

**SCIENTIFIC AND PRACTICAL CONFERENCE OF YOUNG  
SCIENTISTS  
“FUNDAMENTAL MEDICINE: INTEGRATED APPROACHES  
TO CANCER THERAPY”**

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**On February 4–5, 2019, the R.E. Kavetsky Institute of Experimental Pathology, Oncology and Radiobiology of the National Academy of Sciences of Ukraine (IEPOR NASU) hosted the Scientific-Practical Conference of Young Scientists “Fundamental Medicine: Integrated Approaches to Cancer Therapy” dedicated to the World Cancer Day. The event took place by the initiative and support of the Council of Young Scientists of IEPOR NASU.**

The main purpose of the conference was to highlight the significant scientific achievements of young scientists in the area of solving the most acute problems of modern oncology and to exchange advanced knowledge and experience with leading specialists in this field.

The conference was opened by the Director of IEPOR NASU, **Acad. of NASU V.F. Chekhun**, who noted the priority of close collaboration of researchers in the field of experimental and clinical oncology, and the effectiveness of the long-term experience of cooperation between the Scientific Council “Malignant Neoplasms” of the NASU and the interdepartmental Problem Commission of Experts of the National Academy of Medical Sciences (NAMS) and the Ministry of Health (MH) of Ukraine “Oncology”, which makes a significant ground for coordinating scientific, medical and educational activities.

The chairman of the National Association of Oncologists of Ukraine, the Head of the Problem Commission of Experts of the NAMS and the MH of Ukraine “Oncology”, **Corr.-Member of NAMS of Ukraine, Yu.V. Dumansky** addressed his greeting speech to the participants of the conference and stressed that fruitful interaction of scientists and doctors will allow to find new approaches to the treatment of cancer patients.

During the conference, there were presented the reports of leading scientists in the field of oncology and cancer biology. In the key lecture “Modern Vectors of Fundamental Research in the Context of the Problems of Clinical Oncology” **Acad. of NASU V.F. Chekhun** reviewed the most urgent issues, the clarification of which can provide a significant progress in solving the problems of clinical oncology. Much attention was paid to the discovery of tumor heterogeneity factors and their identification, which is one of the key problems in the diagnosis and treatment of cancer. In addition, in the lecture, a number of the most promising directions of research were outlined, in particular: the elucidation of the mechanisms of molecular genetic and epigenetic imbalances; determination of factors

controlling for epithelial-mesenchymal transition; disclosure of processes of plasticity and reprogramming; detection of the impairment in the regulation of metabolic processes; and identification of the role of the immune system in the malignant process.

**Corr.-Member of NASU O.G. Minchenko** (O.V. Palladin Institute of Biochemistry of the NASU, Kyiv) presented the report “Description of Integrated Mechanisms of Metabolism Regulation is the Basis for the Development of Integrated Approaches to Cancer Therapy”, which revealed the role of biological clock, stress of the endoplasmic reticulum and non-coding elements of genome in malignant transformation of cell.

Of significant interest was a lecture by **Assoc. Prof. O.V. Kashuba** (IEPOR NASU) “Reprogramming of Normal and Cancer Cells for Cancer Therapy”, which highlighted the history of stem cell research, as well as contemporary ideas about the possibilities of reprogramming somatic cells into induced stem cells and the use of the latter in medicine. In addition, the report presented the results of recent studies of mitochondrial protein S18-2 (MRPS18-2).

**Prof. L.B. Drobot** (O.V. Palladin Institute of Biochemistry of the NASU) presented a lecture “Adaptor/Scaffold Proteins as Regulatory Factors of Epithelial-Mesenchymal Transition”, which outlined the main features of epithelial-mesenchymal plasticity and its relation to the acquisition of an aggressive phenotype manifested by the appearance of stem-like characteristics, increased resistance to therapy and an increase in the metastatic potential of tumor cells. Particular attention was paid to experimental data, which allowed to consider adaptor protein Ruk/CIN85 as a factor which, through the regulation of the epithelial-mesenchymal transition, is capable of determining the tumor cell phenotype.

Recent views on the processes of immune response upon tumor growth and the prospects of immunotherapy in the treatment of cancer have been highlighted in the report of **Dr. N.M. Khranovska** (National Cancer Institute, Kyiv) “Immunology of Ma-

lignant Neoplasms: Contemporary Views, Theoretical and Applied Aspects". The speaker has described in detail the method of antitumor vaccine therapy based on dendritic cells and provided examples of its use in clinical practice.

**Dr. I.I. Ganusevich** (IEPOR NASU) in the lecture "Metabolic Syndrome and Cancer: The Role of Dysfunctional Adipose Tissue" outlined the association of metabolic disorders, obesity and oncological diseases. It was noted that understanding the mechanism of symbiosis of tumor cells and adipocytes in the tumor microenvironment will make it possible to identify metabolic targets and in the long run to develop a new class of antitumor agents, while a lifestyle correction aimed at maintaining optimal weight can be considered as a strategy for cancer prevention and improved survival rates of cancer patients.

The prospects of the use of transgenic animals for the study of the functional state of oncogenes were reported by **Prof. T.L. Syvyk** (National Agrarian University of Bila Tserkva) in a lecture "Technology for Generation of Transgenic Animal Models for Functional Investigation of the ERBB2 Receptor". The author presented the results of experimental studies on the development of lines of spermatogonial stem cells expressing the induced dominant-negative form of ErbB2, and noted that the obtained models could be used to find new potential antitumor compounds for the treatment of ERBB2-associated neoplasms.

Along with the plenary lectures, the conference program included sectional meetings "Tumor Heterogeneity and Progression of the Malignant Process", "Oncomarkers in Cancer Diagnosis and Therapy", "Immunotherapeutic Approaches to the Treatment of Patients with Malignant Neoplasms", "Genetics of Cancer", "Molecular Mechanisms of Malignant Transformation". In the framework of sectional meetings, oral reports were presented by young scientists.

**V. Kholodniuk** (IEPOR NASU) reported on the variability of the response of B-cells of chronic lymphocytic leukemia to various chemotherapeutic agents (bendamustine, fludarabine and cyclophosphamide) *in vitro* and its dependence on the level of expression of CD150 and CD180 on cell surface.

**M. Yanovytska** (O.O. Bogomolets National Medical University) presented the results of studying the expression of topoisomerase II $\alpha$  in breast cancer tissue. It has been shown that the expression of this marker is higher in aggressive subtypes of breast cancer and is associated with a high index of proliferative activity.

In the report of **I. Horak** (O.V. Palladin Institute of Biochemistry of the NASU), there were presented the data on possible participation of adaptor protein Ruk/CIN85 in the regulation of processes of invasion and metastasis of tumor cells.

Modern views on the use of circulating miRNAs to determine the sensitivity to therapy and prediction of the course of various types of cancer were disclosed in a report by **T. Yalovenko** (IEPOR NASU).

**M. Dashchenko** (Institute of Molecular Biology and Genetics of the NASU) reported on the potential application of miRNA miR-30c-5p for early diagnosis of clear cell renal carcinoma.

**A. Polishchuk** (IEPOR NASU) presented the results of the study on the morphocytochemical and immunophenotypic features of substrate lymphoid cells with villous cytoplasm in B-cell lymphoproliferative diseases.

The report of **O. Mankovska** (Institute of Molecular Biology and Genetics of the NASU) was devoted to the study of the expression of Aurora A, B and C kinases in the normal prostate tissue, prostate adenoma and prostate cancer. According to the data presented, Aurora A and Aurora C are differentially expressed in prostate carcinomas in comparison with normal tissue or prostate adenoma, especially in late stages of the disease.

**O. Briieieva** (IEPOR NASU) reported on the association of amplification of *ERBB2* oncogene and overexpression of ErbB2 proteins and cyclin E1 with low degree of differentiation and high invasive potential indicating the potential for inclusion of these markers in the panel for molecular determination of endometrial cancer subtypes with aggressive course of the disease.

**I. Prokhorova** (IEPOR NASU) presented the data obtained on the experimental metastatic model of Lewis lung carcinoma, according to which sodium dichloroacetate can exhibit high antimetastatic activity both in monotherapy and in combination with a glycolysis inhibitor 2-deoxyglucose.

The report by **D. Gorbyk** (IEPOR NASU) was devoted to the study of the influence of lactoferrin on the morphometric parameters and the cell cycle of Walker-256 carcinosarcoma cells. It has been shown that, depending on the concentration, the action of lactoferrin can lead to segregation of tumor cells, pyknotic changes, hyperchromatosis of nuclei, necrobiosis and necrosis, accompanied by changes in DNA status and an increased aneuploidy.

In a report by **A. Burlaka** (National Cancer Institute, Kyiv), there were presented the data indicating the negative impact of Pringle's classic maneuver on the survival of patients with colorectal cancer, and, moreover, the importance of peri- and postoperative ischemia in the main liver resection in such patients was discussed.

**D. Mahmudov** (National Cancer Institute, Kyiv) reported on the choice of tactics for combined treatment of locally advanced rectal cancer. According to the presented results, neoadjuvant chemoradiotherapy (50–60 Gy in the setting of oxaliplatin based polychemotherapy) does not cause the significant increase of toxicity, and results in increased regression rate increasing the overall and recurrence-free survival rates in the patients.

**A. Mashukov** and **V. Maksimovsky** (Odesa National Medical University) presented a joint report, in which it was noted that the use of multi-organ resections com-

bined with HIPEC technology is a promising area in the complex treatment of locally advanced gastric cancer.

In the report of **K. Malyarchuk** (P.L. Shupyk National Medical Academy of Postgraduate Education, Kyiv), the data were presented on the correlation between morphological response of the tumor with survival after complex treatment of resectable non-small cell lung cancer of the III stage. As the speaker noted, a high level of morphological response is more often observed after conducting neoadjuvant chemoradiotherapy than after neoadjuvant chemotherapy, and is associated with better survival rates.

**K. Nemaltsova** (SI “S.P. Grigoriev Institute of Medical Radiology, NAMS of Ukraine”, Kharkiv) reported on the predictive value of HE-4 marker in patients with ovarian cancer. It was noted that the duration of the recurrence-free period correlates with the dynamics of the HE-4 marker level before and after surgical treatment of the patients.

**V. Sarnatsky** (IEPOR NASU) reported on the prospects of using bioinformatics tools for processing

medical micro-images for diagnostics and prognosis of breast and prostate cancer.

At the poster session, 20 young scientists presented the results of their own research. Their reports addressed various aspects of fundamental cancer research, the search for new approaches to the diagnosis and their implementation in clinics, monitoring and therapy of cancer.

During the second day of the conference, the participants had the opportunity to attend practical master classes on modern methods of molecular biological research: real-time polymerase chain reaction, flow cytometry, immunohistochemistry, DNA comet assay.

In total, about 80 delegates from different scientific, medical and educational institutions of Ukraine took part in the scientific-practical conference. Summing up the conference achievements, the participants noted the high level of presented scientific research and developments introduced into clinical practice and expressed their hope for further fruitful cooperation.