

## APPLICATION OF TRITIUM LABEL FOR THE DETECTION OF NANODIAMOND FILMS ON THE SURFACE OF COLLAGEN TISSUE

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Bioprosthetic heart valves based on bovine pericardium are widely used in the field of cardiac surgery worldwide. The main component of bovine pericardium is collagen tissue that is treated with chemical agents to prevent calcification and preserve the elastic properties of the biological tissue. In the present study we tried to improve the mechanical properties of biological tissue by application of additional nanodiamond-based coating and characterized the coating by means of radiotracer method.

Nanodiamonds show high potential application as a drug carrier because of functionally developed surface as well as high specific surface. Moreover, it is possible to introduce tritium label directly bonded with diamond surface by means of tritium thermal activation method. In the present research we used tritium labeled nanodiamonds to measure its mass on the surface of collagen tissue and nanodiamond-based coating stability in vivo.

The other problem of xenogenic heart valve prostheses is the development of disease caused by microorganisms. From this view point nanodiamonds can be considered as a carrier of drugs of prologue action. Here we used amikacin and levofloxacin, which were labeled with tritium for determination of its adsorption and desorption from nanodiamond surface in vitro and in vivo. Peculiarities of nanodiamond-antibiotic adsorption complexes formation and its application onto collagen tissue will be discussed in the presentation.

To prevent calcification process collagen tissue must be coated with biopolymer like chitosan. Tritium labeled chitosan was used for coating characterization in the experiments in vitro and in vivo.

Thus, preparation and characterization of nanodiamond-antibiotic-chitosan coatings using tritium labeled compounds as well as improvement in the mechanical characteristics that can be reached with such prepared coatings will be discussed in the presentation.

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### The speaker is a student or young scientist

Yes

### Section

1. Applications of nuclear methods in science and technology

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