



Trends in **Molecular Biology** • Special issue

# Abstract Book

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2<sup>nd</sup> Congress of Molecular Biologist of Serbia

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# WELCOME SPEECH



Professor Dušanka **Savić-Pavićević**  
President of the Serbian Society  
for Molecular Biology



Dr. Melita **Vidaković**  
President of the Steering Committee  
of the Serbian Society for Molecular Biology

Dear colleagues and friends,

On behalf of the Serbian Society for Molecular Biology (MolBioS), we warmly welcome you to Belgrade for the Second Congress of Molecular Biologists of Serbia (CoMBoS2).

The congress is gathering almost 250 participants from 13 countries (Sweden, United Kingdom, Italy, Switzerland, USA, Australia, Hungary, Czech Republic, Romania, Montenegro, Croatia, Bosnia and Herzegovina, and Serbia).

The program covers various fields of Molecular Biology, including Molecular Biomedicine, Molecular Biotechnology and Molecular Cell Biology, and consists of plenary and invited lectures, the MolBioS award winner lecture, poster sessions and the project corner. Special attention is paid to students and young scientists through the MolBioS Student Session, flash presentations and workshops on state-of-the-art molecular biology methods.

We wish you to be inspired by exciting and outstanding lectures given by renowned scientists and experts, exchange ideas, find opportunities for new collaborations, and have good fun.

**WELCOME TO**



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## GRAPHENE QUANTUM DOTS PROTECT SH-SY5Y NEURONAL CELLS FROM SNP-INDUCED APOPTOTIC DEATH

Biljana Ristić,<sup>1,2</sup> Matija Krunic,<sup>2</sup> Verica Paunović,<sup>2</sup> Mihajlo Bošnjak,<sup>2</sup> Gordana Tovilović-Kovačević,<sup>3</sup> Nevena Zogović,<sup>3</sup> Aleksandar Mirčić,<sup>2</sup> Irena Vuković,<sup>2</sup> Ljubica Harhaji-Trajković,<sup>3</sup> Vladimir Trajković<sup>2</sup>

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**Introduction:** We examined the molecular mechanisms of graphene quantum dot (GQD)- mediated protection of SH-SY5Y human neuroblastoma cells from oxidative/nitrosative stress induced by iron-nitrosyl complex sodium nitroprusside (SNP).

**Methods:** GQD was produced by electrochemical oxidation of graphite and characterized by AFM, UV-VIS and FTIR spectroscopy. The antioxidant activity of GQD in cell-free conditions was assessed by DPPH, NBT and EPR analysis. The neuroprotective potential of GQD was determined by cell viability assays MTT, CV. Flow cytometry was used to assess markers of apoptosis and GQD scavenging of intracellular ROS/RNS as well. Cellular internalization of GQD was determined using TEM.

**Results:** GQD prevented SNP-induced apoptosis, caspase activation and mitochondrial depolarization in neuroblastoma cells. Although GQD diminished the NO levels in SNP-treated cells, NO scavengers displayed only a slight protection. GQD significantly protected SH-SY5Y cells from neurotoxicity of light-exhausted SNP, incapable of producing NO, implying that protective mechanism is independent of NO-scavenging. GQD reduced SNP-triggered increase in intracellular levels of ROS, particularly  $\cdot\text{OH}$ ,  $\text{O}_2^-$  in cells and cell-free condition. Nonselective antioxidants,  $\cdot\text{OH}$  scavengers and iron chelators, mimicked GQD cytoprotection, indicating that GQD protect cells by neutralizing  $\cdot\text{OH}$  generated in the Fenton reaction. Cellular GQD internalization was required for optimal protection since the removal of extracellular GQD by extensive washing partly diminished their protective effect, suggesting that GQD exerted neuroprotective effect intra- and extracellularly.

**Conclusion:** By demonstrating that GQD protect neuroblastoma cells from SNP-induced apoptosis by  $\cdot\text{OH}/\text{NO}$  scavenging, our results suggest that GQD could be valuable candidates for treatment of neurodegenerative diseases associated with oxidative/nitrosative stress.

Key words: graphene quantum dots, sodium nitroprusside, neuroprotection, antioxidants, neurons

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