

INTRODUCTION IN CANCER BIOLOGY

In highly developed societies, in which life-span is long, cancer is most frequent cause of death. Therefore not only a narrow circle of researches but also ordinary people are keenly interested in carcinogenesis and the efforts of oncologists to introduce new less drastic methods of anticancer therapy. Cancer morbidity in Poland is about ten thousand persons per year, with recognition of one thousand causes among children.

The unusually dynamic progress in studies on molecular and cellular mechanisms of carcinogenesis made within the last few years was accompanied by introduction of better diagnostic methods, opened new perspectives for treatment of cancer and simultaneously led to a greatly increased interest in biological phenomena underlying its development. That is why the editors have decided to publish a special issue of *Kosmos* devoted to these problems.

Recent studies have been focused mainly on the genetically controlled molecular factors of organisms which promote or inhibit tumor growth. That is the reasons why chosen problems in this field were presented and discussed in *Genetics in Medicine*, a topical issue of *Kosmos* (3-4/43, 1994), in the papers by DANUTA ROŻYŃKOWA, ANTONI HORST, ANDRZEJ L. PAWIAK and KRZYSZTOF SZYFTER.

The development of cancer is a consequence of such transformation of somatic cell, which can generate deregulation of cell division and differentiation, leading malignancy. MIECZYŚLAW CHORAŻY and KAZIMIERZ DUX in the first paper of the present issue entitled *Cancer biology — an introduction* — concentrated on biology of carcinogenesis and the action of carcinogenes. They presented also some data concerning oncogenes and suppressors genes. JANUSZ SIEDLECKI (*Molecular basis of cancer disease*) and BARBARA GRZELAKOWSKA-SZTABERT (*Suppressors genes — molecular mechanisms of their action and importance for control of cellular proliferation*) discussed in more detail the tumor suppressors genes, oncogenes and the mechanism of their action in controlling of cell cycle. Many other papers in this issue refer to the same problems. The article by JANUSZ LIMON *Why should chromosome aberrations in human neoplastic cells be analyzed by cytogenetists?* deals with chromosome aberrations in cancer cells, which probably play an important role in pathogenesis of cancer and can provide a clue to the location of relevant genes and their products as well as to function of the cell. The chromosome aberrations specific to the particular type of cancer can also serve as the disease markers that help to reach more precise diagnosis, prognosis and monitoring of the patient treated. Analysis of chromosomal aberrations is not the only way of tumor recognition. The progress in molecular biotechnology also can help to define the genetic changes that cause specific tumor types. Epidemiological studies on hereditary cancer predispositions can

help in solving the problem. This very important question is presented by JAN STEFFEN (*Hereditary factors in human cancer*) who discusses recent studies on expression of hereditary gene defects on evaluation hereditary risk, prospects of reducing cancer mortality in carriers through early detection of gene defects, and monitoring of pharmacological treatment. Another essential factor in the development of cancer invasion in this process of metastasis, which has been presented by LUCYNA GREBECKA (*Migration of the tumour cells*). The molecular mechanism of migration of normal and neoplastic cells through the surrounding matrix have been outlined.

Selective death of cancer cells in the main aim of present-day anticancer therapy. EWA SIKORA in the paper *Apoptosis and oncogenesis* discusses mechanisms of apoptosis regulation in neoplastic cells and introduction of this process by a variety of antineoplastic drugs. On the other hand, the selective action of the anticancer drug can also be achieved by pharmacological manipulation of the intracellular drugs metabolism within a malignant cell. The rationale of this approach to anticancer chemotherapy has been presented by MAŁGORZATA BALIŃSKA, DOROTA JACEWICZ and KATARZYNA KACZOROWSKA in brief paper *Experimental basis of cancer chemotherapy*. The use of anticancer drugs is limited, among others, by the cell resistance. The cellular mechanism of this phenomenon, including multidrug resistance, is presented by BARBARA GRZELAKOWSKA-SZTABERT in the article *Mechanisms of cellular resistance to anticancer drugs*.

In view of the known disadvantages of cancer chemotherapy, modern medicine is looking for new, less toxic and more powerful methods of cancer treatment. The last decade brought two new tools, two complementary methods: those of gene therapy and immunotherapy. ZYGMUNT POJDA in *Immunotherapy of cancer*, discusses various methods of the immunomodulation of the organism leading to destruction of cancer cells. A very particular aspects connected with immunotherapy has been presented by ELŻBIETA WAŁAJTYS-RODE in the paper *Tumor necrosis factor (TNF)*. The last position in the issue, *Cancer gene therapy — future applications and perspectives* by JERZY NOWAK, presents gene therapy, a method which now gives rise to great hopes in treatment and prevention of cancer.

When preparing this issue of *Kosmos* on biology of cancer I focused attention on biological, not medical, aspects of the problem. I realize that the papers presented do not bring a comprehensive review of the modern knowledge of the subject. However, some complementary aspects of the biology of cancer were recently presented in *Kosmos* (issue 3/4, vol 43, 1994) and in the 1994 volumes of *Postępy Biochemii (Progress in Biochemistry)* and *Postępy Biologii Komórki (Progress in Cell Biology)*.

I would like to thank very warmly all the Authors who have contributed to present issue of *Kosmos*.

Małgorzata Balińska