MITOCHONDRIAL RESPIRATION IN INTACT PERIPHERAL BLOOD MONONUCLEAR CELLS ISOLATED FROM PATIENTS WITH LUNG AND BREAST CANCER

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Background. Down-regulation of complex I/II, and inhibition or activation of complex III/IV of mitochondrial respiratory system is associated with malignancy. Growing tumor affects the metabolism of peripheral tissues. Peripheral blood mononuclear cells (PBMCs) represent easily accessible cells useful for the studies on remote effects of malignancy. This study aimed to evaluate mitochondrial respiration in PBMCs from cancer patients.

Material and methods. The study included 114 lung cancer patients and 30 breast cancer patients hospitalized in Chair and Clinic of Oncology at Poznan University of Medical Sciences. PBMCs were isolated via density gradient centrifugation and counted in Yumizen H500 (Horiba) analyzer. Mitochondrial respiration was analyzed in high-resolution respirometer (Oxygraph-2k).

Results. ROUTINE respiration in PBMCs from lung cancer patients (4.91; 2.99–7.48 attomole O2/s*cell) was higher than in breast cancer patients (2.82; 2.04–4.20 attomole O_2/s*cell, median; interquartile range, P=0.0087). No differences in LEAK respiration were found between lung and breast cancer patients. ETS respiration in PBMCs from lung cancer patients (8.94; 6.20–15.73 attomole O2/s*cell) was higher (P=0.0161) than in breast cancer patients (6.38; 4.80–8.13 attomole O_2/s*cell). No differences (P=0.3277) in ROX respiration were observed between lung and breast cancer patients.

Conclusion. Basic mitochondrial respiration and maximum oxygen flux induced by optimal administration of uncoupler are upregulated in PBMCs in the course of lung cancer. Impairment of both respiratory states may lead to dysregulated immune response in cancer patients.

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