Innate immune response of Interferon β against SARS-CoV-2 infection

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Abstract

COVID-19 exhibits a global health threat among the elderly and the population with underlying health conditions. During infection, the host's innate immune response acts as a frontline of defense by releasing cytokines such as type I interferon (IFN α and β) thereby initiating antiviral activity. However, this particular interferon response is interrupted by factors such as SARS-CoV-2 non-structural proteins, aging, diabetes, and germ-line errors eventually making the host more susceptible to illness. Thus, the deficiency of type I IFN leads to poor innate immune responses in the host against SARS-CoV-2 infection, eventually leading to severe illness. Therefore, enhancing the host's innate immune response by administering type I IFN could be a key to prevent the host from COVID-19 severity. Several viral diseases primarily target the innate immune response to replicate and progress in the host. Intriguingly, COVID-19 severity was associated with a significantly low innate immune response. IFN β monotherapy would be an effective early-stage treatment option to prevent COVID-19 severity. For instance, SNG001, an IFN β product, is in phase 3 clinical trial against COVID-19 and its final data will reveal the efficiency of IFN β monotherapy. We evaluated here the importance of the innate immune response during SARS-CoV-2 infection and the molecular mechanism of IFN β-mediated antiviral activity against SARS-CoV-2 infection and concluded that the IFN β monotherapy as an attractive potent treatment option against SARS-CoV-2. Therefore, IFN β monotherapy-mediated enhancement of innate immune response could be a key component in future strategies to prevent large-scale viral disease outbreaks.

Image

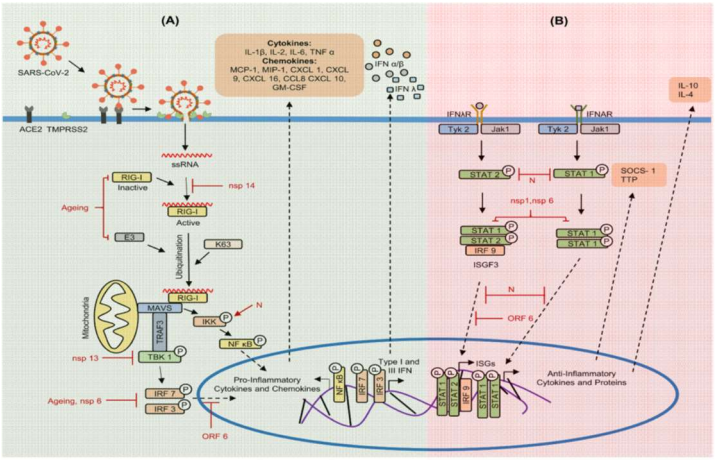


Figure 1: A proposed model of host innate immunity

Recent Publications

1. N. Chen, Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study, Lancet 395 (2020) 507–513.
2. CORONAVIRUS RESOURCE CENTER, Johns Hopkins Univ. Med (accessed June 1, 2020).
3. S.S. Jean, Treatment options for COVID-19: the reality and challenges, J. Microbiol. Immunol. Infect. 53 (2020) 436–443.
4. J.S. MacKenzie, COVID-19: a novel zoonotic disease caused by a coronavirus from China: what we know and what we don't, Microbiol. Aust. 41 (2020) 45–50.
5. Synairgen Research Ltd, Trial of Inhaled Anti-viral (SNG001) for SARS-CoV-2 (COVID-19) Infection, ClinicalTrials.Gov, 2020.



Biography

Suresh Kumar Kali has his expertise in infection immunology and passionate in improving translational research. His open and contextual reviews based on constructive evidence creates new pathways for improving therapeutics. He has articulated this review after years of experience in research and evaluation in education institutions. This review is peer-reviewed and published on international journal.

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