



Repurposing FDA-Approved Drugs for Use as Antivirals against SARS and MERS Coronavirus

Summary

Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) are viral respiratory diseases caused by novel coronavirus strains (SARS-CoV and MERS-CoV, respectively). Categorized as a select agent in 2012, approximately 9,000 cases of SARS have been reported, with 9.5% mortality rate. To date, there have been 1,917 reported cases of MERS with a 35% fatality rate. In response to the growing urgency for therapeutic interventions, UMB researchers screened 290 drugs for antiviral activity against SARS-CoV and/or MERS-CoV. Pharmacological classes of compounds were identified as showing antiviral activity against either or both MERS-CoV and SARS-CoV, with no or low toxicity. These pharmacological classes include neurotransmitter inhibitors, kinase signaling inhibitors, estrogen receptor inhibitors, DNA metabolism inhibitors, and anti-parasitic agents.

Key Investigator

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Field

Virology

Technology

Method of treatment
 Research tool

Advantages

Identified novel pharmacological classes with antiviral activity against Coronavirus

Status

Available for licensing
 Available for sponsored research

Patent Status

US 2017/0027975 A1
 WO 2015/157223 A2

UMB Docket Reference

MF-2014-090

External Reference

Sisk and Frieman (2015)
ACS Infect Dis. 1(9):401-402.

Market

These methods of treatment bring the field closer to addressing these emerging infections. The identification of these pharmaceutical classes of drugs with antiviral activity against Coronavirus may encourage and expedite the development of therapeutics for Coronaviral infections. Their diverse mechanisms of action can also help identify novel therapeutic targets and strategies not only against Coronaviruses, but potentially against viruses with similar pathogenesis.

Technology

The neurotransmitter inhibitors, kinase signaling inhibitors, estrogen receptor inhibitors, DNA metabolism inhibitors, and anti-parasitic agents shown in the figure, alone or in combination with the antiviral drugs shown in the same figure, can have a therapeutic effect against SARS and MERS as measured by *in vitro* antiviral activity assays and in *in vivo* rodent and non-human primate models of Coronavirus infection.

Technology Status

This technology has been tested *in vitro* and *in vivo* in rodent and non-human primate models of SARS and/or MERS Coronaviral infection.

Neurotransmitter inhibitors	Kinase signaling inhibitors	Anti-virals
<ul style="list-style-type: none"> chlorpromazine hydrochloride triflupromazine hydrochloride clomipramine hydrochloride thiethylperazine maleate chlorphenoxamine hydrochloride promethazine hydrochloride fluphenazine hydrochloride thiothixene fluspirilene benztropine mesylate 	<ul style="list-style-type: none"> imatinib mesylate nilotinib hydrochloride dasatinib <p>Estrogen receptor inhibitors</p> <ul style="list-style-type: none"> toremifene citrate tamoxifen citrate <p>Anti-parasitics</p> <ul style="list-style-type: none"> chloroquine phosphate hydroxychloroquine sulfate mefloquine amodiaquine dihydrochloride dihydrate 	<ul style="list-style-type: none"> interferon ribavirin adefovir tenofovir acyclovir brivudin cidofovir fomivirsen foscarnet ganciclovir peniclovir amantadine rimantadine zanamivir