Anti-Bin1 Treatment of Inflammatory Bowel Disease (IBD)

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Unmet Need

Inflammatory bowel disease (IBD), which includes ulcerative colitis (UC) and Crohn's disease, is a debilitating autoimmune condition that is clinically challenging to manage effectively. In the U.S., the CDC estimates that 1.3% of adults (about 3 million) have been diagnosed with IBD.

Many IBD patients are diagnosed early in life. As a result of chronic gut inflammation they experience higher risks of colorectal cancer. Presently, other than general suppression of immunity or inflammatory signals, there are few strategies to limit or prevent IBD flare-ups in a disease-selective manner.

Opportunity

The incidence of IBD in developed countries has been skyrocketing, and the disorder is now becoming a global disease in newly industrialized countries as societies become more Westernized in diet and other factors. The global market for gastrointestinal therapeutics is expected to grow from US $51.9B in 2016 to US $65.1 by 2025, according to the business intelligence provider Grand View Research.[1]

Unique Attributes

Building on their expertise in tissue barrier functions of the gastrointestinal tract, LIMR scientists developed an antibody-based therapy that inactivates Bin1, a membrane-associated molecule that facilitates gut inflammation in the setting of IBD. This therapeutic technology based on novel MOA tightens the poor gut-barrier function found in IBD patients, thereby attenuating multiple sources of inflammation that are associated with a leaky gut barrier.

The scaffold and signaling molecule Bin1 modifies stress and inflammatory responses of cells under stress. In genetic studies in mice, LIMR scientists discovered that Bin1 ablation dramatically attenuated colonic inflammation and risks of colon carcinogenesis. In exploring therapeutic directions to mimic this effect, they discovered a cell-permeable anti-Bin1 antibody that is safe and effective when delivered systemically in preclinical models of IBD. Human colon tissue studies confirm observations that antibody uptake is sufficient to tighten barrier function, as measured physiologically or molecularly at the level of tight junction protein expression. Accordingly, anti-Bin1 acts to tighten colon barrier function, coordinately reducing mucosal lesions, crypt loss, lymphoid follicle rupture, and infiltration of neutrophils and lymphocytes into mucosal and submucosal areas of the colon.

Clinical Applications

The LIMR mAb-based strategy offers potential uses to treat multiple types of IBD by the unique mechanism of action of tightening gut barrier function.

[1] Grand View Research, San Francisco. March 2018.

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Stage of Development

Current work is at a preclinical stage of development, including antibody humanization and ongoing mechanism of action and pharmacology studies.

Intellectual Property

US Patent 10,494,424, issued 3 December 2019. "Methods and Compositions for the Treatment of Diseases and Disorders."

Collaboration Opportunity

Optimization and humanization of murine anti-Bin1 mAb that alleviates IBD in preclinical models in vivo.

Published References

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