Multimorbidity, Drug Combinations, Spike Epitopes and Fast Testing as Central Factors in COVID-19 Treatments

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Letter

Since December 2019 almost 20 million infected and 1000,000 deaths. Today we hear the at the USA president Mr. Donald Trump (age 74) has contracted the corona disease. The Hard acute breathing Distress Syndrome (SARS-CoV-2) has been reported worldwide. Even though Coronary artery disease (COVID-19) Respiratory complications Were the most common and life-threatening, there Frequent reports of central and peripheral nervous system (PNS) involvement.

It was thought that the elderly are more vulnerable to the disease, which turns out as wrong.

The global population of older people with contemporary ability is steadily growing. Multi-morbidity is the leading cause of complex polypharmacy, which in turn is the primary risk factor for giving an inappropriate prescription and adverse reactions and events. Those who register weaker and weaker older people are particularly prone to make prescription errors of various kinds. The causes of prescription errors in this patient population are multifaceted and complex, including the prescribers' lack of knowledge in the physiology of aging, geriatric medicine and geriatric medication, overdose often leading to large polypremacy, inappropriate prescriptions and inappropriate drug omission. This review examines the different ways to minimize prescription errors among older people with greater ability. Educational roles in prescriptions for physicians and clinical pharmacists, the use of implicit and explicit prescription criteria designed to improve drug compliance among older people, and the implementation of information systems and communication technology to minimize errors. Although evidence supporting any single prescription error prevention intervention in unilateral elderly is inconclusive or incomplete, the data published support prescription-focused geriatric drug education, routine STOPP / START application (Adult People Prescription Survey Tool). Treatment) Criteria for prescriptions that may be inappropriate, electronic records and close relationship between clinical pharmacists and physicians with respect to testing and reconciliation between structured medications. Conducting a structured drug review aimed at streamlining drug treatment in the patient population. This injury poses a major challenge. The challenge is to design, construct, validate, and test by clinical trials in multi-purpose and efficient software engines, respectively, that can quickly and quickly perform complex medical reviews among older people with a more significant number of morbidity. The EU-funded SENATOR and OPERAM clinical trials, which began in 2016, will examine the impact of custom software engines in reducing drug-related morbidity, avoidable overhead costs, and re-hospitalization in older people.[2]

Itwas recently reported that linear epitopes of SARS-CoV-2 barbed protein are

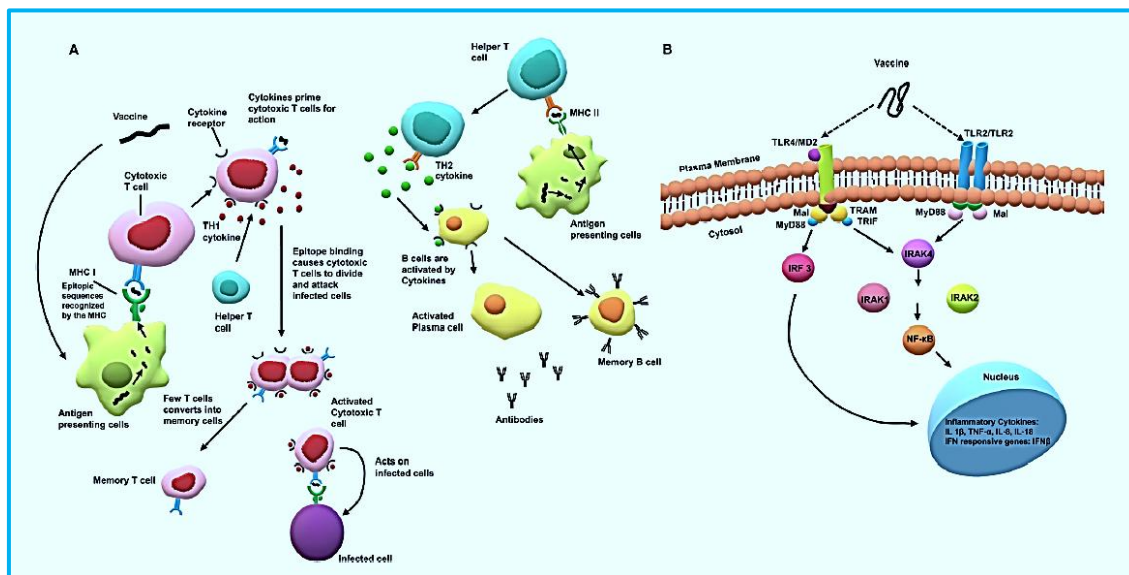induced Antibody neutralization in COVID-19 patients.[3]

Researchers from Bangladesh published a few years ago on the Design of an epitope-based peptide vaccine against spike protein of human coronavirus: an in silico approach [4].

The major route leading in many institutes on earth, is the mRNA-based vaccination. This pathway, based on the early protection of the corona virus on the mRNA molecule related to the spike protein, through the human sub cellular mechanisms, produces polypeptides exposed on the c3ell membrane, enhancing the immune response that exterminated the parasitic virus (SARS-COV-2).[1][5]

Effective antidotes against its recent emergence And rapid expansion of the new corona virus (SARS-CoV-2) require data development And tools to understand and monitor its spread and Immune responses to it. However, little information Available regarding immune response targets To SARS-CoV-2. We used the Epitope Immune database And Resource Analysis (IEDB) catalog Available data related to other viruses. It Includes SARS-CoV, with high sequence similarity To SARS-CoV-2 and is the most characterized Coronary virus in terms of epitope responses. We identified Several specific regions in SARS-CoV-2 There is high homology to the SARS-CoV virus. Parallel Bioinformatics forecasts have identified a priori potential B and T cell epitopes for SARS-CoV-2. The self-employed Identify the same areas using two Approaches reflect the high probability that these Areas are promising targets for vaccine recognition Of SARS-CoV-2. These predictions can make it easier Effective design of a vaccine against this high virus priority

A candidate multi-epitope vaccine against SARS-CoV-2

(A) The intended multi-epitope vaccine has the ability to activate both humor and cell-mediated immunity. The vaccine is processed in cells that display antigen (APC) and the antigenic epitopes are Recognized by MHC I receptors which further stimulate the cytotoxic T cell**)** Tc cell development). Tc Activating cells Cytokine production which causes cytotoxic T cells to divide and attack the infected cells. Operated TCells also differentiate into memory T cells. Similarly, the vaccine antigen is processed and presented in the context of MHC Class II molecule. B cells differ into plasma cells and memory B cells upon activation by cytokines**.** Furthermore, activated B cell or plasma cell produces the neutralizing antibodies responsible for cleaning infection. (B) TLR conversion pathway: Homodimer TLR 2 uses MyD88 and MAL as main NF-κB activators that trigger inflammatory cytokine secretion. TLR4 uses four main adapters I.e. MyD88, MAL, TRIF and TRAM for the secretion of NF-κB which in turn cause inflammatory cytokines Provision for the operation of the IF trac (credit ref[6]).
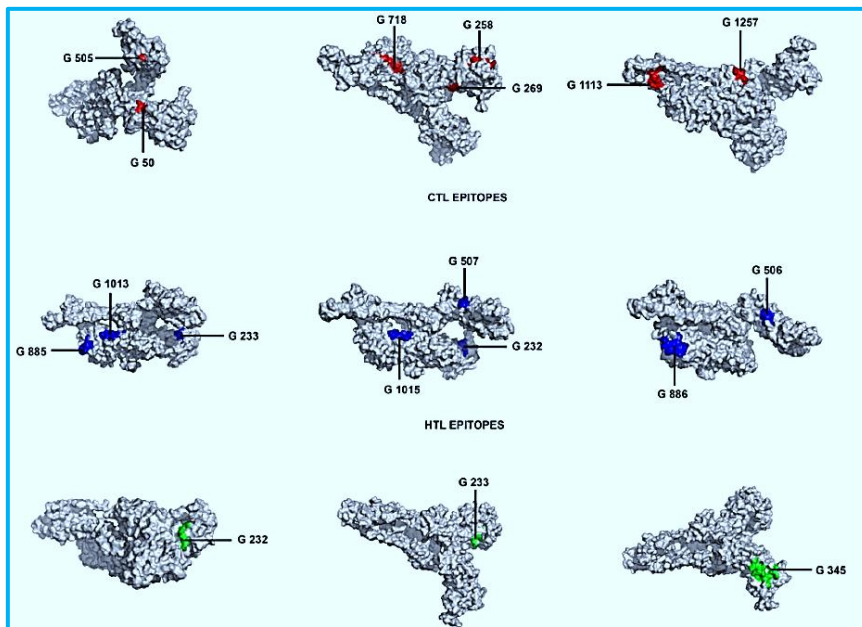
The barbed glycoprotein of SARS-CoV-2 mediates virus entry into the host cell and is one of the best cases Important antigenic factors, making it a potential candidate for vaccination. In this study we Plan a multi-epitope calculation using SARS-

CoV-2 glycoprotein calculation. God The candidate vaccine's overall quality was verified in a silico and molecular simulation Confirmed the stability of the intended vaccine. Docking studies have found stable interactions of Vaccination with toll receptors and MHC receptors. In silico cloning and codon optimization, the skilled expression of the vaccine was intended in the E. coli expression system. The efficacy of the vaccine candidate for activating an effective immune response was evaluated in a silico Immune simulation. The computational analyzes indicate that the planned multi-epitope vaccine is Stable in terms of which can cause specific immune responses and thus can be a potential vaccine Candidate against SARS-CoV-2.[6]

Tertiary structure of the spike protein with CTL epitopes marked by red colour, HTL epitopes are marked by blue colour and IFN-γ epitopes marked by green colour, showing their surface positions. (credit ref. [6])

Epitope based vaccine is a trend that develops in recent month dramatically. The idea that computer technology can be geared and elicit into the effort is many fascinating researchers. Bioinformatics analysis of epitope-basedb vaccine design against the novel SARS-CoV-2[7]

The genome sequence and protein sequences of SARS-CoV-2 were extracted from the National Center. To the Biotechnology Database (NCBI). ABCpred and BepiPred servers were used for consecutive B cells Epitope analysis. Continuous B-cell epitopes are predicted using the Disco Tope 2.0 program. IEDB server used For the calculation of peptides binding HLA-1 and HLA-2. Evaluation of immunogen characterized surface accessibility, antigenicity and other important properties Of the predicted epitopes. A total of 63 consecutive B-cell epitopes were predicted for Spike protein and 4 peptides showed a high antigenicity score and good surface accessibility. Ten Residues within a spike protein are contracts as constituents of non-contiguous B-cell epitopes. Bioinformatics analysis of peptides requires HLA Within a nucleocapsid protein produced 81 and 64 peptides capable of binding MHC Class I and MHC Class II Molecules. The peptides (Nucleocapsid66-75, Nucleocapsid104-112) is link ed to Spectrum of HLA-1 and HLA-2 molecules. Conclusions: B-cell epitopes on spike protein and T-cell epitopes within a nucleoside protein identified. Recommended for the development of a protective vaccine against SARS-CoV-2. A Sequence Homology and Bioinformatic Approach Can Predict Candidate Targets for Immune Responses to SARS-CoV-2[8].

Israel Acquired the First Right to a Fast and High-Quality Corona Test

This week, FDA approval was received and hundreds of test kits will make their way to Israel in about two months. • The quality and speed of the test are extremely important in the fight against Corona. Receiving the answer, this is a test with the highest accuracy percentages VISBY test kit

On the way to a quick corona test: One of the most difficult problems in dealing with the corona virus is the amputation of the transmission chains, which result, among other things, from the long time between performing the test and receiving its results. In various places around the world, rapid tests have been developed in recent months, but not always with satisfactory quality and success rates. In order to deal with the problem, Israel has in recent days signed with a company that produces fast and quality tests, the possibility of receiving them among the first in the world.

The VYSBY company that develops the product has received FDA approval and has signed a down payment with Israel in order to win tests quickly. It is estimated that the tests will arrive in about two months and will first be used by the medical staff and then by the general public.

Similar to tests performed today in Israel, this is a PCR test, during which a sample of fluid is taken from the nose that identifies the genetic material of the corona virus. According to the company, this is 96% accuracy. A very high percentage relative to a quick check.

The person who made the connection between the company's CEO Adam de la Zarta and Defense Minister Gantz was Minister Yizhar Shai. Defense Minister Gantz instructed the Special Operations Division, headed by A., to examine the system through the Biological Institute. Israel is working to obtain a license to produce such rapid tests itself, and several hundred test kits will land in Israel next week.[9]

References

[1] (a) Shimon Shatzmiller*, Inbal Lapidot, Galina Zats, Rami Krieger and Ludmila Buzhansky"; Modern vaccines -mRNA based technology- The great hope to eradicate and cure COVID 19; Med Clin Res, 2020 https://medclinres.org/ Volume 5 | Issue 8 | 41. https://medclinres. org/pdfs/ 2020/modern-vaccines-mrna-based-technology-the-great-hope-to-eradicate-and-cure-covid-19-mcr-20.pdf.

(b) Shimon Shatzmiller*and Rami Krieger," mRNA Technologies for the Combat with COVID-19"; https://medclinres. org/pdfs /2020/mrna-technologies-for-the-combat-with-covid-19-mcr-20.pdf.

[2] Amanda H Lavan, Paul F Gallagher, Denis O'Mahony (2016) "Methods to reduce prescribing errors in elderly patients with multimorbidity". Clin Interv Aging 11: 857-866. https://www.ncbi. nlm.nih.gov/ pmc/ articles/PMC4922820/

[3] Yang Li1, Dan-yun Lai, Hai-nan Zhang, He-wei Jiang, Xiaolong Tian, Ming-liang Ma, Huan Qi, Qing-feng Meng, Shu-juan Guo, Yanling Wu, Wei Wang, Xiao Yang, Da-wei Shi5, Jun-biao Dai , Tianlei Ying, Jie Zhou3 and Sheng-ce Tao," Linear epitopes of SARS-CoV-2 spike protein elicit neutralizing antibodies in COVID-19 patients"; Cellular & Molecular Immunology (2020) 17:1095 – 1097 / doi: https://doi.org/10.1101/2020.06.07.2 0125096

[4] Arafat Rahman Oany, bdullah-Al Emran, Tahmina Pervin Jyoti," Design of an epitope-based peptide vaccine against spike protein of human coronavirus: an in silico approach"; Drug Design, Development and Therapy 2014:8 1139–1149. **DOI** https:// doi.org/ 10. 2147/ DDDT. S67861

[5] "Inside the Company That's Hot-wiring Vaccine Research in the Race to Combat the Coronavirus "https://time. com/57 75784/coronavirus-vaccine-research/

[6] Tamalika Kar, Utkarsh Narsaria, Srijita Basak, Debashrito Deb, Filippo Castiglione, David M. Mueller & Anurag P. Srivastava ."| A candidate multi-epitope vaccine against SARS-CoV-2"; Nature, Scientific Reports | (2020) 10:10895 | https://doi.org/10. 1038/s41598-020-67749-1

[7] Hong-Zhi Chen, Ling-Li Tang, Xin-Ling Yu, Jie Zhou, Yun-Feng Chang and Xiang Wu," Bioinformatics analysis of epitope-based vaccine design against the novel SARS-CoV-2"; Chen et al. Infectious Diseases of Poverty (2020) 9:88https://doi.org/ 10. 1186/s40249-020-00713-3

[8] Alba Grifoni, John Sidney, Yun Zhang, Richard H. Scheuermann, Bjoern Peters, Alessandro Sette," A Sequence Homology and Bioinformatic Approach Can Predict Candidate Targets for Immune Responses to SARS-CoV-2"; 2020, Cell Host & Microbe 27, 671–680 April 8, 2020 ª 2020 Elsevier Inc. https://doi.org/10.1016/ j.chom. 2020.03.002

[9] (a) https://www.mako.co.il/news-lifestyle /2020_q4/Article-851a 8af819 2f4710 27. htm?sCh=31750a2 610f26 110& pId= 17 3113802

(b)https://nocamels.com/2020/04/hebrew-university-scientists-fast-covid19-test/