**Introduction.** Cirrhosis is an end-stage liver disease accompanied with irreversible replacement of the parenchymal tissue by a fibrous connective tissue [1]. One of the most widely used experimental models of liver damage is the common bile duct ligation (CBDL) in laboratory animals, which provides the development of fibrosis followed by progression to cirrhosis at 4–6 weeks [2]. The main role in fibrogenesis belongs to the isoforms of transforming growth factor beta (TGFβ) – a multifunctional cytokine playing important role in immunomodulatory processes in organism [3].

**Aim.** Evaluate the serum level of TGFβ and the expression of the TGFβ1 and TGFβ3 isoforms genes in liver tissue of CBDL rats at different stages of fibrogenesis.

**Materials and methods.** Serum and samples of liver and spleen tissue from Wistar rats with induced CBDL model (n=6) or control group (n=5) were obtained during period of 6 - 11 weeks after model establishment. The control group of animals were performed a "sham" operation without imposing ligatures. The level of gene expression in liver tissue samples was determined by real-time polymerase chain reaction. Morphological study of the percentage of surviving hepatocytes was performed by staining histological sections of the liver. The extracellular level of the cytokine was evaluated by the enzyme immunoassay.

**Results.** Morphological examination of liver histological sections at 6 – 11 weeks of CBDL showed that the percentage of undamaged hepatocytes in the experimental group was 40,5 [25,5 ÷ 50] %, which is 2 times less than in the control group (95,5 [93,5 ÷ 96]. It was shown that the number of preserved hepatocytes in CBDL rats was significantly decreased and by 11 weeks was 3 times less than at week 6. A correlation was established between the percentage of functional hepatocytes and the index of spleen mass ($R = 0,9$, $p<0,05$), which indicates the involvement of immune mechanisms in fibrogenesis. As a result of molecular biological studies, it was found that expression levels of TGFβ1 and TGFβ3 in liver tissue of CBDL rats were significantly increased compared to the control group ($p<0,05$). Thus, the average level of expression of TGFβ1 molecules was 71,95 [30,7 ÷ 96,3] fold, and TGFβ3 was 27, 4 [12,8 ÷ 30,1] fold, which exceeded by 75 times and 13 times similar parameters in control animals. Analysis of the dynamics of TGFβ1 and TGFβ3 genes level of expression revealed the increase by 1,85 times and 2,85 times, respectively, from week 6 to 7. At week 8, the level of TGFβ3 isoform expression in CBDL rats was the same as at week 7. The ratio of TGFβ1 / TGFβ3 in CBDL rats during the study was gradually decreased, what was not observed in the control group. So, at week 6, this index was 7,41, and by the end of week 11 it was decreased in 6 times. A correlation between the percentage of preserved hepatocytes and the level of expression of the isoform of TGFβ3 ($R = 0,87$, $p<0,05$) was established. It was revealed that extracellular production of TGFβ in the serum of CBDL rats was 2 times less compared to the control group of animals and decreased as the disease progressed.

**Conclusion.** Fibrogenesis in CBDL rats was characterized with a significant increase in the expression of the profibrogenic isoform TGFβ1, a disbalance of ratio TGFβ1 / TGFβ3 and a gradual decrease in the extracellular cytokine concentration, which may be a key moment for the optimal determination of fibrogenesis markers and serve as a basis for the subsequent development of effective antifibrogenic therapy for pathological conditions liver.

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## EPIDEMIOLOGICAL ASPECTS OF LUNG CANCER

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In Belarus, lung cancer takes the first place on the incidence of cancer among men. Lung cancer is a serious health and social problem. In the developed countries it is the most common type of cancer and the most common cause of death among oncological pathologies. The main focus is set on two factors: first – strengthen air pollution; second – the increase of tobacco usage.

*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