

The issues of targeted delivery and improved bioavailability of drugs are also promising. An interesting potential use of NP for cancer treatment is the study of tumor-specific thermal scalpels for heating and burning tumors (e.g., gold of nanocoating with polyethylene covering which absorb near-infrared radiation can be used to inhibit tumor growth). Cosmetic products also merit special attention. For example, gold and silver NP have significant antifungal, antibacterial and anti-inflammatory properties and are used in compound of anti-aging creams, deodorants, medicines for burns treatment etc.

Nowadays, the potential impact of NPs and raw NMs on humans will increase as a result of development and commercialization of nanotechnology programs. One of the most serious problems is the workplace (research laboratories, places where NMs are synthesized, processed, used, disposed or recycled). In order to determine whether the unique chemical and physical properties of new NPs lead to specific toxicological properties, the nanotechnology community needs new ways of hazards and risk factors estimation.

Toxicity of NP depends on their surface properties, coating, structure, size and aggregation ability. Poor NPs solubility may cause a risk of cancer. This is due to the fact that in this case the NPs have a larger ratio of surface area to volume, which increases the chemical and biological reactivity.

NPs can penetrate into the body in different ways: transdermal, by inhalation, injection or implantation. Transdermal exposure is especially common in cases of using skin care products, hair care products or lip balms, including sunscreens and anti-aging creams. The danger consists in the fact that cosmetic products do not require clinical trials, but contain the maximum amount of components with NP that can cause erythema (Cobalt and Chromium NPs, for example, cross the skin barrier and damage fibroblasts).

Nowadays, many mechanisms have been proposed to explain the negative effects of NPs, which can lead to cardiopulmonary disease. NPs sometimes affect reactive oxygen species and can also stimulate neurons in the lungs, affecting the CNS and cardiovascular autonomic function. Having the possibility of circulation in the body, NPs can cause an acute inflammatory reaction, as they are recognized and identified by the immune system as foreign.

WHO has already identified a number of health effects to NP exposure, but risk levels and regulations and policies have not yet been articulated. A new type of environmental pollution has appeared – it is nano-pollution. Norms of nanoproducts use (cosmetics, drugs, implants, food packaging, etc.) have not yet been introduced. Therefore, protection during working with nanomaterials and rules for the disposal of these materials after the completion of experiments is an important component in the prevention of nanocontamination, and therefore risks to human health.

Tkachuk I.G.

**THE FORMATIONS AND CHARACTERISTICS OF NANOCOMPOSITE MATERIALS
BASED ON NANOPARTICLES OF 2D LAYERED CRYSTAL INSE AND GASE AND
SOLID $ME(NO_3)$ ION SALTS (ME K, NA, RB, CS)**

*Department of Biological Physics and Medical Informatics
Bukovynian State Medical University*

For manufacturing of nanocomposites based on ionic $MeNO_3$ salts ($Me = K, Na, Rb, Cs$) and 2D nanoparticles of InSe and GaSe used the results of studies of ionic self-organization of nanostructures on van der Waals surfaces of layers of oxides of In and Ga in the implementation of the melts of the ionic salts in the space between the layers of these crystals. Taking into account: different wetting by molten ionic salt crystal surfaces with molecular linkages and surfaces of oxides, which is due to different values of the surface energy of the interphase boundaries; thermal decomposition of ionic molten salts according to the chemical reaction $2 MeNO_3 = 2 MeNO_2 + O_2 \uparrow$ and burn is accompanied by release of molecular oxygen, which creates excessive pressure on the layers of crystal and oxidizes their surface; the processes self-wetting ion salts in the wetting of nanoscale oxides; the formation nano composites type “oxide-ion salt” with high ionic conductivity at the boundaries of 2D nanoparticles. The structure, composition and morphology of

