

Nonstructural proteins of Novel Coronavirus (SARS-CoV-2)

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Coronaviruses (CoVs) are pathogens that infect a large variety of vertebrate animals, resulting in mainly respiratory and enteric diseases. An epidemic of severe acute respiratory syndrome (SARS) occurred in China in 2002, and the causative agent was designated as SARS-CoV. Ten years after the SARS outbreak, another highly pathogenic human CoV, designated as Middle East respiratory syndrome (MERS)-CoV, emerged in Saudi Arabia. Now, we face an epidemic of Novel coronavirus, (SARS-CoV-2). The nonstructural protein (nsp) 1 of SARS-CoV and MERS-CoV are the most studied among CoVs and are known to inhibit host gene expression by translational shutoff and host mRNA degradation. This two-pronged strategy of nsp1 inhibits expression of the IFN gene. Murine models of SARS-CoV have revealed that the dysregulated type I IFN response is a key factor for inducing lethal pneumonia. These accumulated data indicate that the nsp1 of CoV is a major virulence factor. We speculate that the nsp1 of SARS-CoV-2 has similar function to SARS and MERS-CoV.