Current Topics in Biophysics (Zagadnienia Biofizyki Współczesnej) vol. 42, 2019, 1-11

Role of the nitric oxide (NO) in the regulation of steroidogenesis in placenta during physiological pregnancy and preeclampsia (experimental study)

Tamar V. Sanikidze, Levan A. Cheishvili, Nana V. Kipiani, Eka R. Shekiladze, Nina V. Kipiani, Gubaz Z. Sharashenidze, Eduard N. Chikvaidze

The aim of the study was to establish the role of nitric oxide (NO) in the regulation of steroidogenesis in the placenta during physiological pregnancy and experimental preeclampsia (PE) in rats. EPR centers of the placenta, free NO and its metabolites were determined by the Electron Paramagnetic Resonance (EPR) method. At the last stage of pregnancy in the EPR spectra of the rats' placenta with PE alterations of the signals intensity of mitochondrial steroidogenic electron transport proteins were detected: the FeS-centers of adrenodoxin decreased, the ferricytochrome P-450 increased, the free NO content decreased, and the complexes of NO with heme (HbNO) and non-heme iron (FeSNO) were detected. These data indicate the violation of placental steroidogenesis, which is confirmed by a decrease in the level of progesterone in blood. Therefore, the nitrosylation of mitochondrial proteins is an important redox-dependent mechanism of regulation of the intensity of steroidogenesis.