

## **“The pandemic of SARS-COV2: an insight on Pandemic preparedness with the means of Human Psychology and Hybridoma technology”**

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### **Introduction**

The most recently discovered corona virus was held accountable for corona virus disease (COVID-19) and the pandemic henceforth. Metropolitan cities are at the center of this bubonic plague, as they have been during so many plagues in history. New York has become the world’s gloomy, most dreary viral hotspot. The corona virus came into view in Wuhan, a city of 10.9 million people in China's Hubei zone’19.

Corona viruses are a hefty family unit of viruses which may be the root cause for frailty in animals or humans. In *Homo sapiens*, corona viruses are renowned to source and cause respiratory tract infections sorting from the familiar common cold to severe unremitting ailments such as SARS- Severe Acute Respiratory Syndrome and MERS- Middle East Respiratory Syndrome. COVID-19 - contagious ailment caused by the most recently discovered SARS-COV-2 virus. This brand new infection and disease were unidentified before the flare-up started in Wuhan, China, in December 2019. COVID-19 is presently a bubonic and devastating plague, upsetting numerous nations around the world.

The fundamental clinical signs of SARS-CoV-2 patients are fever ( $\geq 38^{\circ}\text{C}$ ), dry hack & cough, low or ordinary white platelet check, and low lymphocyte (white blood cells) tally, known as novel NCIP- novel corona virus-infected pneumonia or COVID19- corona virus disease 2019.

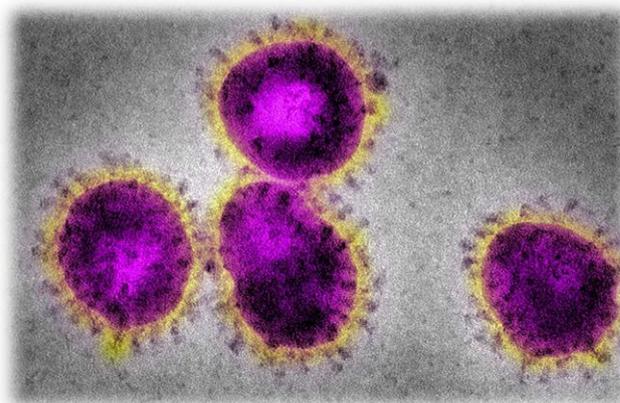
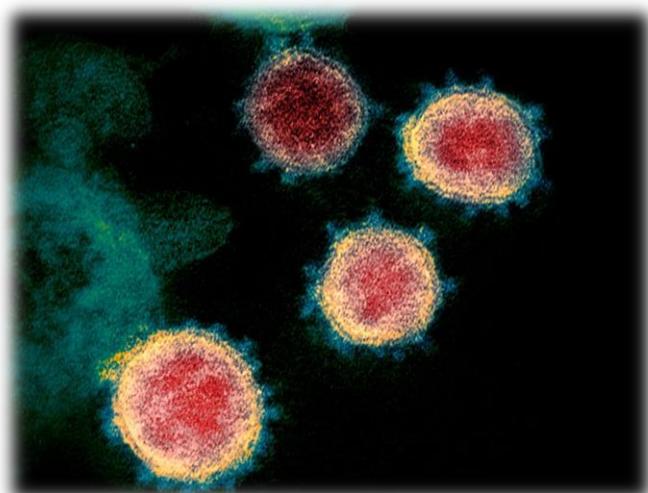


Figure 1 : Microscopic view of the Corona virus.

**Project summary**

The emergence of an exceedingly pathogenic human Corona virus in the Middle East has sparked novel concern in human corona viruses around the world. Standing today we know all the precautions that are to be followed during this pandemic situation, we all know the general symptoms about the outbreak of the Covid-19, but the specific treatment remains undiscovered. Covid-19 has been more severe and detrimental with patients with previously compromised immunity. The current project is going to focus on the various ways of detection, treatment and prevention procedures to eradicate corona virus and to give a future insight on some novel ways to fight the pandemic strongly supported by research analysis. The project will also cover the ongoing research work and further advancements on this field regarding SARS-COV-2 virus.

**Keywords:** covid-19, bioinformatics, SARS-COV-2, human psychology, red biotechnology, pandemic preparedness, novel corona virus, transmission, immune response, vaccine, hybridoma.

**Objective**

Ongoing flare-up of novel corona virus infected and executed a huge number of individuals on the planet. As of now there's so much that we don't know about this viral infection- it's the study of disease transmission or epidemiology, its transmission models and prototypes, who is actually the vulnerable individual or population that is affected truly. It is scientifically observed and researched at this point in time that grown-up older individuals, previously immune-compromised individuals, individuals with other medical conditions seem to be the ones who are infected the most by the relentless viral disease. The rapid testing kits that have been produced and used are found to be faulty, ongoing plasma treatment shows no future and are dependent on other affected patients, several failed attempts for production of a vaccine are prevailing and many other problems that are causing a barrier to combat SARS-COV-2.

This paper presents several COVID-19 combat strategies for India based on inspection, scrutinization of data & records on the disease, stratagem of different other countries which have attested & established successful containment and scientific research which proffers reasonable, rational and logical models for future itinerary of the pandemic. It deals with the production of successful hybridomas in the medicinal field that have been talked and researched upon. Quick and reasonable approaches in finding gene vaccines, peptides or antibody sequences that can restrain the viral epitopes of SARS-COV-2 will save the whole world. This proposed experimental assay will be an essential contribution towards - "Red Biotechnology" , psychological parameters that are less talked upon and towards greater benefit of the world.

### **Origin of the proposal**

The COVID-19 corona virus has, from the earliest starting point, attracted correlations with the 2002–03 flare-ups of MERS and SARS. The SARS corona virus was found to have jumped to people from civet cats that had picked it up from bats. The COVID-19 infection, called SARS-CoV-2, is additionally thought to have originated from bats, either straightforwardly or through a so far unidentified warm blooded creature. Both infections caused turmoil and monetary catastrophe. Be that as it may, the two flare-ups have advanced in an unexpected way, particularly in the speed and degree of spread.

The origin of the proposal came from several failed research attempts on novel corona virus. The treatments are effective but are exceedingly time consuming and are not sustainable for future uses. The corona virus is a RNA virus and therefore highly mutating and thus the production of vaccines are very intricate and complex. Targeting a single epitope is not enough and thus multi epitopic vaccines are the need of the hour. SARS-CoV-2 utilizes its receptor binding domain (RBD) on the spike protein to bind to the host's angiotensin-converting enzyme 2 (ACE2). Consequently, the SARS-CoV-2 vaccine can be developed targeting the structural proteins, and in particular, the RBD region, following the strategy for the SARS-CoV vaccine development. An idyllic vaccine should enclose equally B-cell epitopes and T-cell epitopes, with amalgamation of which vaccine is competent to either induce precise humoral or cellular immune response in opposition to the pathogens competently.

The concept of production of antibodies for a specific disease is already present and for covid-19 the antibody production has been already started on transgenic mice but to get a sustainable and stable treatment this experimental assay for production of hybridomas came into existence in my head. This idea can be escalated for, fabricating successful hybridomas and other probable novel insights to human psychology and behavioral science approaches to combat the epidemic.

### **Importance of the proposed project**

The history isn't encouraging. Over the past two decades, two other deadly corona viruses have been leaping from animals to humans, an Ebola outburst killed more than half of those it infected, and a beckon of Zika infections debilitated babies before they were even born. There's no assurance that corona virus will be different, but scientists internationally have been moving prompt. Researchers in China quickly offered its genetic sequence, giving other scientists a quicker start in the trail for treatments and vaccines. There are more than 92,000 people infected and 3,500 dead worldwide from the virus, which broke onto the world stage less than three months ago.

Even the best health systems like that of Italy have crumbled when they faced a run and got overwhelmed due to community transmission leading to a deluge of cases requiring hospitalization. India is least prepared for handling such an outpouring. Hence our best line of attack is practical containment and preclusion of community spread.

Hence witnessing the deplorable condition of the patients and number of affected people there is an urgent need for improved medical solutions to combat Covid-19, we need a proper pandemic preparedness which is based on human psychology and behavioral science, a sustainable treatment that can eradicate the problem from the root. Some research advancements that took place in the field of medicine and drug needs to be tested in practice and faster. This project is immediately required to save the lives, to save the world from the pandemic.

### **HUMAN PSYCHOLOGY ON A PANDEMIC**

In less than two decades into the 21st century, the world has already been a spectator to plentiful large scourges or epidemics. Challenges emerging from pandemic infectious ailment outbreaks can be more efficiently dealt if conventional public health is improved by sociology and human psych. No pandemic has ever been responsible alone; it has always been associated with multiple societal and psychological factors that escalate the problem.

A pandemic not only affects the medical structure of a country but it also affects the economy, quality of life and has a psycho-social upshot on global landscape. The focus is usually on biomedical facets, the surveillance and sentinel organization for infectious contagions, and what needs to be done to bring outbreaks under control swiftly by understanding the underlining psychology behind it. Social factors linked with infectious disease outbreaks are habitually deserted and the repercussions are ignored. These factors can impinge on epidemic severity, its pace and degree of reach, influencing the wellbeing of victims, their kin's, and their communities. After the pandemic of SERS, MERS & AIDS there are many changes that have been made but the pandemic preparedness of India has always taken a back seat because psychological parameters were never considered in combating a pandemic, in recent times of corona pandemic some reforms were made taken into considerations of the mental health.

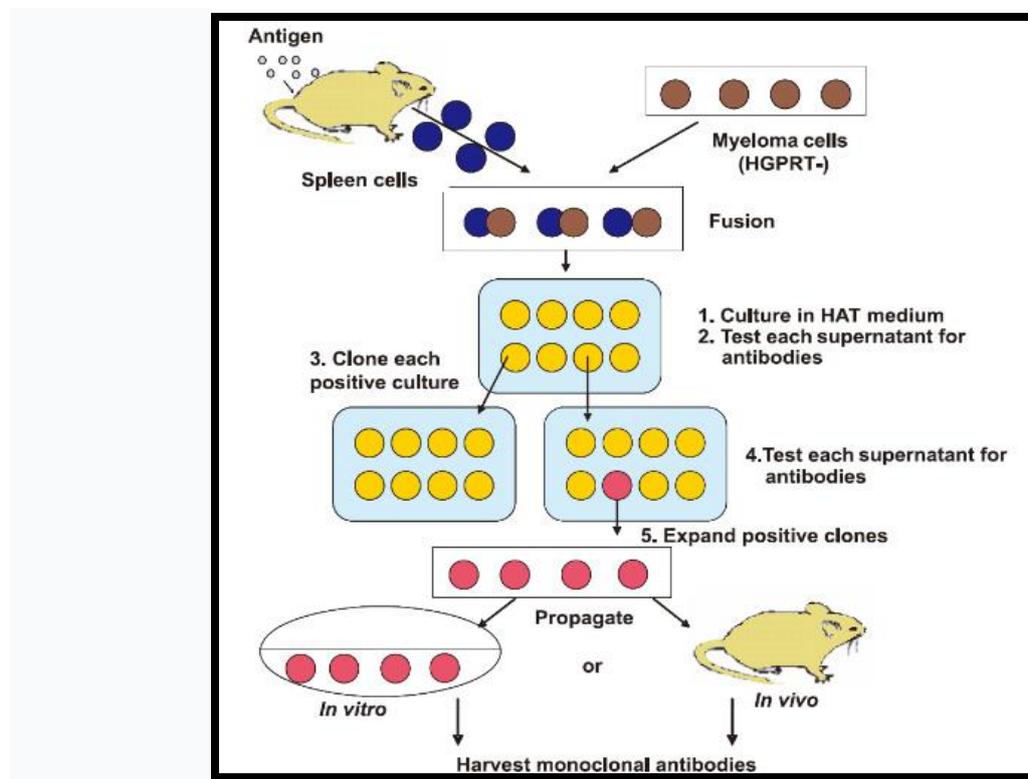
Human psych & behavior is decided and guided by manifold factors in individuals and also the surrounding environment. Most of the worldwide pandemics that we've faced involved a high degree of uncertainty and insecurity. While human behavioral responses to the spread of an epidemic have often been reported anecdotally, there has been relatively little systematic investigation into how behavioral changes can affect disease dynamics. These factors transpire at the micro-level (molecular and biological) and also the macro-level (societal and environmental) and sometimes interconnect in communally mutual associations. Human behavior plays an indispensable role within the spread of contagious diseases and an epidemic that's shrouded with uncertainty, and understanding the influence of behavior on the spread of diseases are going to be key to spice up our pandemic preparedness. Playing a blame game will be really easy in the times of a pandemic by blaming one country or national policies to be the root cause, but our government is trying it's level best to improve the medical facilities, it is also focusing on boosting and strengthening our moral support by promoting novel and innovative ideas fabricated by the youth to combat the crisis of pandemic and lockdown.

Preparation for any pandemic could be a knotty and complex responsibility which involves many collaborators, sectors and different strata of the overall public. There must use caution training and dexterity among all stakeholders, undertaken in a very fully transparent and comprehensive manner, so as to certify equitable & impartial allocation and optimal take pleasure in limited supplies of antiviral drugs and vaccines. The feeling of uncertainty and stress is very natural because currently the people are fighting with something that has no restoration or restitution and we all don't know when it will be eradicated completely. We are constantly struggling with the unknown, where everything is at stake. It is not about any specific pandemic but it is for all the pandemics that we have faced till now. This hassle and ambiguity is being instigated with all the plethora of misinformation and the facts are shrouded with a mist of counterfeit gossip, thus leading to be considered as an infodemic in the digital era. It is also healthier to distance and detach from the social media to thwart 'information pollution'. Rumor mongering is exceedingly detrimental as misinformation and half-truths can have disadvantageous effects on public health. One nonsensical forward can elicit or escalate a spill of disparaging reactions, if in erroneous hands and especially during catastrophe or a pandemic like this. Idyllically, 'social distancing' is a misnomer and should be reinstated by 'physical distancing'. Reciprocated mutual support can fortify emotional connections and acquaintances, which in turn facilitates surviving, coping and positivism. Such a predicament is the preeminent time to amplify our pliability via societal integration and human values & ideals. The deterrent measures need to be pursued and advocated always. The state of affairs in our nation can get potentially shoddier as time passes by. The epidemic must be managed as a contrivance for enhancing and embracing societal community bonds, combating misinformation, recognize the key role of journalism in catastrophe and at last appreciate the significance of public health sector and therefore the necessity for amalgamation of mental well-being I.e. being psychologically well as well as physical-well-being. Keeping one's mind free from all the stress, strain and insecurity amidst all the hazards in the environment is the goal that is to be set, which is difficult but not impossible. At least this we can do for all the public care workers, sweepers, and medical staff working in the frontline risking their life for all of us. The wisdom learnt after overcoming this pandemic, the bitter experiences might make us operational- both psychologically and collectively with the society, for such crises of future times- thus making us pandemic prepared.

### **Consideration for Hybridoma Technology**

Hybridoma technology is an entrenched method to fabricate monoclonal antibodies (mAbs) precise to antigens of concern. A hybridoma is a hybrid cell attained by union of B lymphocyte with usually a tumor cell of antibody forming system or b lymphocyte,(these are called myelomas). The hybrid cell consequently formed posses aptitude to fabricate antibodies due to B lymphocyte genome and the competence for the indefinite growth in vitro due to tumor(myeloma)cell involved in the fusion. Therefore, precise hybridomas are either cultured in vitro or passed through mouse peritoneal cavity to obtain monoclonal antibodies, this is called as hybridoma technology.

The complete genome sequencing was previously conducted by China which paved and cemented the path for production of antibodies and vaccines, which is available under the accession number of MN908947 in the NCBI database. Gene and membrane protein sequences were also obtained from the annotation easily.



**Figure 2: Production of hybridomas**

1. Isolating spike protein and other proteins that are absolutely indispensable and identified for SARS Cov2.
2. Inserting them into the transgenic mice
3. Produces desired antibodies
4. Collection of the antibodies and then fusing with myeloma cells.

Generating hybridomas which can be used to treat the patients

While numerous researchers are developing and fabricating impending vaccines and approaching immunizations, Italian scientists have asserted and researched to potentially develop a vaccine that has lucratively produced antibodies in mice (transgenic) that work efficiently on human cells. It is said to be one of the most sophisticated stages of testing of a prospective vaccine in the country as the vaccine neutralizes the SARS-CoV-2 in the human cells. This research work can be escalated for the production of hybridomas according to my proposed experimental assay.

This research work can be carried forward to generate Hybridomas that are highly sustainable and can be cryopreserved for a longer duration of time. Such approaches indeed would enable the switch from ‘empirical’ to ‘knowledge-based’ application, resulting a patient tailored treatment. This up-and-coming ground of vaccinomics, red biotechnology and the anticipated experimental assay promises to fill the gap between medical trials and innovation science, a niche that has compromised vaccine research and improvement. With prevailing analytical and sequencing techniques, the blueprint and testing as well as corroboration of novel vaccines is now achievable. Capturing absolute improvement of the innovations, however still requires real time laboratory analysis to haul out the full profundity of immunological, epidemiological, and clinical information obtained from in-vitro trials. These novel approaches and research analysis are often used for coping with the unforeseen challenges caused by the COVID-19 pandemic which has taken a major toll on people all across the planet.

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