



Contribution ID: 882

Type: Poster

## IRRADIATION OF YTTRIUM MICROSPHERES AT THE IRT-T REACTOR

National Research Tomsk Polytechnic University (TPU), together with an industrial partner (BEBIG), start produced yttrium microspheres at its research nuclear reactor this fall. This radiopharmaceutical is intended for the treatment of liver cancer in inoperable patients and, unlike analogs, it destroys the tumor in a targeted manner without affecting healthy organs and tissues.

Irradiation of yttrium-89 microspheres will be carried out at the IRT-T reactor, power 6 MW, neutron flux  $1.7 \cdot 10^{14}$  neutron/cm<sup>2</sup>. To obtain one dose of the final preparation, a weighed portion of 0.1 g of yttrium microspheres is irradiated. Microspheres are processed using distilled water, alcohol and hydrochloric acid. Yttrium microspheres are injected into the patient's bloodstream, which delivers them directly to the tumor. After delivery, the microspheres block the access of blood with oxygen to the metastases, in parallel acting on them with beta radiation. In the Russian Federation, this method of treatment is not yet massively applied.

The industrial production of yttrium microspheres began in the fall of 2020. There have already been test deliveries to Moscow clinics. The drug is registered and has permits for use in clinical practice.

April 9, 2021 at A. Tsyb Medical Radiological Research Center for the first time in Russia, clinical trials of the method of radioembolization of tumors with domestic microspheres produced by the Russian company "Bebig" began. Four operations were performed at once on patients with inoperable forms of liver cancer.

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**Session Classification:** Radionuclides Production & Application

**Track Classification:** Production and Application of Radionuclides