Targeting Leukocyte And Epithelial Chrfam7a For Anti-Inflammatory Therapies

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Technology description

Researchers at UC San Diego have demonstrated the existence of a novel therapeutic target, and method of use thereof, for anti-inflammatory treatment in particular leukocytes, as well as in mucosal epithelial cells, by altering expression and/or activity of CHRFAM7A, and/or other human-specific genes or taxonomically-restricted genes. The invention demonstrates the presence, identity, and differential regulation of the human-specific CHRFAM7A gene in human gut epithelial cells in vitro and is supported by clinical data that analyzed gene expression in over 30 patients with Crohn’ s disease and over 30 with active ulcerative colitis. Because α7nAChR ligands (e.g. nicotine) are differentially tied the development, progression and recurrence of human inflammatory bowel diseases, the invention exploits the discovery of a species-specific gene response that can differentially regulate gut epithelial function in humans.

There are over 300 human-specific genes that are not represented in the genomes of animals used to model complex human disease. The human-specific gene CHRFAM7A for example is expressed on leukocytes and epithelial cells and may gauge the inflammatory response in human cells. The promoter controlling CHRFAM7A expression is differentially modulated by inflammation and thus may represent a therapeutic target to modulate the inflammatory response. For example, because the neuroinflammatory response to infection, tissue repair and regeneration, is regulated by the α7-acetylcholine receptor (α7nAChR), the emergence of CHRFAM7A in humans may redefine how the human brain regulates the inflammation.

Additional Information

Related Materials

Xitong Dang, Brian P. Eliceiri, Andrew Baird, and Todd W. Costantini. CHRFAM7A: a human-specific a7-nicotinic acetylcholine receptor gene shows differential responsiveness of human intestinal epithelial cells to LPS. The FASEB Journal Vol. 29 June 2015. Published online February 13, 2015.

Application area

Applications are diagnostic and therapeutic. They include potential anti-inflammatory treatment for clinical diseases like sepsis, the systemic inflammatory response to injury, pancreatitis and cancer. Further applications include diagnosis, prevention and therapeutics of mucosal epithelium including sepsis, trauma injury, burn injury, inflammatory bowel disease, necrotizing enterocolitis, enteritis, infectious colitis, related diseases of epithelial barriers (otitis media) and epithelial cancers.

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