

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
ВИЩИЙ ДЕРЖАВНИЙ НАВЧАЛЬНИЙ ЗАКЛАД УКРАЇНИ
«БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



МАТЕРІАЛИ

101 – ї

підсумкової наукової конференції

професорсько-викладацького персоналу

Вищого державного навчального закладу України

«БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»

10, 12, 17 лютого 2020 року

Чернівці – 2020

УДК 001:378.12(477.85)

ББК 72:74.58

М 34

Матеріали 101 – ї підсумкової наукової конференції професорсько-викладацького персоналу вищого державного навчального закладу України «Буковинський державний медичний університет» (м. Чернівці, 10, 12, 17 лютого 2020 р.) – Чернівці: Медуніверситет, 2020. – 488 с. іл.

ББК 72:74.58

У збірнику представлені матеріали 101 – ї підсумкової наукової конференції професорсько-викладацького персоналу вищого державного навчального закладу України «Буковинський державний медичний університет» (м.Чернівці, 10, 12, 17 лютого 2020 р.) із стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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ISBN 978-966-697-843-4

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It has been suggested that glutathione therapy might give helpful results in prevention of first stage development of nephropathy. However, the underlying mechanism of relationships between H₂S and the antioxidant system warrants further studies.

Kropelnytska Yu.V.

**AGGREGATION OF THE SQUARAINE DYES AND ITS INFLUENCE ON THE
PHOTOGENERATION OF ELECTRIC CHARGE CARRIERS**

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As energy consumption is growing dynamically, the need in new and alternative energy sources becomes more and more acute. The efficiency of new solar energy conversion systems can reach up to 42.3 %. Besides, this energy can also be used in various photochemical and photo-generated processes.

TiO₂ is known as the most suitable semiconducting material for various photocatalytic processes, conversion and accumulation of the solar energy and for numerous environment protection applications such as photodestruction of inorganic and organic pollution agents. The photosensitivity range of TiO₂ can be expanded significantly by application of the special dye-sensitizer. The squaraine dyes are known as prospective candidates for such sensitizers since they can form the H- and J-types associates after application on the semiconductor's surface. These associates manifest themselves through expansion of the shortwave (in case the H-type is formed) or longwave (J-type) absorbance bands.

The inter-molecular interaction occurring inside the organic semiconducting films is an influential factor for successful development of highly effective photoelectric cells since this process is a key actor governing the behavior of excitons and electric charge carriers. That is why investigation of the molecules aggregation remains under strict attention in the field of research and development of the organic photoelectric cells. When the concentration of dissolved dye is high, its molecules can form some associates due to the Van der Waals and electrostatic attraction. In contrary to the chemically bonded dimers (bis-dyes), the above associates can form more complex aggregates bonding more than two molecules. The more molecules are involved in the associated complex, the wider is a gap between the states S₁^h and S₁^l because each of these states, in its turn, also becomes wider. This process leads to a more active intercombinational conversion in the multimolecular aggregates comparing to that in the dimers. Besides, the probability of formation of the parallel disposition of chromophores in the multimolecular associates is also increasing. If a dye doesn't consist of any bulky substitutes and its planar structure is not disturbed, the molecules would make mostly the H-type associates of the sandwich-like parallel arrangement of the chromophores, which ensures the maximal stability because of the disperse and specific electrostatic attraction forces between the monomers. If the above conditions are not observed, the H-type associates does not form and the dye would form a less stable "head-tail" type associates with the angles between the chromophores close to 180°. In contrary to the monomer spectrum, only the longwave absorbance band appears in a spectrum of such associates. This is a rarer situation of the J-type aggregation. In this case the molecules form a one-dimensional structure manifesting itself through a stronger absorbance and the significant bathochromic displacement of the J-type absorbance band. The J-type films reveal a deeper light absorption even beyond absorbance zone of the corresponding monomer. This brings the light absorption parameters closer to the natural solar spectrum and, consequently, improves efficiency of the solar light conversion. Besides, the inter-molecular attraction is stronger in case of the J-type aggregation, which brings new opportunities for further advances in optical and electric performance of the thin organic films.

On the basis of analysis of the relevant publications it can be concluded that the squaraine dyes are prone either to the H- or J-type aggregation depending on their structure, chromophore positions and external conditions. The hypsochromic H-type aggregates can be formed on the air/water interphase, inside the Langmuir-Blodgett films or in the water or mixed water-organic



solutions (the double-layer vesicles). The J-type associates are expected in the configuring dimethylformamide solution, inner-zeolite channels and in the Langmuir-Blodgett films.

Kushnir O.Yu.

GLUCOSE TOLERANCE PROFILES IN RATS WITH ALLOXAN DIABETES

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Alloxan has been used as a diabetogenic agent to induce diabetes. It selectively induces pancreatic β -cell death.

The objective was to determine the influence of alloxan monohydrate on glucose level in the blood plasma of rats.

The research was performed in compliance with the Requirements of work using experimental animals (1977) and the Council of Europe Convention on the Protection of Vertebrate Animals used in experiments and other scientific purposes (18 March 1986). The experiments were carried out on 30 sexually mature male albino rats with the body mass – (0,18 – 0,20) kg. Alloxan diabetes was simulated via injecting the rats with a 5% solution of alloxan monohydrate intraperitoneally in the dose of 170 mg/kg of body weight. After a 12-h fast, a 75-g OGTT (oral glucose tolerance test) was performed with 0, 30, 60, and 120 min sampling for plasma glucose levels measurements. The rats were sacrificed on the 7th day of the experiments in accordance with the ethical treatment of animals. Statistical analysis of results was conducted by Student's test. Sufficient level considered probability differences $p \leq 0,05$.

In accordance with results rats were classified into three groups according to the glucose tolerance status as having normal glucose tolerance (NGT) when fasting plasma glucose (FPG) was <7.0 mmol/L (100 mg/dL) and 2-h post-load <7.8 mmol/L (140 mg/dL) – this group included rats without alloxan injection; impaired glucose tolerance (IGT) when FPG was <5.6 mmol/L (100 mg/dL) and 2-h post-load was 7.8–11.0 mmol/L (140–199 mg/dL) and diabetes when FPG was >7.0 mmol/L (126 mg/dL) and/or 2-h plasma glucose >11.1 mmol/L (200 mg/dL) [In accordance to the American Diabetes Association (ADA) criteria]. In group of IGT 2-h post-load plasma glucose level was 28% higher in comparison to the respective index of the control. Rats with diabetes demonstrated FPG higher on 112% as well as 2-h post-load plasma glucose level which was increased on 97% than control indices respectively.

These results demonstrated that alloxan monohydrate has an action with formation of different glucose tolerance profiles in rats with alloxan diabetes.

Lenga E.L.

EFFECTS OF MELATONIN ON THE CONTENT OF REDUCED GLUTATHION IN THE BLOOD UNDER TOXIC HEPATITIS

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Every year oxidative load on the body of contemporary humans is constantly increasing. In the fight to maintain oxidant / antioxidant balance, a prominent place belongs to the glutathione system, which is active in all organs and tissues. However, under conditions of intensification of peroxidation processes, in order to enhance and maintain the activity of this system, it is advisable to use drugs with antioxidant properties. One of these is the epiphyseal hormone melatonin.

The objective of the study was to determine the effect of melatonin on the content of reduced glutathione reduced in the blood of rats under toxic tetrachloromethane hepatitis.

The experiments were performed on nonlinear adult male rats weighing 180 ± 10 g. Animals were kept under artificial lighting with periods of 12 h of light: 12 h of darkness (12C: 12T), which corresponds to the normal function of the epiphysis. After a five-day stay under appropriate lighting conditions, the rats were divided into groups: I - control; II - animals with toxic hepatitis