Skin cancer, apart from the fact that they are not the most lethal form, are most frequent malignant neoplasm for Caucasian race in United States and other countries.[1] In Poland, they are 8-10% of all cancer cases and, according to incidence prognosis, this number will be constantly raising.[2] Skin cancer are one of tumor types characterized by high malignancy and, when detected late, low survivability rate, especially for people with malignant melanoma. They are most frequent in countries with high rate of sunlight due to intensity of ultraviolet radiation which is one of major causes for healthy cells to transform into tumor ones. Despite all of this molecular mechanism of creation of skin cancer is still unknown. In case of melanoma it is assumed that the main reason is gradual transformation of melanocytes into dysplastic cells and then into cancer cells. Therefore, chemical filters and compounds protecting against harmful effects of UVA and UVB rays are used in cosmetic products. For improvement of protection against the harmful effects of UV radiation, it is searching new substitutes of the currently used filters, both chemical and physical, acting like a micromirror. The proposed alternatives are oxide nanoparticles (NPs) - structures with size not exceeding 100 nm, which are increasingly applied to cosmetology products, including sunscreen. It is found that high surface-area to volume ratio of NPs, contributes to ultraviolet blocking.[3] Currently, zinc oxide (ZnO)NPs and titanium dioxide (TiO_2)NPs are the two most commonly used components in sunscreens.

Nanotechnology is a relatively new field of science, hence the current limited state of knowledge, which is not sufficient to explain the harmful impact of nanoparticles on human health. However, the literature reports indicate a negative impact of metal oxide NPs to healthy cells, including skin cells.[4-8] It is not clear whether, despite their protective effects, NPs from suncreens do not penetrate into the cell contributing to the transformation to the cancer cell during co-exposure with UV radiation. In addition, there are controversial information about phototoxicity of NPs[9,10] and their penetration through skin. In the literature is a lack of data about their cytotoxicity on melanocytes and their possible carcinogenic properties. Therefore, the aim of the present study is to know and understand the impact of co-exposure to ZnONPs or TiO_2NPs and UV radiation on malignant melanoma *(melanoma malignum)* development using *in vitro* and animal model, depending on concentration of tested NPs and incubation time. For the first time in the world literature, we are making an attempt to assess the influence of ZnONPs and TiO_2NPs on melanocytes, pigment cells present in the epidermis, whose transformation is primarily responsible for the formation of malignant melanoma, considering potential carcinogenic properties of NPs and their interaction with UV radiation. Clarification of the molecular mechanism of action of nano-structures on skin cells, including their comprehensive characterization in biological system is very important, because enables demonstration of risk associated with the use of NPs in suncreens, as well as would allow to determine safe concentration of NPs or indicate safe type of NPs to human skin. This study will boost our general knowledge in terms of nanotoxicology and dermatology.

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