



EDITOR-IN-CHIEF'S WORD

The guest of this issue of the Bulletin of the Croatian Academy of Engineering is our honorary member and prominent scientist in the field of personalized medicine, Prof. Dragan Primorac, M.M., Ph.D.

We asked him to briefly outline the latest achievements in this field and in particular through the activities of the Croatian Specialty Hospital Sv. Katarina, with which the Academy has a cooperation agreement and which was co-founded by Prof. Primorac.

I believe that you will read this article with interest, which is topical today and especially in times of general crisis caused socially by the COVID 19 pandemic.

Editor-in-Chief

Vladimir Andročec, President of the Croatian Academy of Engineering



EDITOR'S WORD

Dear readers,

It is my pleasure to present in this edition of the HATZ Bulletin the Engineering Power research activities being conducted at St Catherine Specialty Hospital in collaboration with their partner institutions.

The presented papers discuss technologically advanced clinical treatments that emphasize the personalized medicine approach in different important fields of contemporary clinical practice as well as their work related to COVID-19 pandemic issues.

The guest editor of this edition is Prof. Dragan Primorac, Ph.D. Honorary Member of the Croatian Academy of Engineering and professor at several academic institutions in Croatia, USA, China, India and Germany.

Editor

Zdravko Terze, Vice-President of the Croatian Academy of Engineering



FOREWORD

St. Catherine Specialty Hospital is amongst the first healthcare institutions that fully live the concept of personalized medicine. In our work, we are guided by our commitment to excellence in all segments of work, knowledge, collaboration with the best, systematic staff training, and the application of cutting-edge medical procedures and the latest scientific discoveries. Our highly trained medical experts and their unique work performance is our special strength. That's what sets us apart. We've intentionally set high standards, and we take all the necessary steps to reach them. Patient satisfaction is our only success indicator. The path of modern medicine is a combination of science and clinical medicine. This concept is called translational medicine. It's a great privilege to be part of a team that contributes to the development of science, which will ultimately impact human health. The concept of personalized or precision medicine is based on knowing and understanding processes on the molecular level, which is crucial to treatment. In other words, genome analysis provides information that may be important for disease prevention, making an early diagnosis, and finding optimal treatment, and monitoring the effectiveness of therapy. The right therapy for the right patient at the right time is the key motto of personalized medicine and is particularly important when it comes to pharmacogenomics. What we're particularly interested in our institution, is osteoarthritis therapy, a degenerative joint disease which is mainly caused by cartilage loss in the joints. It is assumed that more than 750 million people worldwide suffer from osteoarthritis. Osteoarthritis treatment has long been based solely on the modulation of pain and, in the most severe cases, implantation of a partial or total endoprosthesis. Great advances in the fields of tissue engineering and regenerative medicine have been made based on new findings. One of the methods is the use of mesenchymal stem cells in the treatment of osteoarthritis. We've achieved exceptional results best testified daily by our patients.

The following papers are part of the scientific research conducted in St. Catherine Specialty Hospital in collaboration with our partner institutions. They are a compilation of our previous work on these topics and we encourage the readers to read these papers in full, they are referenced at the end of each paper in this series.

Mesenchymal stem cells, autologous immunomodulatory effector cells, are discussed in the first paper in the context of orthopedics, where they have proven to be a new tool that can help patients who are not yet candidates for total joint replacement surgery. The individual approach we commit to in St. Catherine Specialty Hospital is stressed throughout the second paper, where we present a case of a patient suffering from osteogenesis imperfecta. The third paper is a short overview of pharmacogenomics' core concepts, a new field in clinical practice that combines molecular genetic analysis with actionable therapeutic interventions that are unique for each patient. Finally, the fourth paper addresses the pandemic of COVID-19, which has stopped our lives in a place in the past year. We decided to present our work on the effect of environmental factors on SARS-CoV-2 and IgG glycome composition in COVID-19 patients.

I hope you will find our work interesting and encourage you to contact us if you have any questions or comments; we would be happy to hear from you.

Guest-Editor

Professor Dragan Primorac, M.D., Ph.D.