PHARMACOLOGICAL STUDY OF THE USE OF NANOPARTICLES OF CERIUM DIOXIDE IN THE DEVELOPMENT OF NEW GENERATION EFFECTIVE AND SAFE PHOTOPROTECTORS

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The effect of excessive solar radiation on the skin can be harmful and cause melanoma. Due to the bad environment, ozone depletion and increased solar activity, this problem has become very serious. By results of the researches which have been carried out by Institute of dermatology and cosmetology, every summer during holiday as a result of solar burns 10 thousand Ukrainians get sick of a cancer of skin. 95% of the patients in Ukraine with a melanoma perish that is connected with late diagnostics and untimely prevention. Protection of skin against sunshine by means of UV-filters is the most effective prophylactic of the photodermatosis, aging and a cancer of skin. For today as a part of modern photoprotectors are used physical light filters on the basis of oxide of zinc and dioxide of the titan which are effective, but have a high toxicity. Dioxide of cerium is promising new UV-filter that can be included in the sunscreens compositions. According to the literature it has low toxicity and is capable of screening the solar rays.

We have made detailed pharmacological studying of cream (developed on department of pharmacy drug technology named by D.P. Salo) contains 5% of nanoparticles of dioxide of cerium on model of a photodynamic trauma on guinea pigs. This cream had already proved us its efficiency early on the same model in normal conditions and exceed efficiency of existing photoprotectors presented in the market of Ukraine (Biocon) for 15% that is connected with a high shielding rate.

Experiment is made on 40 same-gender guinea pigs divided into 4 groups on 10 animals. We did radiation by an ultra-violet lamp at distance of 10cm within 15 minutes on shaven sites of skin of $3cm^2$ in size on three on each animal. Control of results carried out by Suvorov's calorimetric ruler, level of the histamine in blood, and quantity of leukocytes. Also we measured markers of lipid peroxidation in tissues (reduced glutathione, TBA-reactants, diene conjugates, catalase). In groups where we had protected skin by the way of studied cream the indicators were at the level of intact animals while at animals from groups which we radiated without photoprotector it was observed expressed erythema, the raised level of a histamine and quantity of leukocytes, the high level of TBA-reactants and diene conjugates.

As a conclusion this study showed that nanoparticles of cerium dioxide is a promising substance for further research and development factory dosage form of powerful and safe photoprotectors.