

Can Leukotriene Modifiers and Mast Cell Stabilizers Decrease the Fatal Outcomes of Coronavirus?

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Human coronavirus infections can induce severe pulmonary pathologies but also typical symptoms of infectious diseases, including inflammation, high fever, cough and organ failures that might be fatal. Some of the immune cells (mast cells), which are located in the submucosa of the pulmonary tract, attack primarily to Coronavirus.¹⁻⁴ First, the virus activates mast cells and then certain chemical compounds are generated against the pathogen. Here, we develop a new idea that inflammation in patients with COVID-19 may be mitigated by both leukotriene modifiers and mast cell stabilizers. COVID-19 is frequent and the most of people's nasal secretions contain specific antibodies to decrease the infectivity of the Coronavirus. Cell-mediated immunity with allergy have not been studied well-enough in the literature, but it may play a crucial role in pathogenesis. While working to find a novel drug for COVID-19 or for the prevention of fatal coronavirus infections with a vaccine for future outbreaks, the discovering re-purposed both leukotriene modifiers and mast cell stabilizers to attenuate the effect of virüs to some extent may be achieved by new clinical trials. We must also prevent those of patients who are under threat of COVID-19 induced cytokine storms, which is often fatal among patients with COVID-19.² Physicians must first be aware of the possibility of both leukotriene modifiers and mast cell stabilizers, then make the diagnosis. With a proactive manner in medicine, we must specifically find a solution to the infected patients with overly active immune responses beforehand because of the outcomes from the overactive immune response can be deadly. One of the most important mechanisms underlying the deterioration of disease is cytokine storm.²

Angiotensin-converting enzyme 2 (ACE-2) inhibitor-induced angioedema could be a mast cell/histamine-mediated.³ Human pathogenic coronaviruses attach to epithelial cells through ACE-2 increased angiotensin-converting enzyme two and expression of ACE-2 in the lung, intestine, kidney and blood vessels facilitates infection. Some of the drugs that stimulate the expression of ACE-2 increase the risk of fatal COVID-19.⁵ Activated mast cells by viruses also promote the generation of many cytokines, which can release histamine and cytokines to initiate secondary effects on target cells. The precise mechanisms of mast cell stabilizers and leukotriene modifiers are still

not completely understood. Mast cell stabilizers affect pathways of several cell types, including mast cells, eosinophils, B cells and epithelial cells. Cromolyn, nedocromil, pemirolast and ketotifen have been shown to have additional anti-inflammatory effects on other cells.⁶ Leukotrienes are generated from arachidonic acid and then released or stored through many inflammatory cells. Leukotrienes were known to be in the center of bronchoconstriction and inflammatory response and they interact with surroundings as important mediators.

Many physicians experienced coronavirus infections during the pandemic and it is known that transmission from human to another one, with an incubation period (between 2 and 14 days).⁶ Immune cells, including covering mast cells in the submucosa of both the pulmonary airways and nasal cavity defense the patients against the Coronavirus infection.¹ So, if we could detect the infected people beforehand, we can begin both mast cell stabilizers and leukotriene modifiers to prevent a severe immune reaction, which could be a threat for older people. Here we provide a brief prevention and treatment strategy with both mast cell stabilizers and leukotriene modifiers. Owing to the lack of powerful medications and vaccines, the re-purposed drugs could be a solution to some extent.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to report.

ABBREVIATIONS

COVID-19: Coronavirus disease of 2019; **ACE-2:** Angiotensin-converting enzyme 2.

REFERENCES

1. Kritas SK, Ronconi G, Caraffa A, Gallenga CE, Ross R, Conti P. Mast cells contribute to coronavirus-induced inflammation: New anti-inflammatory strategy. *J Biol Regul Homeost Agents*. 2020;34(1):9-14. doi: 10.23812/20-Editorial-Kritas. Epub ahead of print. PMID: 32013309.
2. Wang J, Wang BJ, Yang JC, Wang MY, Chen C, Luo GX, et al. Advances in the research of mechanism of pulmonary fibrosis induced by Corona Virus Disease 2019

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- and the corresponding therapeutic measures. *Zhonghua Shao Shang Za Zhi*. 2020;36(0):E006. Chinese. doi: 10.3760/cma.j.cn501120-20200307-00132. Epub ahead of print. PMID: 32174095.
3. James C, Bernstein JA. Current and future therapies for the treatment of histamine-induced angioedema. *Expert Opin Pharmacother*. 2017;18(3):253-62. doi: 10.1080/14656566.2017.1282461. Epub 2017 Jan 25. PMID: 28081650; PMCID: PMC5515622.
 4. Wan Y, Shang J, Graham R, Baric RS, Li F. Receptor Recognition by the Novel Coronavirus from Wuhan: An Analysis Based on Decade-Long Structural Studies of SARS Coronavirus. *J Virol*. 2020;94(7):1-9. doi: 10.1128/JVI.00127-20. PMID: 31996437; PMCID: PMC7081895.
 5. Lauer SA, Grantz KH, Bi Q, Jones FK, Zheng Q, Meredith HR, *et al*. The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. *Ann Intern Med*. 2020;172(9):577-82. doi: 10.7326/M20-0504. Epub 2020 Mar 10. PMID: 32150748; PMCID: PMC7081172.

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