Serbian Biochemical Society

President: Marija Gavrović-Jankulović
Vice-president: Suzana Jovanović-Šanta
General Secretary: Isidora Protić-Rosić
Treasurer: Milica Popović

Proceedings

Editor: Ivan Spasojević
Technical support: Jelena Korać Jačić
Cover design: Zoran Beloševac
Publisher: Faculty of Chemistry, Serbian Biochemical Society
Printed by: Colorgrafx, Belgrade

Serbian Biochemical Society
Eleventh Conference

Scientific meeting of an international character

September 22nd and 23rd, 2022, Novi Sad, Serbia

"***Amazing Biochemistry"***

Noncovalent and covalent binding of phycocyanobilin to S protein of SARS-CoV-2 and its receptor-binding domain

Ana Simović[1], Mirjana Radomirović[1], Nikola Gligorijević[2], Dragana Stanić Vučinić[1], Simeon Minić[1], Milan Nikolić[1], Tanja Ćirković Veličković[1,3,4,5]

[1]Department of Biochemistry, University of Belgrade – Faculty of Chemistry, Belgrade, Serbia
[2]Department of Metabolism, Institute for the Application of Nuclear Energy, University of Belgrade
[3]Serbian Academy of Science and Arts, Belgrade
[4]Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium
[5]Global Campus, Ghent University, Incheon, Korea

[*]*e-mail: asimovic@chem.bg.ac.rs*

The emergence of the coronavirus SARS-CoV-2 has attracted attention of the whole scientific community,. The SARS-CoV-2 spike (S) protein plays the most important role in viral attachment to host receptor angiotensin-converting enzyme 2 (ACE2), via the receptor-binding domain (RBD), fusion and entry into the host, and it serves as a target for the development of antibodies, entry inhibitors and vaccines. It has been demonstrated that phycocyanobilin (PCB), a bioactive open-chain tetrapyrrole chromophore of phycocyanin (PC), chromoprotein derived from the cyanobacterium *Arthrospira platensis*, can bind a plethora of different proteins, both in a noncovalent and covalent manner. This study aimed to investigate interactions of PCB with S protein and RBD respectively. Electrophoretic techniques, fluorescence spectroscopy, and inhibition of S–PCB and RBD–PCB covalent adduct formation using iodoacetamide and N-ethylmaleimide, were employed to examine interactions of PCB with S protein and RBD, while the effects of PCB binding on RBD structure were studied by CD spectroscopy. SDS-PAGE with Zn^{2+} staining has revealed that PCB covalently binds to both S protein and RBD, via free cysteine residues. Binding constants determined by the fluorescence quenching method were: 2.1×10^{7} M^{-1} for PCB and S protein and 8.4×10^{4} M^{-1} for PCB and RBD. Far-UV circular dichroism spectra showed that the binding of PCB influences RBD structure by decreasing the disordered structure content. Due to moderately strong noncovalent interactions of PCB with S protein and RBD, as well as covalent adducts formation, it may exert one of its many bioactive effects via impact on S protein binding to ACE2 receptor.

Acknowledgements

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 810752.