

## Investigation of the features of bone implants surface condition during combined radiation sterilization

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The relevance of research on the creation of new, effective and safe approaches to the sterilization of bioimplants is beyond doubt due to the high prevalence of diseases and the growth of traumatic injuries of the bone and joint apparatus. The maximum reduction of the radiation dose, elimination of the side effects of radiation, as well as ensuring absolute sterility of the transplant is an important interdisciplinary task. A promising solution is the use of combined technologies combining ozone-oxygen mixture treatment at the first stage with subsequent radiation exposure at the second stage [1].

The material for the study was samples of native bovine bone tissue made and processed on the basis of the joint Laboratory of Biomedical Technologies (Lomonosov Moscow State University – VILAR). The surface structure of bone fragments was studied by scanning electron microscopy (SEM) using JSM-7800F (Japanese Electron Optics Laboratory, Japan). Morphofunctional characteristics of the surface of bone implants, including its relief and porosity, play an essential role in the implementation of bone grafting.

The results of changes in some of these characteristics obtained earlier during radiation exposure are known [2]. The effects of ozone have not been sufficiently investigated to date. In our first works, it was shown that ozone treatment does not lead to significant morphological changes in the surface of bone samples [3], as well as microhardness parameters [4]. Of particular interest are new data on the elemental composition of bone implants [3]. This research was performed at the NEFU Radiation Technologies Laboratory within the framework of the state assignment of the Ministry of Science and Higher Education of the Russian Federation No. FSRG-2021-0014 and has been supported by the Interdisciplinary Scientific and Educational School of Moscow University «Photonic and Quantum technologies. Digital medicine».

### The speaker is a student or young scientist

No

### Section

1. Nuclear technology and methods in medicine, radioecology

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