ACTA MEDICA LITUANICA. 2007. Vol. 14. No. 3. P. 146–148

Review of research on cancer prevention at the Institute of Oncology, Vilnius University

Laima Griciūtė,

Saulė Uleckienė

Institute of Oncology,
Vilnius University, Lithuania

Research on the scientific bases of cancer prevention was carried out in several directions by the scientists of the Institute of Oncology, Vilnius University: epidemiological studies, quantitative analyses of chemical carcinogens in the environment, and investigations of the possibilities of the body to avoid cancer, i. e. studies of the immune and antioxidative systems in the situations preventing cancer risk. The activity of new kind, cancer chemoprevention, was carried out on experimental animals. At present, the prevalence of HPV in Lithuania and types of this virus are being studied. Attention was payed to the education of students, medical staff as well as information of the population on cancer risk and possibilities to avoid it. Several books and a great number of booklets and leaflets on cancer prevention were published.

Key words: research on cancer prevention, Institute of Oncology, Vilnius University

Prevention is an important part of the overall cancer control, but it is the activity in which not only cancerologists are involved. It is the work consisting of a lot of components. Prevention may be really efficient provided not only the medical staff, legislators, people involved in the environment protection, but also every citizen participates in it. In order to protect his own health and the health of the others, everybody should participate in this activity. However, the role of cancerologists is specific and very important in cancer prevention. Owing to the knowledge of the basic data on cancerology, of the local situation on cancer morbidity and mortality, cancerologists can select the priorities for research and implementation of preventive measures best of all. In addition, the appreciation of the effectiveness of these measures is also within the scope of cancerologists. It is the duty of cancerologists to educate medical students in cancerology as well as to inform the population about the high risk cancer factors and possibilities to avoid it.

Cancer is not a single, but a group of diseases, therefore, the causes and pathogenesis of different cancers are different. At present, prevention of only some cancers is possible, namely, of those which may be avoided by elimination of causative factors or efficient treatment of accessible precancerous lesions. Cancerologists must take part in the building of the scientific bases of preventive measures in the future.

Scientists of the Institute of Oncology, Vilnius University, carried out research in several directions. Search for the high risk cancer factors involved the epidemiological studies conducted in several regions of Lithuania and / or in several plants as well as quantitative analyses of polycyclic aromatic hydrocarbons and volatile N-nitrosamines in environment. The internal risk factors were studied by researching immunological disturbances and changes in the antioxidative system. Research on the possibilities of chemoprevention was carried out on experimental animals.

The first priority of the epidemiological research was prevalence of the tumours of gastrointestinal organs, because gastric cancer was the most common one both in men and in women in Lithuania (1). Later on, attention was most focussed on tumour morbidity in the new industrial regions of Lithuania. Increased lung and larynx cancer morbidity and mortality in men were observed in the districts of Jonava and Kėdainiai (2).

Studies on cancer risk among asbestos-cement workers (3) and textile industry workers were carried out (4). No augmentation of morbility was established. Cohort studies in other industries and popullation groups – the Chernobyl Power Plant accident clean-up workers, medical staff working in radiodiagnostics, workers of slaughter-houses – are being conducted (5, 6).

Analyses of the possible causes of cancer – well known carcinogenic substances such as polycyclic aromatic hydrocarbons (PAH) and volatile N-nitrosamines (NA) – were performed in the ambient air, open water sources and soil in different places of Lithuania. This work was done in cooperation with the Institute of Physics. The indicators of the groups of compounds are benzo(a)pyrene (BP) and N-nitrosodimethylamine (NDMA). Special attention was payed to the pollution of soil and edible plants near the roads. Recommendations to the farmers were published (7). Average concentrations of BP differed in separate administrative districts of Lithuania. They were from 0.1 to 1.8 ng/m^3, whereas NDMA was 13–378 ng/m^3. These results were considered relatively low, with the exception of some western and north-eastern zones of the country. Maps of the polluted

Correspondence to: S. Uleckienė, Institute of Oncology, Vilnius University, Santariškių 1, LT-08660, Vilnius, Lithuania.
E-mail: saule.uleckiene@loc.lt

areas were designed (1989–1992) (8–10). Lung cancerogenesis induced by BP and sulfuric acid was studied in experimental animals (11).

The changes of immunohomeostasis as endogenous high risk factors were investigated. Original classification of immunodisturbances (ANALL) was proposed (Age, Natural Antibodies, Leucocytes, and Lymphocytes) (12, 13).

The status of immunity was investigated among the Vilnius city dwellers as well as among the people living in two districts: Trakai, contaminated by industrial siftings, and Širvintai, considered to be a rather clean district. These investigations proved the influence of age on the immune function. Among the Vilnius city dwellers, the majority of the cellular immunity indices were decreased, while those of humoral immunity were increased or not changed. In Trakai, prominent restoring compensatory reactions were observed. Stimulation of the immune system in males was more evidently expressed due to the impact of tobacco smoking and alcohol drinking (14, 15).

Immune functions of women working in cotton industry were studied. It was observed that the immune functions of women working in clothing workshops were supressed, evidently because the ambient air was contaminated by chemical substances (16). Inhibition of the function of antioxidative system was observed in weavers and clothiers in comparison with the same indices in the control group (17).

Cancer chemoprevention is the pharmacologic intervention by specific chemicals to suppress or reverse carcinogenesis and to prevent the development of cancer. Two basic concepts support this cancer control strategy: multistep carcinogenesis and "field effect" (18). Some studies were conducted at the Institute of Oncology, Vilnius University. The peptides of low molecular weight, not actually identified derived from gastrointestinal tract of pigs, were tested in induced carcinogenesis on experimental animals. Different chemical carcinogens, both organotropic and locally-acting, as well as ionising radiation were used for the induction of tumours in rats and mice. Simultaneously with carcinogen peptides on study, Ventriculine (V) and Duodenine (D) were applied. V inhibited carcinogenesis in different experiments from 30% to 55%, while D did from 37% to 66%. No anticarcinogenic activity of these preparations was observed in radiogenic carcinogenesis. V is a week inductor of interferon and TNF, both compounds are antistressors, they exhibit no antioxidative potency, but inhibit chromosomal abberations in bone marrow cells, induced by BP in mice (19).

Selenium compounds as anticarcinogenic substances were tested in experiments on animals.

Original organic selenium compounds (synthesized at the Institute of Oncology, Vilnius University) were tested in mice lung carcinogenesis. Inhibition of urethane-induced lung adenomas was observed. D-glucosamine hydroselenate inhibited the development of tumours by 44–50% (20).

Cervical and mammary cancer screening programmes are being implemented in Lithuania. Recommendations for this work were prepared by the staff of the Institute of Oncology in cooperation with the colleagues from Kaunas Medical University and the State Center of Pathology. Research on the prevalent types of human papilloma virus – the main cause of cervical cancer – is being carried out (21, 22). It is important as a preparation for vaccination in the future.

Provision of information on cancer to population and education of medical staff were emphasized as important measures in the prevention program *Europe against Cancer*. Population must be motivated to take part in the preventive activities and encouraged to participate in screenings.

The measures taken by the Institute of Oncology, Vilnius University, to inform the population on cancer risk factors and possibilities to avoid it were lectures on specific problems delivered in 2004–2005 every month at the Vilnius Teachers House. Booklets, leaflets with easy-to-read information and placards containing pictures and information are being prepared and published by the Institute of Oncology, Vilnius University.

The information centre functioning at the Institute of Oncology, Vilnius University (VU OI), provides individual information to the people interested. Cancer prevention is presented in the internet portal WWW.VUOI.LT.

Lectures on cancer prevention problems are delivered to medical students as well as doctors working in the fields other than cancerology. Several books on cancer prevention problems were published.

In the future VU OI foresees:

– continuation of epidemiological studies in industry and some population groups;

– search for the biomarkers which may indicate threat of cancer;

– implementation of chemoprevention in the groups of persons, considered as high risk cancer groups;

– adequate information to population on cancer by different means.

Received 14 May 2007
Accepted 01 August 2007

References

1. Stukonis M. Mirtingumas nuo skrandžio vėžio Lietuvos TSR didžiuosiuose miestuose. Navikų diagnostika ir kompleksinė terapija 1961; 275–285.
2. Petrauskaitė R, Pershagen G, Gurevičius R. Lung cancer near an industrial site in Lithuania with major emissions of airway irritants. Int J Cancer 2002; 99(1): 106–11.
3. Smailyte G, Kurtinaitis J, Andersen A. Mortality and cancer incidence among Lithuanian cement producing workers. Occup Environ Med 2004; 61(6): 529–34.
4. Kuzmickienė I, Stukonis M. Lietuvos tekstilės apdailos darbuotojų sergamumas piktybiniais navikais. Sveikatos mokslai 2005; 1(38): 4–7.
5. Kesminienė A, Rimdeika G, Kurtinaitis J. Study of Chernobyl clean-up workers from Lithuania. Acta medica Lituanica 1997; 2: 55–61.
6. Kesminiene A, Cardis E, Tenet V, Ivanov VK, Kurtinaitis J, Malakhova I, Stengrevics A, Tekkel M. Studies of cancer risk among Chernobyl liquidators: materials and methods. J Radiol Prot 2002; 22(3A): A137–41.
7. Miliukaitė A, Žemaitytė R. Rekomendacijos žemdirbiams. VMĮ Lietuvos onkologijos centras 1998.
8. Griciūtė L, Dagienė M, Štriupkuvienė N, Gurevičius R. Atmosferos oro užterštumo reikšmė žmonių sveikatai.

Pirminės profilaktikos ir higienos aspektai: Moksl. Str. Rink. Vilnius: Epidemiologijos, mikrobiologijos ir higienos MTI; 1987; 12–8.
9. Dagienė M, Griciūtė L. Kancerogeninės medžiagos Lietuvoje. Lietuvos mokslas 1994; T. 2, 1(2): 51–7.
10. Griciūtė L, Dagienė M, Miliukaitė A. Pramonė, aplinkos užterštumas ir vėžys. Mokslas ir Lietuva 1991; 3: 27–32.
11. Uleckiene S, Griciute L. Carcinogenicity of sulfuric acid in rats and mice. Pathol Oncol Res 1997; 3(1): 38–43.
12. Moncevičiūtė-Eringienė E. Disturbances of immunohomeostasis as endogenous risk factors of cancer and other diseases and indicators of environmental contamination. Kn.: Vėžio profilaktikos problemos / Sud. Moncevičiūtė-Eringienė EV: Lietuvos mokslas 2001; 33 kn: 88–122.
13. Monceviciute-Eringiene E, Kazbariene B, Milasiene V, Characiejus D, Kemekliene R. Natural antibodies to endotoxin in experimental and clinical oncology. Exp Oncol 2006; 28(1): 89–91.
14. Kazbariene B, Kalibatas J, Krikstaponiene A, Zabulyte D, Monceviciute-Eringiene E. Alterations of human immune system functions in relation to environmental contamination, gender and alcohol consumption intensity. Cent Eur J Public Health 2007; 15(1): 13–7.
15. Kazbariene B, Krikstaponiene A, Monceviciute-Eringiene E. Disturbance of human immunohomeostasis by environmental pollution and alcohol consumption. Acta Microbiol Immunol Hung 2006; 53(2): 209–18.
16. Krikštaponienė A, Kemeklienė R, Kazbarienė B, Lokienė R Moncevičiūtė-Eringienė E. Endotoxins and cancer prevention. Kn.: Vėžio profilaktikos problemos / Sud. Moncevičiūtė-Eringienė EV: Lietuvos mokslas 2001; 33kn: 123–61.
17. Didžiapetrienė J, Prasmickienė G, Šukelienė D, Žemaitytė R. Antioxidative system state of women working in cotton industry. Kn.: Vėžio profilaktikos problemos / Sud. Moncevičiūtė-Eringienė EV: Lietuvos mokslas 2001, 33 kn: 162–75.
18. Uleckienė S, Domkienė V. Actualities of cancer chemoprevention. Kn.: Vėžio profilaktikos problemos / Sud. Moncevičiūtė-Eringienė EV: Lietuvos mokslas 2001; 33 kn: 58–71.
19. Griciute L, Uleckiene S, Domkiene V. Animal tissue components may be anticarcinogenic. Lyon: IARC Publ 2002; 156: 415–6.
20. Uleckienė S, Didžiapetrienė J, Griciūtė L, Šukelienė D. Evaluation of original selenium-containing compounds for potentially chemopreventive properties in experimental lung carcinogenesis. Trace Elements and Electrolytes 2005; 22(1): 33–6.
21. Uleckiene S, Domkiene V. Chemopreventive effect of novel organic selenate on experimentally induced tumours. Theory and Practice of Cancer Prevention: Materials of Conference / Sud. Griciūtė L, Didžiapetrienė J. Vilnius, 88–9.
22. Gudlevičienė Ž, Didžiapetrienė J, Ramael M, Uleckienė S, Valuckas K. P. Human papillomavirus and *p53* polymorphism in Lithuanian cervical cancer patients. Gynecol Oncol 2006; 102(3): 530–3.
23. Gudlevičienė Ž, Didžiapetrienė J, Rudokienė E. Investigation of human papillomavirus type 16 prototypes and variants in cervical cancer patients. Biologija 2006; 2: 50–3.

Laima Griciūtė, Saulė Uleckienė

VĖŽIO PROFILAKTIKOS MOKSLINIŲ PAGRINDŲ TYRIMAI ONKOLOGIJOS INSTITUTE

Santrauka

VU Onkologijos institute vėžio profilaktikos mokslinių pagrindų tyrinėjimai buvo vykdomi keliomis kryptimis: tai epidemiologinės studijos, kancerogeninių junginių aplinkoje analizės ir organizmo galimybių atsispirti vėžiui, t. y. imuninės ir antioksidacinės sistemų būklės esant vėžio rizikai, tyrimai. Bandymuose su gyvūnais vykdyta chemoprofilaktika. Pastaruoju metu tyrinėjamas ŽPV ir jo tipų paplitimas Lietuvoje. Buvo skirtas dėmesys studentų ir kitų specialybių gydytojų vėžio profilaktikos pagrindų mokymui, taip pat visuomenės informacijai apie vėžio riziką ir galimybes jos išvengti. Išleistos kelios knygos ir daug kitos informacinės medžiagos vėžio profilaktikos klausimais.

Raktažodžiai: vėžio profilaktikos moksliniai tyrimai, Vilniaus universiteto Onkologijos institutas