



## From COVID-19 to COVI-Flu: A Burgeoning Pandemic

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### Abstract:

Coronavirus disease 2019 (COVID-19), a respiratory illness caused by the novel betacoronavirus SARS-CoV-2, has rapidly caused a global pandemic. This viral infection has broad symptomatic presentations, ranging from asymptomatic to fatal. Studies have demonstrated that patients with severe symptoms and elevated pro-inflammatory (IL-1 $\beta$ , IL-6, IFN $\beta$ , and TNF $\beta$ ) and lower anti-inflammatory cytokine levels (IL-10) tend to possess a poor prognosis. Based on the available evidence, we proposed a mechanism by which SARS-CoV-2 infection causes systemic organ damage through IL-6-mediated inflammation. Elevated IL-6 fuels a cytokine release syndrome and hypoxia, resulting in vast systemic injury, multi-organ damage, and eventually organ failure. Additionally, we propose a potential synergism between influenza virus and SARS-CoV-2, which we termed “COVI-Flu.” Under our model, simultaneous infection with both viruses will cause a further increase in IL-6 production, which will yield more widespread systemic inflammation and injury than infection with either virus alone. Currently, there are no available safe and effective therapeutic interventions against SARS-CoV-2 or COVI-Flu. Based on the similarities between the disease mechanisms of SARS-CoV-2 and influenza virus, we proposed the idea of a combination therapy that can control the systemic inflammation induced by both viruses. One promising approach is a cellular therapy that has yielded promising preliminary efficacy in COVID-19 patients. Looking forward, we see combinational therapies being used that can better thwart the virus’s heterogeneity and mutational adaptations. In anticipation of the impending COVI-Flu pandemic

### Biography:

Yan Leyfman has contributed to the development of several anti-cancer therapies that have recently entered clin-



ical trials and his successes have been recognized by such prestigious organizations as the Barry M. Goldwater Research Foundation, Sigma Xi, New York Times, USA Today, National Society of Collegiate Scholars, and Harvard Medical School. He has been recognized as one of the top medical student researchers in oncology nationally by the American Society of Hematology and American Society of Clinical Oncology and locally by the Pennsylvania Society of Oncology & Hematology and the American College of Physicians. During the COVID-19 pandemic, he was recruited to join the Global COVID-19 Taskforce to serve as a Special Advisor for Immunology, Oncology and Cellular Therapeutics and was made Director of the Immunology Group, which produced a cohesive mechanism of action for SARS-CoV-2, a new prognostic assay to predict patient outcomes, and the first synergistic paradigm between the flu and SARS-CoV-2, termed “COVI-Flu” along with therapeutic interventions for both. Within days of publication ahead of print as the upcoming cover article in the journal, Shock, this manuscript received over 32 million views and was amongst the top five COVID-19 articles worldwide according to QxMD.

### Publication of speakers:

1. de Brito, R. C., N. Lucena-Silva, L. C. Torres, C. F. Luna, J. B. Correia, and G. A. da Silva. 2016. The balance between the serum levels of IL-6 and IL-10 cytokines discriminates mild and severe acute pneumonia. *BMC Pulm Med* 16: 170.

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