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.

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INFLUENCE OF THE MATRIX ON THE PHOTOLUMINESCENCE PROPETIES OF QUANTUM DOTS

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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

between particles. That is proven by the fact, that the crystals grown from the diluted solution do not demonstrate this shift.

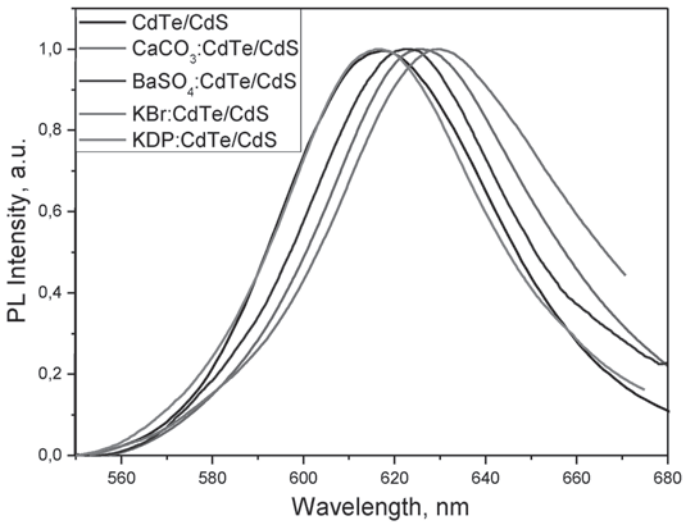

Figure. Normalized PL spectra of starting CdTe/CdS solution and composite crystals.

Encapsulation of nanoparticles by other solid matrices caused a bathochromic shift in the luminescence peak. Interband quantum transition theory was used to explain influence of the matrix on the luminescence properties of the capsulated CdTe QDs.

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SYNTHESIS AND EVALUATION OF HYPOGLYCEMIC ACTIVITY OF NEW PYRAZOLOTHIAZOLIDINE HYBRID STRUCTURES

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In recent years the search for new effective and safe antidiabetic (hypoglycemic) medicinal products for therapy of type 2 diabetes mellitus (DM-II) has become especially important. The key leading compounds for creating antidiabetic agents were found to be synthesized on the basis of pyrazole and thiazolidine scaffolds.

In this context the recently obtained results showing high hypoglycemic activity of hybrid platforms formed from pyrazole and 1,3-thiazolidine cyclical fragments seem especially interesting. Taking into account the fact that inclusion of two molecular chemotypes in one hybrid molecule is quite productive for constructing bioactive compounds, the subject of this study is related to the synthesis, evaluation of hypoglycemic activity and probable action mechanism of new pyrazole-thiazolidine structures connected by hydrazone bridge.

3-Aryl-4-formylpyrazoles I a-d with pharmacophoric aryl and pyridine substituents in the position 3 of the heterocycle were chosen as basic substrates for synthesis of the target hybrid compounds. Structural modification of their formyl group with thiosemicarbazide in boiling methanol in the presence of catalytic agent, acetic acid, was successfully used to synthesize (with yields of 73-83 %) the corresponding thiosemicarbazones II a-d – ambident bicenter reagents for further formation of thiazolidine nucleus. It was shown that their 1-hour cyclocondensation with acetylenedicarboxylic acid diethyl ester, a reagent that is highly electrophilic and widely used in heterocyclic synthesis [36], is highly regioselective and leads to previously undescribed (1,3-thiazolidine-5-ylidene)hydrazones of 3-arylpyrazole-4-carbaldehydes III a-d with yields of 82-93 % (Diagram). Taking into account results of the studies, it can be soundly assumed that this interaction is carried out through a stage of primary acylation of compounds II a-d thiourea group with formation of intermediates A.