

## Guest Editors Introductory Words

Dear readers,

Until 2002, coronavirus infections were quite insignificant diseases of the upper respiratory tract. There was usually no invasion of the virus into the lower airways. A significant change occurred in 2003 when a serious disease with high mortality called SARS (Severe Acute Respiratory Syndrome) appeared. According to available information, the SARS epidemic claimed up to 800 victims and the infection was reported from 30 countries around the world. In 2012, another epidemic caused by coronavirus broke out. It was named after its location Middle East Respiratory Syndrome (MERS). The disease had a much higher mortality rate than SARS and was reported to have killed more than a thousand patients.

At the end of 2019, the first reports were published from the city of Wuhan (China) about an increase in the number of patients with severe pneumonia caused by a later type of coronavirus called SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2). The disease was named COVID-19 (Corona Virus Disease). The virus spread rapidly and reached all countries of the world in a short time. The World Health Organization (WHO) officially set COVID-19 a global pandemic on March 11, 2020. At the time of writing of this editorial, more than 244 million cases have been confirmed worldwide with nearly five millions dead.

The pandemic has also affected our lives, not only personally but also professionally. Scientists around the world began to be interested in the origin of the disease, its symptoms, diagnosis and, of course, the treatment. The scientific era dedicated to this global pandemic has begun. In a short time, more than 100,000 papers have been published focusing on almost all aspects of the disease. The results of scientific research were the background for development of rapid and effective diagnostics, improved implementation of epidemiological procedures, improved therapy and follow-up for patients after the recovery from COVID-19. This led to the development of a vaccine.

However, the pandemic is still not in decline, and SARS-Cov-2 is revealing its new forms, which challenge us to search for new ways to understand the basic biology of the virus and its behavior in the human body. We have also tried to contribute to scientific progress in this area.

A part of the papers published in the supplement focuses mainly on the understanding the physiological

differences and interactions of the virus with cells in the respiratory and immune systems, which are the basis for setting up the correct and successful treatment. A very interesting work is the description of differences in the behavior of SARS-Cov-2 in children and adults and their clinical consequences (Kapustova *et al.*, this issue). Although most children have only mild symptoms, understanding the pathophysiological mechanisms of the disease in children can be very important in designing therapy for adults and the elderly with severe disease forms. As reported in further work (Barnová *et al.*, this issue), the immune response in COVID-19 is complex and involves specific and non-specific immune processes. This paper summarizes several changes identified in the field of specific cellular immunity, which are associated with the progression of symptoms, worsening of the condition thus leading to more severe the lung damage. Both papers are written with respect towards the disease that the authors encounter every day at their workplaces. The third work of our selection also deals with the respiratory and immune system of COVID patients (Čalkovská *et al.*, this issue). It aims to highlight the key role of type II alveolar cells and reduced surfactant function in the pathogenesis of the respiratory failure caused by COVID-19 and to emphasize the rational basis of exogenous surfactant therapy in patients with acute respiratory distress syndrome in COVID-19.

Despite the difficult period we are still going through and the enormous workload, we have managed to prepare several articles that can offer readers interesting and comprehensive information about the effects of SARS-Cov-2 in the respiratory and immune systems. I want to express my special thanks and appreciation to the colleagues who devoted their time and energy to the preparation of these contributions. This was particularly difficult during the severe second wave of the COVID-19 in Slovakia, when we literally fought every day for the patient's life at our workplaces. I hope that our readers they can find inspiration and encouragement for further research work in this field. Last but not least, I appreciate the effort of entire editorial board for managing this topic with care, respect and the quality of published papers. It was my pleasure to co-edit this special issue. Stay safe and healthy.

Martina Antošová