## DEVELOPMENT OF QUALITY CONTROL OF THE DO3A-NBI-56418 LABELED BY $^{177}$Lu FOR THERANOSTIC GOALS OF TRIPLE NEGATIVE CANCER WITH USING PAPER CHROMATOGRAPHY

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Receptors for triple negative breast cancer express gonadotropin-releasing hormones (GnRH) in more than 50% of cases. Among several analogues (agonists and antagonists) of GnRH that have been studied for the treatment of this type of cancer, the non-peptide antagonist NBI-56418 is of greatest interest [1].

The Institute of Nuclear Physics is working with a team of researchers from the University of Oslo, Norway to create a radiopharmaceutical on the basis of NBI-56418, labeled by $^{177}$Lu. The advantages of $^{177}$Lu as a therapeutic isotope are determined by its nuclear characteristics: maximum β-energy (max b- = 496 keV, g = 113 keV (6.4%) and 208 keV (11%)); Half-life 6.71 days; The optimal depth of penetration into human tissue during the radiotherapy of small tumors, a small radiation load on healthy organs.

In the research work presents experimental data on the choice of optimal conditions for the separation of the free cation $^{177}Lu^{3+}$ and the labeled complex $^{177}$Lu-DO3A-NBI-56418.

In our work was studied the influence of pH, composition and the ratio of the components of the mobile phase on the separation quality. The registration of the distributed activity of $^{177}$Lu was carried out using a scintillation detector.

The most qualitative separation was observed when using a mobile phase, which is a mixture of 1M ammonium acetate and methanol in equal proportions.

1. Mazen Jamous, Uwe Haberkorn and Walter Mier. (2013). Synthesis of Peptide Radiopharmaceuticals for the Therapy and Diagnosis of Tumor Diseases. Molecules , 3379-3409

## SILICON BASED MICROPIXEL AVALANCHE PHOTODIODES FOR IONIZATION PARTICLES

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This paper is dedicated to using scintillation detectors based on silicon photomultipliers for ionization particles (electron, alpha, neutron et.c). For these purposes LYSO inorganic and plastic scintillator was used. In the experiments the scintillation lights produced by interaction between radiation and scintillator are registered by silicon based micropixel avalanche photodiode (MAPD) matrix (2×2). Silicon based micropixel avalanche photodiodes (MAPD) is a type of silicon photomutlipliers which is produced Zecotec photonics. Sensitive area, gain and operation voltage of the MAPD is 3,7×3,7 $mm^2$, $10^6$ and 90 V, respectively. Photon detection efficiency of the MAPD is 40%. Size of LYSO scintillator is 6×6×2 $mm^3$. Plastic scintillator, however, is 20×20×10 $mm^3$ in size. Alpha-particle emitting nuclide Am-241, beta emitting nuclide Cs-137 and neutron source PuBeare used for testing the developed detectors. All measurements are carried out under normal air pressure and temperature. The obtained results reveal that the developed detectors are efficient for simultaneous counting of alpha, beta-particles and neutrons. The results give possibilty to use the studied charge particle detectors as a radioactive dust monitors and a contamination monitors, and neutron detector as an area monitors and a personal dosimeters.