistic insights into the role of NLRX1, targeting cellular metabolism and offering new therapeutic possibilities beyond traditional targets in autoimmune disease treatment.

"For decades, immunologists have applied reductionist approaches to studying the smallest details of the immune response without considering crucial system-wide interactions with nutrition and metabolism," said Josep Bassaganya-Riera, director of NIMML, a professor of immunology, and CEO of BioTherapeutics. "Our laboratory has built predictive computational and mathematical models and artificial intelligence pipelines capable of analyzing complex, massively interacting systems, including interactions between immunity and metabolism. This study not only elucidates novel mechanisms of immunoregulation in IBD, but it also validates transcriptomic and computational modeling studies that predicted the importance of NLRX1 in regulating gastrointestinal inflammation and its potential as a therapeutic target for infectious and immune-mediated diseases."

Due to an incomplete understanding of how NLRX1 works to decrease inflammation, scientific attempts to target this molecule as a treatment for the disease had previously stalled. The lab team's findings provide a deeper understanding of this gene's role in mucosal immunity and metabolism. This levels the playing field for both nutritional interventions that target NLRX1 and the development of NLRX1-based drugs.

"This seminal work, while impactful independently, sets the stage for the next lines of applied investigation on the role of NLRX1 in IBD," said Andrew Leber, scientific director of BioTherapeutics. "It highlights the need to understand not only the immediately relevant pathways for novel immunoregulatory genes, but their global effect on all of the cohesive metabolic and immunological processes within a cell, a goal that we will continue to pursue."

This work builds upon NIMML's successful track record in leading innovative transdisciplinary research at the interface of nutrition, immunity, and metabolism that dates back to its founding in 2002. The NIMML team has been involved in establishing spinoff companies that translate new scientific discoveries into the development of marketable products that address unmet consumer or clinical needs.

More information: Andrew Leber et al. NLRX1 Regulates Effector and Metabolic Functions of CD4T Cells, *The Journal of Immunology* (2017). DOI: 10.4049/jimmunol.1601547