Expression one gene related with the oxidative stress phenomenon in enodmetroid endometrial cancer

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Reactive oxygen species (ROS) are mainly produced by the mitochondria under both physiological and pathological conditions. Their production is based on both enzymatic and non-enzymatic reactions. Oxidative stress is therefore caused by an imbalance between the production and accumulation ROS in cells and the ability of the biological system to detoxify them. If left unchecked, it can accelerate aging and induce neurodegenerative and cardiovascular diseases, and even cancer. ROS may therefore contribute to tumor induction and survival, as well as to treatment resistance, but their consistently high levels have a cytotoxic effect, which may be helpful in anticancer therapy. The aim of the study was to assess the activity of genes associated with oxidative stress in endometrial cancer. The study included 45 patients with endometrioid endometrial cancer and 45 without neoplastic changes. The expression profile of genes associated with oxidative stress was determined with mRNA microarrays, and RT-qPCR. A one-way ANOVA with the following Tukey's post hoc test revealed that out of 600 mRNAs representing oxidative stress-related genes, the number of mRNAs differentiating each cancer grade from the control was as follows: G1 vs. C, 56 mRNAs; G2 vs. C, 112 mRNAs; G3 vs. C, 118 mRNA ($p < 0.05$; $FC > 2$ or $FC < -2$). Further analysis indicated that 17 mRNAs were characteristic of G1 cancer, 48 mRNAs for G2 cancer and 56 mRNAs for G3 cancer. In addition, the expression of 25 mRNAs significantly changed regardless of endometrial cancer grade. The next step involved the overrepresentation test for these 25 common mRNAs representing 18 genes and the selection of the "cellular response to reactive oxygen species" biological process and its subprocesses. The experiment showed that AQP1, CYBA, MELK, PKD2, PRDX2 were significantly overexpressed in endometrial cancer, while ATP2B4, FOXO1, KCNMA1, KLF2, PRNP, SNCA, SOD3, THBS1, and TXNIP were downregulated.

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