

red blood cells, lymphocytes, fibroblasts, histiocytes. The signs of tumor cell death by activation of apoptosis were observed: shrinkage and reduction in cell volume, chromatin hyper condensation, fragmentation of organelles and nucleus, a large amount of coarse bundles of microfilaments, the presence of apoptotic cells. Tumor tissue was infiltrated predominantly with CD3 and CD161a cells, CD45a indicators decreased by 3–4.5 times.

The analysis of antitumor effect in breast cancer patients depending on factors of energy processes inhibition revealed that complete tumor regression only in combination with ATP occurred in 14.2%, and D-in 18.8%, partial regression using ATP was 71–5%, D – 62.5%. Tumor progression was not observed.

Conclusion: Modulating abnormalities in energy metabolism due to metabolic acidosis of tumor microenvironment on the background of systemic chemotherapy, one can achieve activation of additional pathogenetic mechanisms of inhibition of tumor growth and tumor cell death. It is necessary to emphasize the importance of the further search for factors of pathogenetic mechanisms and therapy of the influence on the tumor, including the modulation of acidosis of peritumoral area that opens up new perspectives in solving this problem.

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Allelic imbalance and epigenetic changes as a marker of tumor spreading into the adjacent tissue

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Non-small cell lung cancer (NSCLC) is characterized by multiple genetic alterations such as loss of heterozygosity (LOH), microsatellite instability (MSI), promoter hypermethylation and changes of miRNA expression. According to a field cancerization (FC) phenomenon the adjacent histologically normal tissue plays a role in tumor progression by triggering the transformation process.

The aim of the study was the analysis of genetic alterations in tumor and adjacent tissue to determine the FC size and to reveal associations with clinico-morphological features of patients.

The study group included 135 patients with NSCLC. From each patient 4 FFPE samples were analyzed: tumor, adjacent normal lung tissue at 2, 5, 10 cm. LOH/MSI analysis was evaluated by PCR using 7 microsatellite loci. Promoter hypermethylation in genes RASSF1A FHIT, DAPK1, CDH1, CD44, TIMP3, MGMT was investigated by methyl-sensitive PCR. The expression levels of miRNAs let-7a, miR-155, miR-205 were measured by real-time PCR.

Our results demonstrated that LOH/MSI occurs only in tumor while promoter hypermethylation occurs also in adjacent tissue at 2, 5 cm, but not at 10 cm. The downregulation of let-7a, miR-155 in adjacent tissue is lower than in tumor. The levels of

investigated miRNAs in adjacent tissue vary depending on tumor differentiation – in patients with differentiated tumors it is higher than in the group with poorly differentiated tumors.

We postulate that FC size in NSCLC is at least 5 cm from tumor and includes only epigenetic but not structural (LOH/MSI) alterations. The evaluation of epigenetic changes in adjacent tissue (e.g., surgical margins) can potentially be used for postsurgical prognosis.

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Prevalence and primary prevention of human papillomavirus infection in Tomsk city and Tomsk region

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Cervical cancer is one of the most common female malignancies with incidence of 19.7 per 100,000 population in Russia in 2011 (Davydov, Aksel et al., 2011). Over 6000 women in Russia die of cervical cancer annually.

The cervical cancer incidence shows a tendency towards increasing rates among young women (Chissov, 2009). Tomsk region has been found to be the territory of increased cancer risk for cervical cancer. The age-standardized incidence rate is 1.87 times higher in Tomsk region than in Russia, being 20.40/0000 (Pisareva, Odintsova et al., 2012). The highest incidence of cervical cancer is observed in women aged 15–39 years (Churuksaeva, Kolomiets, Shpileva, 2012). The causal role of human papillomavirus infections in cervical cancer has been documented beyond reasonable doubt. Prevention of exposure to high risk HPV types by vaccination may prove to be the most efficient and logistically feasible preventive intervention for cervical cancer.

Epidemiological studies conducted at the Tomsk Cancer Research Institute have shown that the median age of patients with cervical intraepithelial neoplasia and cervical cancer is 39.9 ± 8.5, and 89.5% of women are HPV-positive. Prevalence of high-grade squamous intraepithelial lesion (H-SIL) peaks between ages 25 years and 30 years.

The predominant HPV type in screened women of Tomsk region as well as worldwide is HPV-16, reaching peak incidence in women aged 36–40 years (74%). In the older age group (from 51 to 60 years), HPV-18 is associated with 25% of cervical cancer cases. High prevalence of HPV-31 has been found in women under the age of 45 years with an incidence peak (17%) in the age group ≤20 years.

The geographical widespread data on HPV type-distribution are essential for estimating the impact of vaccines on cervical cancer and cervical screening programs. Immunization against HPV for young women aged between 9 and 26 years, with a predominant age cohort 11–13 years, was introduced in Tomsk region in 2010. The aim of the HPV immunization program is to protect females before they reach an age when the risk of HPV infection increases. A total of 627 girls were vaccinated, and