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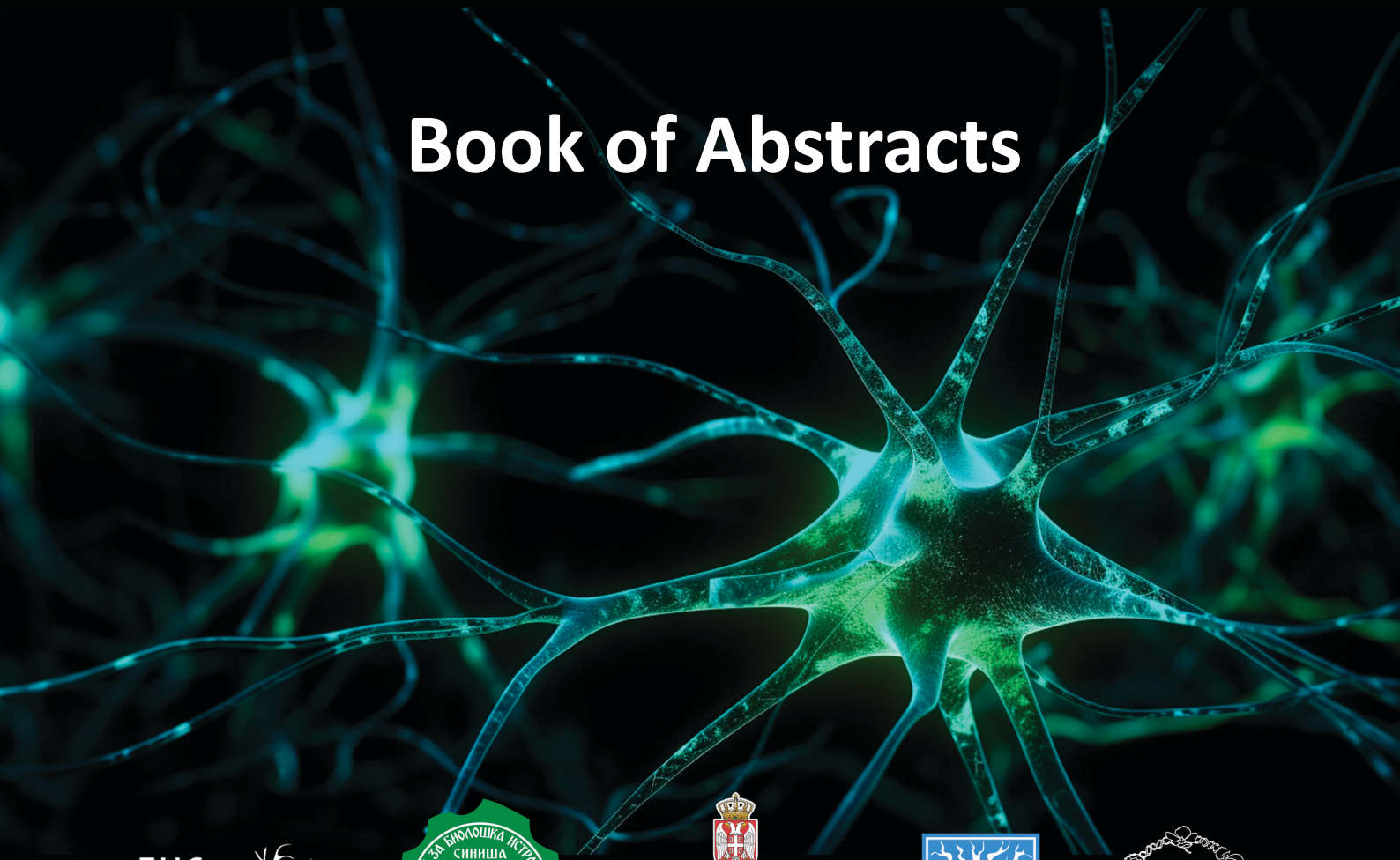

Book of Abstracts

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Assistant editors:
Anica Živković
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Graphene Quantum Dots show protective effect in animal model of neuroinflammation

Jelena Tasić[1], Sašenka Vidičević Novaković[1], Željka Stanojević[1], Verica Paunović[2], Saša Petričević[3], Tamara Martinović[4], Tamara Kravić-Stevović[4], Darko Ćirić[4], Zoran Marković[5], Aleksandra Isaković[1] Vladimir Trajković[2]

[1]*University of Belgrade, School of Medicine, Institute of Medical and Clinical Biochemistry, Belgrade, Serbia*
[2]*University of Belgrade, School of Medicine, Institute of Immunology, Belgrade, Serbia*
[3]*Galenika ad, Center for biomedical research, Belgrade, Serbia*
[4]*University of Belgrade, School of Medicine, Institute of Histology and Embryology, Belgrade, Serbia*
[5]*Institute of Nuclear Sciences Vinca, Belgrade, Serbia*

Background: Experimental autoimmune encephalomyelitis (EAE) is one of the most studied model of neuroinflammation, used to test immunomodulatory and antiinflammatory drugs. Graphene quantum dots (GQD) are oval graphite two-dimensional sheets with a diameter <100 nm, one carbon atom thickness, with potential applications in biomedicine.
Objective: To investigate the potential protective effect of GQD in EAE model.
Methods: Female DA rats were immunized with spinal cord homogenate and Freund's complete adjuvant. GQD treatment (10 mg/kg, ip) was administrated during the inductive, effector and both phases of a disease. MAP kinase (MAPK) and Akt activity in popliteal lymph nodes (PLN) and CNS was determined by western blot. Quantitative PCR and flow cytometry were used to examine the expression of proinflammatory cytokines and specific transcription factors while infiltration of GQD in cells/tissues was detected by transmission electron microscopy. GQD anti-inflamatory/direct cytoprotective effect was analyzed on oligodendrocyte and neuron cell cultures by MTT assay. Data were analized by Mann Whitney test ($p<0.05$ was considered as statistical significant difference).
Results: GQD administration, in all phases of EAE, significantly reduced clinical score of a disease. Clinical improvement correlates with increase in activity of ERK, p38 and Akt that is followed by reduction of Th1 cell response in PLN and infiltrated spinal coard T cells. Due to its capacity to infiltrate cells and tissues, GQD exhibits direct cytoprotective effect on CNS. Additionaly, GQD reduced the expression of proinflammatory cytokines in ConA stimulated lymphocytes.
Conclusion: GQD alleviate EAE, through direct cytoprotective effect on CNS and inhibition of Th1 cell response.