

Application for OVPR COVID-19 Seed Grant Program

Title of Research Project:

Interferon-lambda as a Broad-spectrum Antiviral Drug for COVID-19

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Summary

Coronavirus Disease 2019 (COVID-19) is an inflammatory illness caused by an emergent coronavirus, severe acute respiratory-CoV-2 (SARS-CoV-2). The COVID-19 pandemic has already claimed >74,000 lives world-wide, and there is an urgent need for agents that inhibit SARS-CoV-2 replication and transmission. Interferons (IFNs) are cytokines that are critical for immune defense against viral infections. IFNs are placed in three classes based on their distinct cell surface receptors. Type I IFNs (alpha/beta) and type II IFN (gamma) are FDA-approved for treatment of cancers and some viral infections but are contraindicated for treatment of COVID-19 patients due to their potent proinflammatory activity. Importantly, the recently identified type III IFN, IFN-lambda (IFN- λ), inhibits viral replication in lung epithelial cells but does not induce or exacerbate inflammation due to the limited tissue distribution of its receptor. We propose to evaluate the effect of IFN- λ on SARS-CoV-2 replication in cultured lung epithelial cells and a mouse model of infection. We hypothesize that IFN- λ will block SARS-CoV-2 viral replication in lung epithelial cells and may be used to treat COVID-19 patients and reduce viral transmission by SARS-CoV-2-positive individuals.