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ZnO nanoparticles toxicity studied on isolated heart model nanotechnology safety, nanotoxicology

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The increase in the production of nanomaterials in the past decades introduced both positive and negative prospects in the consumer goods. ZnO nanoparticles are amongst the most frequently used and globally produced nanomaterials. Oral ingestion is one of the already acknowledged exposure routes for the unintentional consumption of ZnO nanoparticles with negative implications. Our goal was to study the effects of chronic dietary exposure to ZnO nanoparticles on chosen cardiac parameters. For this purpose Wistar rats were treated daily with oral doses of 4.76 and 47.60 mg ZnO nanoparticles/kg of body weight during chronic six week exposure. Although the isolated heart model was previously used to study nanoparticle effect on cardiac parameters, this is the first use of the isolated heart model for the study of negative effects of ZnO nanoparticles. We studied cardiac function in terms of ventricle developed pressure, heart rate, coronary flow and the presence of arrhythmia. Our data shows that the chronic consumption of ZnO nanoparticles induces dose-dependent cardiotoxic effect on Wistar rats. We observed impaired cardiac function in terms of decreased left ventricle developed pressure and coronary flow, and the generation of ventricular tachycardia. In the absence of similar studies, this is the first evidence of direct negative implications of the chronic oral ingestion of ZnO nanoparticles on the heart function. The present study introduces new views on previous knowledge regarding lowest observed effect concentration in terms of the chronic dietary exposure to ZnO nanoparticles.

Biography

Tamara Milivojević has completed her PhD in December 2014, from the University of Ljubljana, Slovenia. Her prime focus was on the effect of ZnO nanoparticles on different levels of biological organization. She is the author and co-author of several papers in reputed journals. She presented her work as a speaker at the international conferences and symposiums. Beside bionanotechnology, she studies the biology and taxonomy of Hymenoptera.

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