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Abstract

RNA Topoisomerase and rRNA Methyl Transferases as Corona virus new molecular targets

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Abstract:

Invisible SARS-CoV-2 ~30kb single (+)-stranded RNA virus (120nm) has crossed limit by killing 1.5 millions and affecting 100 millions. Severe COVID-19 infection is more common in adults aged ~70 years and older and in individuals with co-morbidities such as hypertension, diabetes, cardiovascular disease, and chronic respiratory disease. Indian Government as well as other G-20 nations declared war against Corona virus. Corona virus has structural proteins (S, M, N, E) are derived from 3'- end of the genome. Unusual two large polyproteins are derived from 2/3 of 5' end of the genome and degraded into sixteen non-structural proteins (Nsp1-16). Nsp12 is RNA-dependent RNA polymerase which is target for drug remdesivir. Nsp3 and Nsp5 are proteases may be also candidates for drug and vaccine candidate. We predicted here corona-virus non-structural proteins like nsp2 RNA topoisomeras and Nsp9/13/14/16 rRNA methyltransferases as good peptide vaccine candidates and drug targets. Nsp2 as RNA topoisomerase was predicted by homology search with Vibrio haemolytica DNA topoisomerase I and VI as well as DNA gyrase, DNA primase and Trypanosoma brucei type1B DNA topoisomerase. Nsp13 was assigned as Rlm rRNA guanosine 2'-O methyltransferase as compared to mouse capping methyltransferase. Such enzyme was known as RNA helicase. Nsp16 was designated as RlmE 2'-O rRNA methyltransferase. Such non-structural proteins of corona virus may be good candidate for vaccine and drug candidate as well as for diagnostic purpose. RNA topoisomerase regulates RNA topology for viral mRNA synthesis. rRNA methyltransferase methylates ribosomal RNA of the ribosome and regulates protein synthesis. We predicted viral rRNA methyltransferase homology to ribosomal proteins also favouring mitochondrial rRNA methylation of host and may inhibit oxidative phosphorylation and ATP synthesis favouring coma, blood clotting and sepsis in corona-affected patients.

Biography:

Asit Kumar Chakraborty is working as Associative Professor and head of the Department of Biotechnology and Biochemistry, Vidyasagar University, India

Publication of speakers:

1. Asit Kumar Chakraborty, et al., "Cyclic enaminone as new chemotype for selective cyclooxygenase-2 inhibitory, anti-inflammatory, and analgesic activities," J of Pharmaceutical sciences & Drug Development; 2019 Feb 15;164:121-170.

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