Title: Treating FcyR gene mutations can reduce symptoms of Mast Cell Disorders
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Mast Cell Activation Syndrome (MCAS) presents as rashes, asthma, increased heart rate, lowered blood pressure, hives, throat swelling, difficulty swallowing, cramping of the stomach, syncope, nausea, flushing of the skin, etc. Flares occur due to triggered mast cells when allergy cells release mediators, during connective tissue interactions, or atypical nervous cell signals. Often, MCAS reactions can be triggered by factors other than allergy related causes. Flares can be triggered by irregular nerve signals, surgical procedures, medications, heat, physical exertion, smoke, perfumes, fever, and stress. MCAS is categorized by recurrent and frequent immune system reactions due to a mutation of mast cells. MCAS can affect organ systems other than the skin, such as the gastrointestinal and cardiovascular systems. These overly sensitive mast cells reproduce identical mast cells that mass produce cells and spontaneously' discharge mediators (AAAI 2019). Mast cells are regulated by a receptor called Fc gamma receptor (FcyR) found in blood. An FcyR gene mutation could result in lack of regulation of mast cells, causing frequent flares. Moreover, Fc gamma receptors (FcyRs) are responsible for effector functions that help control mast cell reactions. This research suggests treatment for patients with MCAS, by increasing the frequency of FcyR genes, so that there will be more receptors to interact with immunoglobulin antibody's Fc fragments to regulate mast cells. Furthermore, through creating more FcyR cells, we can eliminate more mast cells though cytotoxicity or phagocytosis, to prevent an MCAS reactions.

Works Cited

Anania, Jessica C, et al. “The Rare Anaphylaxis-Associated Fc?RIIa3 Exhibits Distinct Characteristics From the Canonical Fc?RIIa1.” Frontiers in Immunology, Frontiers Media S.A., 20 Aug. 2018, https://www.ncbi.nlm.nih.gov/pubmed/30177930.

Frieri, Marianne. “Mast Cell Activation Syndrome.” Clinical Reviews in Allergy & Immunology, U.S. National Library of Medicine, June 2018, https://www.ncbi.nlm.nih.gov/pubmed/25944644.

Indik, Z K, et al. “Structure/Function Relationships of Fc Gamma Receptors in Phagocytosis.” Seminars in Immunology, U.S. National Library of Medicine, Feb. 1995, https://www.ncbi.nlm.nih.gov/pubmed/7612895.

Trotta, R, et al. “Fc Gamma R-Dependent Mitogen-Activated Protein Kinase Activation in Leukocytes: a Common Signal Transduction Event Necessary for Expression of TNF-Alpha and Early Activation Genes.” The Journal of Experimental Medicine, The Rockefeller University Press, 1 Sept. 1996, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2192797/.

“Mast Cell Activation Syndrome: AAAAI.” The American Academy of Allergy, Asthma & Immunology, https://www.aaaai.org/conditions-and-treatments/related-conditions/mcas.