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Special Issue on COVID-19 UPDATE 2021

Editor-in-Chief

Prof. Dr. Alaattin ŞEN

Asst. Editor-in-Chief

Asst. Prof. Dr. Şerife AYAZ GÜNER



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ABSTRACTED AND INDEXED

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COVID-19 UPDATE 2021: a concise preface on the current research status for COVID-19 special issue

It has been nearly 20 months since the first severe acute respiratory syndrome 2 coronavirus (SARS-CoV-2) case was discovered in Wuhan, China, in December 2019, but despite all the restrictions imposed due to a lack of adequate information about the virus and a lack of vaccination, it has infected people all over the world. The disease's prevalence has swiftly expanded, and the COVID-19 pandemic has become the most severe health issue that humanity has faced in the last century. Currently, 215 million confirmed cases of COVID-19 have been documented worldwide, with 4.5 million deaths, and around 5 billion doses of the vaccine have been delivered. We released our first special issue on COVID-19 in June of last year as TÜBİTAK Academic Journals group that exhibits social and scientific responsibility in the outbreak. That issue has gotten a lot of attention, so we have decided to devote our fourth issue this year to a special issue of COVID-19 because of the need for more research on the broader consequences of the COVID-19 pandemic on society during the ongoing pandemic process.

The COVID-19 pandemic has unfortunately also affected scientific studies, and scientists have experienced and still are experiencing significant difficulties in continuing their current studies due to the crucial problems faced in the supply chain in addition to restricting regulations. Despite this, scientists have diverted their available resources to COVID-19 investigations, sparking a rush of research into all facets of the COVID-19 epidemic. Scientists continue to provide social and scientific contributions to this topic, with over 200 thousand papers published in the PubMed database in 2020, accounting for about 4% of all scientific outputs. Researches have proceeded at an unprecedented rate, resulting in exceptional advances in disease treatment and prevention. Despite the fact that these observations and studies have significantly advanced our understanding of the COVID-19, there are still many unresolved issues. In this special issue titled "COVID-19: UPDATE 2021", we aim to present research and theoretical papers that address all these questions and many others related to COVID-19. Therefore, we invited colleagues working in any field related to COVID-19, from viral genetics to epidemiology to computer modeling, to submit their work for publication in this special issue.

To address these issues, this special issue opens with a current review presenting the COVID-19 dynamics and its relationship to neurological outcomes, endogenous antibody responses following vaccinations, as well as the pharmacokinetics of neutralizing monoclonal antibodies and their actions against emerging viral mutant forms. After a brief discussion of current diagnosis and treatment methods, a fascinating study is presented that debates the potential and promising new approaches in the diagnosis and treatment of COVID-19, such as optical spectroscopic methods involving mass spectroscopy and UV/visible, infrared, and RAMAN spectrum analyses coupled with chemometrics, based on the relevant literature for corona virus-infected samples.

A hyperinflammatory state resulting in cytokine storm and respiratory distress syndrome appears to be the leading cause of COVID-19-related deaths. Another review article examines the mechanisms suggested in the pathogenesis of the COVID-19-associated cytokine storm, the immunopathogenesis of the disease, the immune methods used to control the virus, and the mechanisms of hyperinflammation that occur during the course of the disease. Another study investigates the role of both the gut-lung and the gut-brain axes in COVID-19 extrapulmonary complications, relying on the fact that cytokines and microbial products that cross the blood-brain barrier induce neuroinflammation, which contributes to the pathophysiology of neurodegenerative diseases, including neuropathies. This paper discusses a dysbiosis of the gut microbiota and the function of dysbiosis-related inflammation in neuropathy and disease severity in COVID-19 patients and provides valuable insights. This special issue continues with another in-depth examination of disease pathogenesis, this time concentrating on polymorphic variations of host proteins implicated in COVID-19 etiology. This study also investigates how these variations influence COVID-19 diagnostic and treatment methods, as well as what adjustments might be made.

The use of information technologies to analyze the massive data on the SARS-CoV-2 genome gives insight into tracking mutations and studying the virus evolution. However, storing, processing, aligning, and analyzing these numerous genomes remains a difficulty. We are glad to publish an excellent study that examined more than 1 million SARS-CoV-2 genomes to illustrate the distribution and significance of variants that might elucidate the virus genesis and evolution in this special issue. The current work is remarkable for analyzing the most SARS-CoV-2 genomes in academic publication. The ongoing COVID-19 outbreak is being addressed in various ways, including the use of vaccinations, experimental treatment alternatives, absolute quarantine, and partial curfews. Weekend curfews are one technique for reducing the number of infected persons, and this strategy is used in several countries, such as Turkey. We have published a study analyzing the effect of weekend curfews on the transmission of COVID-19 utilizing the hybrid cage model and Monte Carlo method. A fictitious country with three towns and 26,610 inhabitants was being used as a model in the simulation setting. The findings confirm the theory that enforcing a weekend curfew decreases the disease rate. Following these two genomes and modeling-based analytic investigations, there are five drug modeling and repurposing studies. Confirming the impact of the medicines studied in these research with experimental investigations and clinical trials would speed up the COVID-19 drug development process. The first of these investigations discovered that ergotamine can suppress SARS-CoV-2 during the infection and replication stages and that the essential amino acid residues for drug binding to NRP1

are Tyr297, Trp301, and Tyr353. Another study included 6733 FDA-approved drugs, the virtual screening protocol of the MetaCore/MetaDrug platform using the binary QSAR model, the repurposing of Cefuroxime pivoxetil, an ester prodrug of the second-generation cephalosporin antibiotic Cefuroxime, against SARS-CoV-2, showing that it can be an essential drug. In addition, another study examined the nonstructural proteins of SARS-CoV-2 as targets of recently developed and approved small molecule inhibitors. Two further modeling investigations suggest that some carboline alkaloids and flavanols have potential for SARS-CoV-2 treatment.

Following the theoretical modeling investigations, two studies experimentally examining the natural compounds are presented. QCB (quercetin, vitamin C, and bromelain) supplementation vs. standard care demonstrated beneficial effects on patients' recovery and lung results in a prospective randomized controlled cohort study of 429 individuals. Similarly, Anatolian bee propolis, with its eight polyphenols, showed promise as novel medicines. According to the results, propolis has a robust inhibitory capability against the COVID-19 virus. Infrared spectroscopy was used to examine CoronaVac-induced biomolecular alterations in human blood, and that was how we wrapped up our experimental data in this special issue. This study indicates that vaccine delivery alters several functional groups of lipids, proteins, and nucleic acids, which will stimulate more research.

We wrapped up our special issue with two review papers that included intriguing data. The first one investigates how *Drosophila*, which has genes with functional human homologs, might play a significant role in researching to develop COVID-19 vaccines and antiviral medicines. At the same time, the other demonstrates that cannabinoid-type chemicals, particularly cannabidiol, extracted from glandular trichomes in the calyx of cannabis flowers offer a therapeutic alternative in the treatment of SARS-CoV-2. These studies provide a distinct perspective on the existing literature.

I would like to thank the distinguished group leader scientists and their colleagues who reacted positively to our invitations and contributed to this special edition of Turkish Journal of Biology COVID-19, as well as our technical office, associate editor and editors for their outstanding efforts in preparing the issue, and finally, to our reviewers for comprehensive yet rapid peer reviews. We believe that this Special Issue of the Turkish Journal of Biology on COVID-19 is not only very timely but also scientifically innovative and exciting.

Prof. Dr. Alaattin ŞEN
Editor-in-Chief
