

Preclinical trials of radiopharmaceutical for cancer diagnosis

31 May 2017

A radiopharmaceutical labeled with the technetium-99 isotope for advanced identification of cancer is ready for a preclinical-phase trial. Scientists from Tomsk Polytechnic University, Tomsk Research Institute of Oncology and the Institute of Biorganic Chemistry of the Russian Academy of Sciences have jointly developed this medication.

This radiopharmaceutical has a complex structure based on a [protein scaffold](#) called DARPIn with an attached chelate complex that binds the protein to the radioactive technetium-99 isotope. TPU scientists developed a non-waste [technology](#) for the production of this isotope, which is highly applicable in medical diagnostics.

'There is a so-called lock on the cancerous cell in the form of receptors, and the protein contained in the medication is the key to the receptors. It needs to be labeled so as not to be lost among numerous keys. That is the reason why the chelate complexes are essential.

The isotope of technetium is entrapped on this marker and is easily tightened with the help of gamma cameras. This structure of the radiopharmaceutical makes it possible to accurately determine the size of the tumor, as well as its location. It is especially important in the diagnosis of small-cell cancers when cancer cells are scattered throughout the affected organ,' says researcher Mekhman Yusubov.

In 2017, TPU researchers have patented the technology for obtaining chelate complexes. 'We proposed our way to obtain chelate complexes. We use iodine as one the reagents. In general, the technology for obtaining these complexes using iodine is more effective, as the yield of the final product increases and the number of stages for it obtaining is reduced. In addition, the technology is more cost effective compared to the existing ones due to the application of cheap and

environmentally friendly reagents,' Mekhman Yusubov says.

According to the scientist, in the future, this drug can be used for both diagnosis and treatment of [cancer](#) diseases. However, more detailed studies have to be performed.

Provided by Tomsk Polytechnic University

APA citation: Preclinical trials of radiopharmaceutical for cancer diagnosis (2017, May 31) retrieved 18 September 2019 from <https://medicalxpress.com/news/2017-05-preclinical-trials-radiopharmaceutical-cancer-diagnosis.html>

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