the animals were administered a 50% oil solution of tetrachlormethan at a dose of 0.25 ml / 100 g weight); D - for the next seven days after intoxication, the animals were intragastrically injected by Echinacea purpurea tincture (0.25 ml / kg body weight). Euthanasia, by decapitation under light ether anesthesia, was performed at 8 o'clock in the morning. In the serum of rats TAAS was determined, which was expressed as a percentage of inhibition of spontaneous peroxidation of endogenous lipids of the brain (according to the content of malonic dialdehyde).

Under conditions of different duration of the photoperiod, changes in TAAS were observed: in the second group of animals, it decreased by 9.21%, and in the third group it increased by 18% compared to the animals of the first group. The introduction of EPT increased the antioxidant activity of rat serum by 10.32% (under conditions 12L: 12D), by 18.74% (under conditions 24L: 0D) and by 6.5% (under conditions 0L: 24D) compared with animals of the corresponding control groups.

After intoxication with tetrachlormethan in all groups of animals, there was a decrease in the level of TAAS: in the IC group - by 28.04%; in the IIC group - by 34.7% and in the IIIC group by 27% compared with animals of the corresponding control groups. At seven-day administration of EPT to intoxicated rats the increase of TAAS by 24% (under conditions 12L: 12D), by 40% (under conditions 24L: 0D) and by 14% (under conditions 0L: 24D) was revealed.

Therefore, according to the results of research there was a decrease in TAAS of rats under conditions of stay in constant daylight and an increase of it in round-the-clock darkness, which may indicate the suppression of antioxidant protection in conditions of reduced functional activity of the pineal gland. At the same time, the presence of animals in the conditions of round-the-clock darkness promotes the activation of TAAS in them. The introduction of EPT has a positive effect on increasing the antioxidant resistance of serum in both healthy animals and those intoxicated with tetrachlormethan. This effect was manifested, in particular, at low functional activity of the pineal gland and may indicate the feasibility of EPT as a drug with antioxidant properties under conditions of enhanced oxidation processes.

Luhinich N.M.

EFFECTS OF THE 14-DAY-INTRODUCTION OF MELATONIN ON CONTENT OF TBA-ACTIVE PRODUCTS IN THE LIVER OF ALLOXAN DIABETIC RATS

Department of Bioorganic and Biological Chemistry and Clinical Biochemistry
Bukovinian State Medical University

Complications of diabetes include cardiovascular disease, chronic renal insufficiency and diabetes retinopathy. These complications associated with hyperglycemia cause oxidative stress in the body.

The experimental model of alloxane diabetes is quite common, which is often used to study the different aspects of pathogenesis and pathomorphology of diabetes. It is known that during the diabetes activation of free radical oxidation of biomolecules occurs as well as depletion of the antioxidant system. Free radicals destroy lipids and proteins on the membranes and cause modifications and oxidation of lipids and proteins thereby damaging cells.

Melatonin is one of the strongest antioxidants that is secreted by the daily rhythm of the pineal gland. Recently, scientists and physicians actively studied the physiological effects of melatonin on different organs and systems, as this hormone has somnogenic effect and it is a regulator of circadian systems of the organism as well as the immune system stimulator and shows protective properties from premature senescence, cancer, stress and is an antioxidant. It can suppress reactive oxygen species (ROS). This study was aimed to investigate the effect of melatonin on content of TBA-active products in the liver of alloxan diabetic rats.

The experiments were carried out on sexually mature male albino rats with the body weight – 150-180 g. Alloxan diabetes was evoked via single injecting the rats with 5% alloxan monohydrate solution (Sigma Chemicals Company: 150 mg/kg body weight) dissolved in normal saline to the male rats, after an overnight fast (access to only water) of 12 hours to make them more

susceptible to developing diabetes. After diabetes induction, melatonin (10 mg/kg daily) was administered intragastrically to the animals in the melatonin-treated group for 14 days.

The animals were divided into the next groups: control rats – group I; diabetes (14 days) – group II; diabetes + melatonin (14 days) – group III. All data are expressed as means ± S.E. and represent at least four independent experiments. Significant differences between groups were evaluated by using Wilcoxon test with $p< 0.05$.

During the experiment an increased level of glucose in the blood was found and that is typical for diabetes mellitus. It was established that under conditions of alloxane diabetes processes of free radical damage to biomolecules are intensified as evidenced by the increase in the content of TBA-active products in the liver by 42 % at 14 days of alloxane diabetes. That indicates the increase of oxidative stress. We have found out that the introduction of melatonin daily for 14 days to rats with alloxane diabetes contributed to a decrease of the content of TBA-active products in rats liver to 31 % compared with untreated animals. An important aspect of the cellular effect of melatonin is its effect on the process of lipid peroxidation and the level of free radicals that grow in diabetes mellitus. Antioxidant effect of melatonin is likely to be related to the ability to intercept free radicals due to the presence of indole ring in its composition.

The results of our study showed that alloxane diabetes was observed by an increase the content of TBA-active products in the liver on the background of significant increase of glucose levels in the rats' blood. In conditions of alloxane diabetes and the introduction of exogenous melatonin in rats with alloxane diabetes in a dose of 10 mg/kg daily for 14 days it caused a pronounced antioxidant effect lowering free radical oxidation in the liver of alloxan diabetic rats.

Okrepka G.M.

INFLUENCE OF THE MATRIX ON THE PHOTOLUMINESCENCE PROPETIES OF QUANTUM DOTS

Department of Medical and Pharmaceutical Chemistry
Bukovinian State Medical University

Nanoparticles of semiconductors, also known as quantum dots (QDs), have unique chemical, optical and electrical properties, and also, they demonstrate strong size-dependent photoluminescence and absorption in the visible region. These properties make quantum dots attractive and perspective material for different optical and optoelectronic types of equipment but these devices require steady-state composites. Despite numerous methods of quantum dots incorporation into organic and inorganic matrix, the search for the tight matrix for enhancing QDs photostability under UV-irradiation, thermal and chemical stability is a very important task.

The comparison of CdTe/CdS QDs photostability in different matrices (KH_2PO_4 (KDP), KBr, $CaCO_3$, $BaSO_4$) was reported. Colloidal solutions of CdTe/CdS nanocrystals stabilized by thioglycolic acid were synthesized in aqueous solution. KDP:QDs and KBr:QDs composite crystals were synthesized by means of the direct incorporation via slow solvent evaporation method. $BaSO_4$:CdTe/CdS and $CaCO_3$:CdTe/CdS composite crystals were synthesized by the coprecipitation method. The steady-state photoluminescence measurements were carried out using Ocean Optics USB2000 array spectrophotometer at room temperature. Using Specta Suite software, PL spectra of the composites were collected and the time dependence of the integrated PL intensity (measured every 10s) was recorded. PL decay under UV irradiation of two low-pressure mercury lamps with total power of 8 W was measured.

In the Figure PL spectra of starting CdTe/CdS colloidal solution diluted as 1:10 (to the diminished Förster resonance energy transfer) and obtained composites are represented. The red shift in all composites due to an aggregation of nanoparticles was observed with the exception of KDP matrix.

The incorporation of CdTe/CdS QDs into the KDP crystals showed no indication of QDs aggregation, as evidenced by a small blue shift of the PL maxima. Foerster resonance energy transfer is less pronounced in the matrix than in the growth solution due to the fixed distance