

**Dear Colleagues, Ladies and Gentlemen!**

It is a great pleasure for me to welcome you at the *Symposium on Genomics and Proteomics in Experimental and Clinical Oncology*, which is organized by the Serbian Academy of Sciences and Arts - Branch in Novi Sad, the Academy of Studenica - the Institute of Oncology Sremska Kamenica, and the Academy of Medical Sciences - Branch of Vojvodina.

At the beginning of the third millennium human genome project is finished. Sequence of three billion base pairs of the human genome has been deciphered and post genomic era has started. At the same time, two new sciences with enormous programs have been born with aim to investigate structure and function of about thirty five thousand human genes and the structure and function of more than three hundred thousand of proteins. These programs are followed by two extraordinarily powerful technologies: DNA microarray (DNA chip) and protein chip with possibility to analyze at the same time tens of thousands of genes and proteins. In 1994, the first commercially available microarray was produced by Affymetrix. After that, there was a tremendous advance in the technology so that the recent arrays can accommodate up to around 30 000 oligonucleotides or cDNA sequences and detect expression of nearly 50 000 transcripts.

This, together with bioinformatics and other technologies of recombinant DNA, opens a new era of biomedical investigations with enormous possibilities. This holds especially to the problem of malignant tumors, which due to immense phenotype heterogeneity is still beyond our understanding. Although gene mutation remains a paradigm of carcinogenesis, current interest in cancer focuses largely on transcriptional profiling of cancer cells. Today molecular diagnosis of tumor entities with the chip technology is becoming reality. It seems that the study of the reprogramming of gene expression during malignant alteration by the methods of genomics and proteomics is the most promising way to achieve this goal. Even today there are important information and knowledge in the domain of experimental and clinical oncology concerning prevention, diagnostics and therapy. Thus, for example, gene expression profiles can be defined which neatly distinguish acute myeloid from acute lymphoblastic leukemia. An algorithm based on expression profiles was able to characterize two categories of high-grade lymphoma patients with very different 5-years survival rates (70% versus 12%) most of them undistinguishable by morphology and immunological markers. It does not mean that we may think of putting microscope and the flow cytometer aside but this technology will be more and more available in routine clinical laboratory. There is no doubt that DNA microarrays provide a significant boost to cancer research both in basic experimental and clinical oncology. With more refinements of the technology on the horizon, its broader clinical application might become a reality.

Also, we should remember that products of genes are proteins and the protein is the final arbiter of function. The field of proteomics may yield an important tool in the war against

cancer. We might expect that proteomic technology will lead towards development and validation of diagnostic and prognostic tools, and discovery of new antineoplastic drugs.

However, science moves from gene discovery to functional genomics and then to research, which will correlate molecular events and physiological processes. An important aspect of this work is signal transduction - understanding at the biochemical level how a cell responds to external stimuli. Signal transduction is an essential part of many cellular processes including growth, proliferation, differentiation, and apoptosis - all of which are important for studying of oncogenesis.

In relation to all of this, it would be of benefit for our colleagues to acquire this new knowledge in the field of oncology and to the participants to exchange their experience and ideas.

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Six papers presented at this symposium are published in this issue of the Archive of Oncology.

Editorial Board