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Editorial

Updates on bioengineering applied to Covid-19 pandemic: from bench to bedside

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The first identified case, with strong evidence of origin in a live animal market in the city of Wuhan in China [1], in November 2019, of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), known as COVID-19 [2], created, simultaneously, a fear due to the lack of knowledge about the behavior of the disease and a challenge to overcome it through science [3].

The agility of the disease in spreading throughout the world culminated in the declaration of a pandemic state by the World Health Organization on March 11, 2020. Currently, it is estimated that 669 million people have been infected with 6,738,373 deaths throughout the world, data recorded with sadness but, they were not more serious, certainly, due to the work of scientists and their laboratories, through the use of bioengineering, which with great agility and speed, took the vaccines from the production bed to the world population [4].

Mathematical models to identify the main critical parameters of the spread of this disease were created and adjusted during the pandemic, in which the computational results are an effective step that can be used for additional predictions and give more control strategies [5,6]. In the evolution to more severe symptoms, which often led patients to the Intensive Care Units (ICUs), lung ventilators were essential in the attempt to maintain life and recovery, with a high rate of intubations due to the clinical condition of low levels of oxygenation and lung injury [7,8].

Vaccines were essential to reduce the number of cases of COVID-19 and, mainly, to prevent severe cases, reducing the need for hospitalizations in hospital beds, avoiding the collapse of health systems, restoring conditions of life, work and displacement of people to levels close to pre-pandemic [9]. In addition, vaccines were improved in the face of the emergence of new variants of the SARS-Cov-2 virus, a clear demonstration of the importance of bioengineering [10].

New antiviral drugs are also emerging commercially, which contribute to the reduction of viral load and favor the treatment and prognosis, especially in elderly patients and/or with comorbidities, which would tend to a faster and more lethal clinical worsening [11]. Innovative treatments aimed at post-COVID rehabilitation can also collaborate in the morphological and functional recomposition of structures injured by the virus, such as the use of photobiomodulation with the use of low-level laser therapy [12].

New challenges will arise from this disease that was previously unknown but which, at every moment, generates a new challenge for science. I have no doubt that bioengineering, with its tireless researchers, will overcome obstacles, taking research from the bench to the bedside.

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