Type 2 diabetes mellitus selection coefficients were obtained on the data about 2106 health and 537 type 2 diabetes mellitus women fertility indexex. It has been shown, that positive direction of type 2 diabetes mellitus selection types is an original cause of its prevalence in population increasing. Change in gene population of frequencies of predisposition to type 2 diabetes mellitus has led to increase in structure of disease of the form with development absolute insuline deficiency at type 2 diabetes mellitus patients , more burdened form of this type of diabetes.

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THE CYTOGENETIC APPROACHES TO THE PREVENTION OF RADIOGENIC CANCER

Introduction

It has been recognized that only prophylactic activity through the implementation of the relevant social and national policy can prevent the growth of cancer morbidity rates. Such a strategy of health promotion is applied successfully in the prevention programmes of the European region and must be dominant in connection with the Chornobyl catastrophe [1–3]. Otherwise we will be further bound to eliminate its consequences (treating patients) rather than prevent the rise of cancerous diseases, part of which develop under the influence of the radiation factor of the Chornobyl disaster. Therefore the issue of studying the effects of low dose radiation on human organism currently has a clear practical orientation as a large part of population has been affected or are being affected by the radiation factor of the Chornobyl disaster. Furthermore, Ukraine has 15 active nuclear power generating sets which represent one of the major nuclear power programmes in Europe. The abovementioned circumstances prompt scientists to conduct thorough study and purposeful modification (attenuation) of the medical and biological effects of low dose radiation.

One of the fundamental aspects problem of low doses is the evaluation of genetic apparatus structure and function destabilization, as radiation-induced genome damage can cause the development of immunodeficiency, carcinogenesis, reproductive problems and a range of other negative long-term effects, primarily in people with radiation hypersensitivity. Objective information on the condition of the human somatic cells genetic apparatus can be obtained through the analysis of chromosome aberration and genome damages in peripheral blood lymphocytes. In accordance with the recommendations of the World Health Organization, these indices are objective biodosimeters and the most sensitive indicators of the mutagenic effect of radiation.

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With the aim of preventing the negative effects of low dose ionizing radiation on human organism, drugs activating the immune and reparation system and thereby increasing genome stability are used. Efficient modifiers include inosine (trade name "riboxine") widely used in cardiology, which supports energetic balance in tissues. By increasing ATP (adenosine triphosphate) level this drug stimulates the postradiational rehabilitation processes, as well as other systemic metabolic processes.

Goals: to study the modification effect of inosine on the frequency of the radiation-induced cytogenetic effects in human somatic cells.

Methods

The irradiation of lymphocytes *in vitro* received from healthy donors had been done on therapeutic apparatus "Rockus" (with ^{60}Co source) in range 0.1–1.0 (0.1; 0.2; 0.3; 0.4; 0.5; 1.0) Gy. The inosine was added to the cell culture in the concentration of 0,01 mg/mL of blood 30 min before the irradiation. With the aim of determining individual radiation sensitivity of the persons under study, lymphocyte culture was exposed to irradiation during the 46th hour of cell incubation, i.e. at the G_2-stage of cell cycle — the most irradiation-sensitive period with the dosage of 1.5 Gy according to G_2-radiation sensitivity assay [4]. Intact cell cultures for each donor were used for control (for the evaluation of the spontaneous chromosome aberration level).The metaphase analysis of chromosome aberrations had been carried out with group kariotyping.

Results

First working stage — using inosine as antimutagen.

The effects of inosine on spontaneous chromosome aberrations level in human lymphocytes have been investigated. It has been established that under the influence of inosine, general chromosome aberration frequency in lymphocyte culture of conditionally healthy donors decreases 2.6 times, and chromatid type aberration frequency decreases 1.7 times; chromosome type aberrations "disappear" under the influence of inosine (Fig. 1).

Second working stage — using inosine as radioprotector.

The highest radioprotective effect of inosine is observed when the cell culture is irradiated in the range between 0.1–0.2–0.3 Gy. The level of chromosome aberration decreases from 6.06±0.6; 7.06±1.6; 7.76±1.0 to 1.6±0.1; 2.6±0.4; 2.2±0.6 respectively and reaches the meanings of spontaneous level of genetic damages of human's cells. During this the coefficient of modification equals to 2.7–3.8. With a further increase in radiation up to 1.0 Gy, the radioprotective effect of inosine decreases and the coefficient of modification equals to 1.2 (Fig. 2).

It has been established that inosine ambiguously affects 'dose-effect' calibration curves:

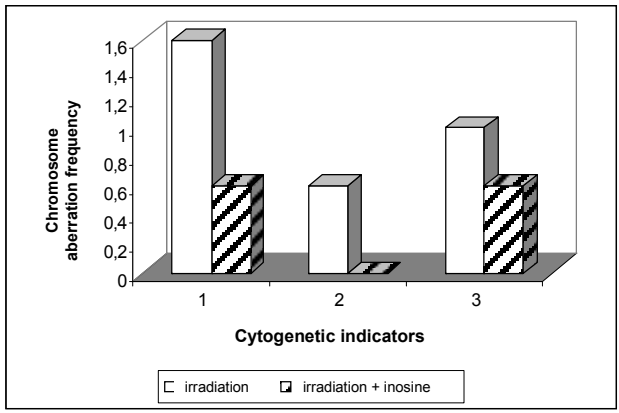

Fig. 1. **Modifying effect of inosine on spontaneous aberrations level in PBL of conditionally healthy donors.**

Keys: 1 — total amount of chromosome aberrations, 2 — chromosome type aberrations frequency, 3 — chromatid type aberrations frequency (mean group values)

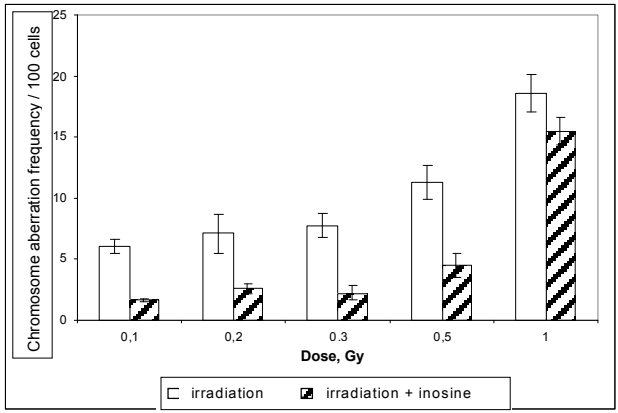

Fig. 2. **Modifying effects of inosine on radiation induced chromosome aberrations frequency**

— under the influence of inosine, the dose curve built on the basis of mean group values of chromosome aberration rates is located below the calibration curve, plateau remaining in the same dose range of 0.1–0.3 Gy observed in one irradiation. This is primarily indicative of inosine efficiency; secondly, inosine does not fundamentally affect the abnormal form of the 'dose-effect' curve;

— for certain values of donor's individual radiation sensitivity, the dose-independent section (plateau) can increase up to the upper limit of the low dose range (0.5 Gy).

As the increase in the level of chromosome change in cell population is considered potentially carcinogenic, using inosine as radioprotector under low dose radiation is relevant with the aim of radiogenic cancer primary prevention.

Conclusions

The protective effect of inosine has been established on the genetic level of human somatic cells by using low doses of radiation. Inosine does not affect the abnormal form of the 'dose-effect' curve. Obtained data regarding inosine effect on human genome stability should be taken into account for the primary prevention of radiogenic tumor development as a remote negative effect of the Chornobyl disaster.

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Резюме

The antimutagenic and radioprotective effect of inosine has been established on the chromosomal level of human cells. Inosine should be used in order to prevent the emergence of radiogenic cancer.

На хромосомном уровне клеток человека установлен антимутагенный и радиозащитный эффект препарата инозин, который целесообразно использовать с целью профилактики возникновения радиогенного рака.

На хромосомному рівні клітин людини встановлено антимутагенний та радіозахисний ефект препарату інозин, який доцільно використовувати з метою профілактики виникнення радіогенного раку.

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МЕТОДИЧЕСКИЕ ОСНОВЫ ЭФФЕКТИВНОГО ПРЕПОДАВАНИЯ КУРСА "ИСТОРИЯ ЭВОЛЮЦИОННОГО УЧЕНИЯ" В КРАСНОЯРСКОМ ГОСУДАРСТВЕННОМ АГРАРНОМ УНИВЕРСИТЕТЕ

Дисциплина "История эволюционного учения" представляет собой составную часть общей подготовки студентов биологических и технических специальностей наряду с другими общеобразовательными курсами.

Целью введения в образовательные программы ФГОУ ВПО "КрасГАУ" дисциплины "История эволюционного учения" является повышение биологической грамотности и заполнение пробела в общем, фундаментальном естественнонаучном образовании студентов.

Курс по выбору "История эволюционного учения" носит мировоззренческий характер и построен таким образом, чтобы вводить необходимые базовые естественнонаучные понятия для создания представлений об истории эволюционных идей, о многообразии взглядов на проблему происхождения жизни на Земле.

В этом курсе приводятся основные сведения о доказательствах эволюции органического мира, закономерностях микро- и макроэволюции, о происхождении и развитии жизни на Земле, рассматривается теория антропосоциогенеза.

Задачи курса следующие:

— познакомить студентов с историей эволюционных идей, изучить основные группы доказательств органического мира;

— изучить понятие вида и его критерии, выяснить механизмы репродуктивной изоляции в природе, познакомиться со структурой вида, изучить элементарные эволюционные факторы и их роль в эволюции, рассмотреть механизмы возникновения адаптаций и видообразования;

— изучить главные направления органической эволюции и пути достижения биологического прогресса; выявить основные пути филогенеза групп организмов; изучить современную систему органического мира;

— познакомить студентов с многообразием взглядов на проблему происхождения жизни на Земле, изучить сущность современной теории происхождения жизни, рассмотреть основные этапы эволюции растительного и животного мира на нашей планете;

— рассмотреть движущие силы антропосоциогенеза, показать взаимосвязь биологических и социальных факторов антропосоциогенеза, изучить