

Looking Forward to Application of Nanodiamonds of Detonation Synthesis in Biology and Medicine

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High reactivity, hydrophilic properties of the surface, high absorbing capacity ($S > 400 \text{ m}^2/\text{g}$), low toxicity ($\text{LD}_{50} > 7000 \text{ mg/kg}$, per os), good compatibility with blood, biological extracts and proteins form the base for the perspective use of detonation nanodiamonds (NDs) in biology and medicine.

Nowadays, there exist three following main routes of further use of NDs:

- [1] direct medical application of NDs;
- [2] NDs as additives to new and traditional medicines to enhance their effect and provide a prolonging effect of the main drug;
- [3] NDs as effective adsorbing agents in detoxication systems and medical diagnosticums.

Direct medical application of NDs is based on their antioxidant activity confirmed in vitro and in vivo experiments and lies in the field of the therapy of so-called "free radical" diseases including cardio-vascular disorders, cancer and Alzheimer disease. Anticancer effect of NDs seems to be the main problem on this route of investigations. Minding undoubtful further perspectives of the use of NDs in cancer therapy, their effect upon the growth of tumors is still not systematically investigated.

We have shown that NDs greatly prolong the life-period of laboratory animals suffering from sarcoma and carcinoma, normalize peroxidation processes in blood of laboratory animals housing the tumor and slow tumor's growth.

Making preparations including NDs as a vehicle with antioxidant properties is also of great perspective.

Creation of complex preparations on base of NDs and natural antioxidants, for example, substances isolated from fruit bodies and mycelium of higher mushrooms possessing antioxidant, peroxidase and antitumor activity is one of the trends of great interest.

We have shown that preparation including NDs suspension and *Cerena unicolor* extracts more than twice enlarges the life-period of laboratory animals suffering from carcinoma in comparison with the group without any medical treatment.

NDs may be further applied as effective adsorbing agents in hemodialysis systems and enterosorbents in acute intoxication treatment.

High adsorbing capacity of NDs and their good compatibility with biological material form the base of NDs' use in immuno-chemical diagnosticums for inspection of population on mass scale to reveal dangerous infections.