COVID -19: The Battle against the Unknown

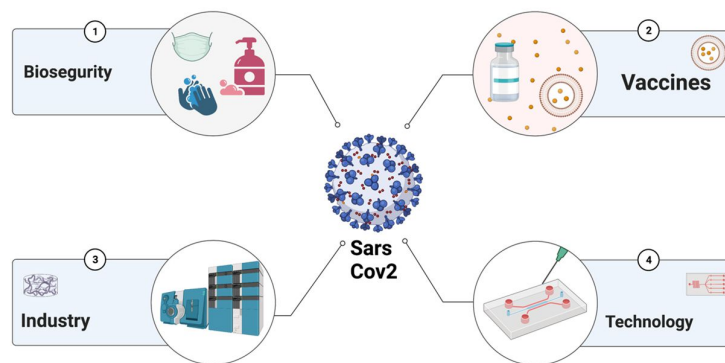**Marbel Torres Arias[*], Andrea Aluisa and Alex Gavilanes**

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ABSTRACT

The era in which we live today has been one of the most difficult episodes that humanity has gone through, COVID-19, a pandemic that threatened the tranquility of every individual on this planet and became an insecure place that limited the link between human beings and the invisible. For this reason, the world we knew gave an eminent sign of the comforts and value of what we possess. Society had the need to modify the way of life and a new normality. In this article I will indicate some aspects that we did not know from our worst enemy, the virus and that the armies fought several battles in knowing and investigating from the neutralization of the virus to its modifications, developing one of the most epic battles that we have faced and against the clock.

Keywords: Pandemic; Normalcy; Defence; Virus

Graphical Abstract

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INTRODUCTION

The first discovery took place on December 31, 2019, an invisible enemy to our eyes was found, named as coronavirus triggering severe acute respiratory syndrome 2 (SARS-Cov-2) named after the International Committee on Taxonomy of Viruses (ICTV), and isolated from patients with pneumonia in Wuhan city, China [1]. On March 11, 2020, the World Health Organization (WHO) announced that COVID-19, was a public health emergency disease of international concern [2], subsequently using a clear and strong signal word of

Pandemic because the number of cases outside China had increased 13-fold, and the number of affected countries had tripled.

And from there, each country had to present different strategies against the same enemy, with the key being their capacity, resources and determination, where they had to find a balance between protecting health, minimizing social and economic disruption, and respecting human rights.

This battle until December 2021 is being fought in 227 territories worldwide, the number of soldiers fallen against this virus is 5.5 million people, 250 thousand fighting for their lives and almost 30 million actively fighting against our invisible enemy [3].

DEVELOPMENT

Throughout history we have battled many enemies that have caused both epidemics and pandemics such as the flu of 1918, 1957 and 1968 and the outbreaks of SARS severe acute respiratory syndrome, MERS middle-east respiratory syndrome, 2014 Ebola and finally the coronavirus Sars Cov 2 (WHO), but it will certainly not be the last. In the book "The Art of War" Sun Tzu says that to win the battle you must know your enemy".And thanks to new technology and human knowledge, strategies have been created to combat these enemies while preventing death.

KNOWING OUR ENEMY

We will begin by describing the new virus with which we coexist, which is a particle with genetic code RNA (ribonucleic acid) encapsulated in a vesicle of proteins that cannot replicate on their own, they need cells and their components to make copies of themselves. The viruses are so small that they can be seen only with an electron microscope. SARS-CoV-2 is an enveloped, spherical particle approximately 120 nm in diameter containing a single-stranded RNA genome. It belongs to the Coronaviridae family and is the seventh coronavirus to infect humans [4].

The virus is transmitted by close person-to-person contact, mainly through respiratory droplets produced when an infected person coughs, sneezes, sings, exercises or talks. The large respiratory droplets spread up to a maximum distance of 2 meters from an infectious person, and can remain airborne for several hours. They also detected SARS-CoV-2 in stool, gastrointestinal tract, and saliva and urine samples from infected patients [5].

WHAT CAUSES OUR ENEMY IN OUR BODY

Throughout the COVID-19 pandemic, the provoked symptomatology including fever, malaise, dry cough and dyspnea, was diagnosed as viral pneumonia but it is clear that not all infected patients react the same. Different symptoms, morbidity, genetics, age and geographic location can affect virus transmission. Some genetic implications lead to severe COVID-19 infection. In addition, immune-related genetic variants are associated with susceptibility to SARS-CoV [6].

Older adults are more at risk and are aggravated if they have chronic health conditions, including hypertension, diabetes, coronary artery disease, and chronic kidney disease. These conditions cause them to develop complicated COVID-19 infection and mortality compared to younger cohorts without these conditions [7].

Moderate patients experience pneumonia, without detectable hypoxemia, with lesions on chest CT scan. Severe patients experience pneumonia with detectable hypoxemia and CT scan lesions, while critical patients experience acute respiratory distress syndrome followed by shock, encephalopathy, myocardial injury, coagulation dysfunction, heart failure, and acute kidney injury [8]. Ninety percent had opacities on CT scan [9].

And each individual who has had to fight this battle against the virus, has had to isolate himself completely, and defend himself day by day. Therefore, it is important to know our enemy in order to fight it.

HOW TO IDENTIFY OUR ENEMY

Methods to diagnose the COVID-19 disease have employed our technologies and tools and have been published in various scientific journals throughout the pandemic and are 100% accessible for all scientists worldwide to share data and strategies to treat the virus. For example, laboratory methods focused on different types of samples such as nasal swabs, saliva, blood, stool and the correct sample collection, as well as the right time to collect each sample in relation to the disease cycle [10]. Evaluation of the performance of laboratory methods has also been important to provide more data for treatment and health care strategies and statistics of disease progression and epidemiology [11]. Biomarkers for COVID-19 diagnosis and genomics analysis to find the virus variants have also been analyzed [12,13]. But these have not been able to be carried out with necessary speed in different countries being very challenging to do mass testing [14]. To verify the sensitivity and safety of the tests for accurate diagnosis, there has been a great development in the biotechnology industry associated with nanotechnology to improve and make highly effective tests for diagnosis such as rapid and sensitive POC (point-of-care rapid screening test) for COVID-19 in order to identify asymptomatic patients and control the spread of COVID-19 and pandemic outbreaks.

DEVELOPMENT OF A STRATEGY AGAINST SARS-COV-2

At the time the battle against this virus began, there was no approved strategy (vaccine or therapeutic drug) against SARS-CoV-2. Efforts were known to develop effective vaccines to control the spread of other viruses of the same family [12]. And reports, these strategies (vaccines) are safe and induce sufficient defense (immune response). Based on the previous experiences

of developing these vaccines against other viruses or pathogens, several research groups and biopharmaceutical industries of major powers have developed prophylactic vaccines. Most studies have used the surface-exposed spike protein (protein S) to induce a host immune system response, such as neutralizing antibodies and T-cell response [13]. Vaccines targeting whole S, S1 subunit and RBD (association protein) have been developed [15]. A wide range of vaccine platforms have been applied to develop vaccines, including mRNA vaccines, DNA-based vaccines, recombinant subunit protein vaccines, inactivated vaccines, and viral vector-based vaccines (Graphical abstract). WHO released the draft landscape of COVID-19 candidate vaccines on July 25, 2021, 8 are approved and in phase III under development.

LEARNINGS FROM OUR ENEMY

The COVID-19 pandemic remains a major battle and a serious public health threat to countries around the world, as full vaccination has not yet been achieved and post-marketing phase 4 vaccine outcome data are still being analyzed. The main challenges in the COVID-19 pandemic is to limit transmission and define clinical management that will improve the cure rate and effectively reduce the overall mortality rate. This has required a thorough understanding of all aspects of coronaviruses and their variants to prevent or lessen their threat to society in the future. The entire population must be aware of their protection measures and there has been a 200% increase in scientific dissemination in an understandable and easy-to-assimilate form in the face of myths and infodemics of groups of people.

A thorough understanding of the epidemiology, pathophysiology and pandemic response efforts to combat COVID-19 is an invaluable new lesson for society that provides a protocol for fighting future pandemics should they occur. More importantly, that the research work against COVID-19 will provide the evidence needed to develop vaccines and therapies against future pathogens and win a battle against future enemies.

CONCLUSIONS

Our world has faced a new virus where many lives have been lost. No country's economy was prepared for it and which staggered, forcing us to transform ourselves.

The development of science in every field against COVID-19 has broken all concepts of technological progress and beaten records in the development of vaccines, antivirals, monoclonal antibodies for the world's population.

I am sure that this pandemic will leave a mark in each of the people who fought these internal battles against our

greatest fears and a learning experience for collaborative work at national and global level.

REFERENCES

1. Phelan AL, Katz R, Gostin LO (2020) The novel coronavirus originating in Wuhan, China: challenges for global health governance. JAMA 323: 709.

2. Li X, Wang W, Zhao X, Zai J, Zhao Q, et al. (2020) Transmission dynamics and evolutionary history of 2019-nCoV. J Med Virol 92: 501-511.

3. Liu YC, Kuo RL, Shih SR (2020) COVID-19: The first documented coronavirus pandemic in history. Biomedical journal 43: 328-333.

4. World Health Organization (WHO) (2019) Coronavirus disease (COVID-19) Pandemic. https://www.who.int/emergencies/diseases/novel-coronavirus-2019

5. DuZ,WangL, CauchemezS, Xu X, Wang X, et al. (2020) Risk for transportation of 2019 novel coronavirus disease from Wuhan to other cities in China. Emerg Infect Dis 26: 1049-1052.

6. Saghazadeh A, Rezaei N (2020) Immune-epidemiological parameters of the novel coronavirus - a perspective. Expert Rev Clin Immunol 16: 465-470.

7. Shahid Z, Kalayanamitra R, McClafferty B, Kepko D, Ramgobin D, et al. (2020) COVID-19 and older adults: what we know. J Am Geriatr Soc 68: 926-929.

8. Yuki K, Fujiogi M, Koutsogiannaki S (2020) COVID-19 pathophysiology: a review. Clin Immunol 215: 108427.

9. Jin Y, Yang H, Ji W, Wu W, Chen S, et al. (2020) Virology, epidemiology, pathogenesis, and control of COVID-19. Viruses 12: 372.

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10. Mathuria JP, Yadav R, Rajkumar J (2020) Infect. Public Health 13: 901-905.

11. La Marca A, Capuzzo M, Paglia T, Roli L, Trenti T, et al. (2020) Testing for SARS-CoV-2 (COVID-19): a systematic review and clinical guide to molecular and serological in-vitro diagnostic assays. Reprod Biomed 41: 483-499.

12. Cui F, Zhou HS (2020) Diagnostic methods and potential portable biosensors for coronavirus disease 2019. Biosens Bioelectron 165:112349.

13. Jiang S, He Y, Liu S (2005) SARS vaccine development. Emerg Infect Dis 11: 1016-1020.

14. Dhama K, Sharun K, Tiwari R, Dadar M, Malik YS, et al. (2020) COVID-19, an emerging coronavirus infection: advances and prospects in designing and developing vaccines, immunotherapeutics, and therapeutics. Hum Vaccin Immunother 16: 1232-1238.

15. Zhou Y, Jiang S, Du L (2018) Prospects for a MERS-CoV spike vaccine. Expert Rev. Vaccines 17: 677-686.