Keywords: lung cancer, age and gender dynamics, risk factors which can lead to cancer, smoking impact, prevention, impact of the environment on cancer incidence, air protection

The object of research is the official statistics of the European database of the Republic of Belarus the incidence of lung cancer in the population.

The purpose of research – to study the epidemiological aspects of population sickness rates of lung cancer in Republic of Belarus, and to assess the medical and social significance of the problem in people's lives.

In the study, a retrospective analysis of lung cancer incidence rates in the Republic for the period 2010–2015 was conducted. Extensive and intensive indicators, rates of increase in morbidity, long-term trends by the method of least squares were calculated. The statistical processing of data and the graphical construction of the diagram were carried out using Microsoft Excel 2007.

As a result of a retrospective analysis of the incidence of malignant neoplasms in the lungs in the Republic of Belarus for the period from 2002 to 2015 we can draw the following conclusions:

• lung cancer occupies the first place in the structure of oncological morbidity; the number of men with lung cancer exceeds the number of women by 9–10 times;

• for the period from 2002 to 2015 there was an unstable tendency of reduction the incidence of lung cancer in the Republic of Belarus ($R^2 = 0,5972$);

• The overwhelming majority of patients are elderly with the age 60 years and over.

• During the studied period, there is a pronounced tendency to reduce the death rates, caused by lung cancer, of the population of the Republic of Belarus ($R^2 = 0,9443$).

Lung cancer more than other forms of malignant tumors is associated with pollution of air by carcinogens, smoking has an immense role in the development of lung cancer. Professional factors play a major role in the development of lung cancer.

OPTIMIZATION OF MORPHOLOGICAL METHOD OF APOPTOSIS RESEARCH IN CELL CULTURE

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Now there is no consensus on what parameters are optimum for an apoptosis research. We provided a research on optimization of a morphological method of a research of apoptosis in cell culture using a fluorescent dye acridine orange (AO). As a result, it was chosen such optimal characteristics as concentration of dye, concentration of cells in suspension, time and temperature of incubation. After the apoptosis assay procedure was optimized, the level of apoptosis in a culture of lymphocytes incubated for 48 hours in the presence or absence of 15 μg / ml phytohemagglutinin (PHA) was assessed using a morphological fluorescence method in our modification in patients with osteoarthritis.

Keywords: apoptosis, acridine orange, fluorescence, morphological method of research, cell culture.

The problem of investigation of apoptosis and its relationship with various diseases is relevant in biology and medicine. Now there is no consensus on what parameters are optimum for an apoptosis research. We provided a research on optimization of a morphological method of a research of apoptosis in cell culture using a fluorescent dye acridine orange (AO).

The study was based on a 48-hour culture of lymphocyte cells, a 72-hour culture of MSC and a 72-hour culture of CAL 51 carcinoma cells. Centrifugation was used to isolate the cells, as a result of which substances placed in tubes were separated into different substances according to the density level. Cells with higher density settle on the bottom of the tube, and a precipitate is formed. To control the intermediate loss of cells associated with subsequent manipulation with them, cell viability is calculated by the method of turning the trypan blue dye at a final concentration of 0,1 %. To evaluate apoptosis a fluorescent dye AO was used. With the help of this dye, the apoptotic cells are taken into account by the characteristic morphology of the nucleus (condensed and fragmented chromatin). AO selectively reacts with the nucleic acids (DNA and RNA) of the cell.

After the study, it was found that the most suitable concentration of fluorescent dye AO for the study of spontaneous apoptosis is 2 μg / ml. When adding a dye at a given concentration, it is possible to adequately assess the results of apoptosis in the cells under study. The optimum temperature for the incubation of cells is 37° C. As

a result of laboratory studies, it was found that the increase in the incubation temperature increases the intensity of apoptosis reactions in cells. With regard to the incubation time, the present study found that the most optimal incubation time, in the study of spontaneous apoptosis is 10 minutes. This time is sufficient for the AO to completely penetrate the cell and be embedded in nuclear DNA and RNA. The optimal concentration of cells in the study of spontaneous apoptosis in cells is $2x10^6$/ml. With the addition of a low concentration of cells, only single cells are observed in the test samples, as a result of which it is impossible to fully assess the nature of the morphological changes in cells in apoptosis. In the presence of a sufficient sample of cells in the sample, it is possible to adequately evaluate and draw reasonable conclusions about the course of apoptosis reactions in the cells under study.

After the apoptosis assay procedure was optimized, the level of apoptosis in a culture of lymphocytes incubated for 48 hours in the presence or absence of 15 μg / ml phytohemagglutinin (PHA) was assessed using a morphological fluorescence method in our modification in patients with osteoarthritis. A statistically significant decrease in the number of lymphocytes in apoptosis in the presence of PHA was found in comparison with spontaneous apoptosis in patients with osteoarthritis. The findings are consistent with a statistically significant decrease in lymphocyte concentration after exposure to PHA for 48 hours compared to similar parameters in the absence of stimulation. It should be noted that in all cases, the lymphocyte concentration increased with respect to the lymphocyte concentration at the beginning of the incubation ($1x10^5$ / ml cells).

THE ASSESSMENT OF THE EFFICIENCY OF THE CARDIAC CARE TO THE POPULATION OF GOMEL REGION

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The analysis of the statistical data of the state healthcare institution Gomel Regional Clinical Cardiological Center on a case rate and mortality from the circulatory system diseases in Gomel region from 2011 to 2015 showed the decrease of primary circulatory disease incidence of the population of Gomel region from 2011 to 2015 by 16 % andthe decreasein mortality rate from the circulatory diseases by 6 %.

Keywords: coronary artery disease, myocardial infarction, circulatory diseases, cardiac care.

Circulatory system diseases are the leading cause of death amongpopulationaround the world, they influence significantly on the performance and bioticpotential of the society and on the demographic safety of the state. High incidence and constant tendency to increase the case rate from the circulatory system diseasesis a problem for all developed countries of the world, notably the leading diseases are coronary artery disease, arterial hypertension and cerebrovascular diseases.

For the assessment of the efficiency of the cardiac care to the population of the Gomel region, the database of the in follow-up by the cardiologistpatients in the state healthcare institution Gomel Regional Clinical Cardiological Center from 2011 to 2015 was analyzed. Indicators of the case rate and mortality from the circulatory system diseases, the introduction of hi-tech types of patient care and their efficiency were considered.

During the observation period, the reduction was revealed in primary incidenceof circulatory system diseases(by 16 %), arterial hypertension (by 23 %), coronary heart disease (by 15 %), cerebrovascular illnesses (by 23 %), and indicators of the crude incidence rate decreased slightly. Bothabsolute and relative indicators of the mortality from the circulatory system diseases in Gomel region from 2011 to 2015 decreased by 6 %. Among the able-bodied population these indicators decreased by 26 % and 22 % respectively. The mortality indicator from an acute myocardial infarction in the healthcare institutionof Gomel region decreasedby 22 % by 2015 in comparison with 2011, from an acute disorder of the cerebral circulation decreased by 12 % by 2015. The quantity of the cardiac surgical treatmentperformedinthe state healthcare institution Gomel Regional Clinical Cardiological Centerincreased from 2011 to 2015 by 26 %. At the same time, the number of endovascular surgical methodsforcoronary vessels increased fourfold.

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