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Chemical Moieties/Peptide Mediated Options for Combating Corona Virus: A Review

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Abstract The aim of this review is to understanding and finding the mode of a synthetic chemical molecule or peptide that could crack outbreak of human corona virus nCoV-19 (COVID-19) to some extent or you can say that selecting the best from what has been already tried. To fulfill this aim we started searching research / review article database of PUBMED. After comparing possible options of combating the problem, peptide intervention and synthetic moieties have been found that could break the outbreak of COVID-19.

Keywords: *corona virus, Covid-19, protease, ACE-2, pyrazolones*

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1. Introduction

Corona virus is well known threat peaking its crown again to world (till date about 172 countries have been suffering) in the form of nCoV-19 (COVID-19) during the current time of Dec. 2019-March 2020 (cont.) which was initially supposed to be emerged several years ago in different other forms like MERS-CoV (Middle East Respiratory Syndrome-Corona-Virus) and SARS-CoV (Severe Acute Respiratory Syndrome-corona-virus) with the few similar pathological symptoms but with great power of spreading infection to one another [1]. As the title of this review suggests, when we had dived to PUBMED for understanding and finding a synthetic chemical molecule that could crack this outbreak of human corona virus nCoV-19 (COVID-19) to some extent; we observed that very few research papers are available which can talk about its inhibition in the form of any chemical moiety or by piercing the protein / peptide related to it.

To fulfill our objective to a little extent, we have found some research papers which were shown to have tremendous work in this field but they were bound to limitation of a research manuscript only. This review is just a try to re-expose those particular published papers which may have potential to re-design the present global scenario which is becoming an unsolved puzzle for us.

2. Past Possibilities for Crack to Human Corona Virus

In 1987, Dörries R and co-workers analyze the CSF for immunoglobulins (virus specific) for intensity and site for clonal heterogeneity and synthesis. They studied Brown Norway rats for their humoral immune response which were primarily infected with antibody (murine corona virus JHM). They revealed that rats have control the intracerebral spreading of JHM viruses effectively with a strong virus-specific antibody response, which can prevent a clinically apparent disease [2].

In 2004, Jian-Ping Guo and team synthesized ten-amino-acid peptides (Cellulose membrane) having the sequences of SARS (severe acute respiratory syndrome); they probed the membrane with convalescent sera extracted from SARS recovered cases. They revealed that these sera have high SARS-CoV neutralizing effect, which may have major role in establishing the base for designing vaccines against corona virus [3]. After 4 years in 2008, Sarmistha Basak and co-researchers had again worked on peptides synthesis and evaluation to create SARS intervention. They revealed that the peptide segments (1153-1172) and (1164-1184) of HR-C3 and HR-C4 had great affinity on HR-N892-931 domain of peptide which may further lead to virus (SARS-CoV) infection intervention [4].

Now have a look on synthetic molecules, in 2009, Yoon-Suk Lee and his team synthesized 5-isoxazol-5-yl-20-deoxyuridines derivatives but **found no activity on Corona virus**, influenza virus and HIV [5]. It shows that isoxazol derivatives are not going to help us in present critical scenario. In 2010 again a research team of Krishnan Suresh Kumar worked on synthesis of Schiff bases of 2-phenyl quinazoline-4(3)H-ones and found **3-[(3-Hydroxy-benzylidene)-amino]-3H-quinazolin-4-one active against feline corona virus** (FIPV) [6].

It was also observed that **viral cysteine protease, SARS-CoV M^{pro} have major role** in management of

Corona virus mediated infection [7]. Another new clue has been depicted in 2011 by A. Kaparianos that there is a **role of Renin Angiotensin-II system, Angiotensin Converting Enzyme (ACE) and ACE-2 analogues in Acute Respiratory Distress Syndrome**; hence it may be useful in combat of Corona Virus related problems [8].

Again in 2011, a ray of hope has been occurred with the synthesis of 2-phenyl-3-substituted quinazolin-4(3H)-ones derivatives found with little activity against feline corona virus (FIPV); but **no sufficient clinical evidences** has been observed [9]. But in 2013, Mi Kyoung Kim and co-workers synthesizes **2-(3-Amino-4-piperazinylphenyl) chromone derivatives** and depicted that it has **corona virus (SARS-CoV)-specific antiviral activity** against severe acute respiratory syndrome [10]. In 2015, again a successful game has been played with 9-Residue Amyloid-Forming Peptide fragment of SARS Corona Virus E-protein to face it [11].

In 2019, Belén Martínez-Gualda and research team has worked on a new **series of Trp dendrimers containing divalent and tetravalent branched arms** and found significant **antiviral activity against pathogens such as human corona virus**, they also depicted that these dendrimers are the first members of such family that showed activity against human corona viruses [12]. Again in 2019, Ayman M. S. Ahmed and his team synthesized 4-arylhydra-zono-5-trifluoromethyl-pyrazolones and their ribofuranosyl & 50-deoxyribofuranosyl nucleosides; they found activity against MERS-CoV with EC_{50}= 4.6 µM [13].

3. Conclusion

Very few research papers are available which can talk about inhibition of COVID-19 in the form of any chemical moiety or by piercing the protein / peptide related to corona virus. We have found following decisive points:

1. Convalescent sera extracted from SARS-CoV recovered cases.
2. Quinazolin derivatives are active against feline corona virus (FIPV).
3. Viral cysteine protease, SARS-CoV M^{pro} have major role in management of Corona virus mediated infection.
4. Role of Renin Angiotensin-II system, Angiotensin Converting Enzyme (ACE) and ACE-2 analogues in Acute Respiratory Distress Syndrome (due to Corona Virus).
5. Chromone derivatives are found for corona virus (SARS-CoV)-specific antiviral activity
6. Trp dendrimers containing divalent and tetravalent branched arms are found with significant antiviral activity against pathogens such as human corona virus.
7. Pyrazolones derivatives and their ribofuranosyl/ 50-deoxyribofuranosyl nucleosides are found active against MERS-CoV.

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