

## **Preliminary dosimetric Evaluation of a New Therapeutic $^{177}\text{Lu}$ Complex for Human Based on Biodistribution Data in Rats**

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**Abstract :** Tris (1,10-phenanthroline) lanthanum(III) trithiocyanate is a new compound that has shown to stop DNA synthesis in CCRF-CEM and Ehrlich ascites cells leading to a cell cycle arrest in G<sub>0</sub>/G<sub>1</sub>. One other important property of the phenanthroline nucleus is its ability to act as a triplet-state photosensitizer especially in complexes with lanthanides. In Nowadays, the radiation dose assessment resource (RADAR) method is known as the most common method for absorbed dose calculation.  $^{177}\text{Lu}$  was produced by irradiation of a natural  $\text{Lu}_2\text{O}_3$  target at a thermal neutron flux of approximately  $4 \times 10^{13}$  n/cm<sup>2</sup>•s.  $^{177}\text{Lu}$ -PL3 was prepared in the optimized condition. The radiochemical yield was checked by ITLC method. The biodistribution of the complex was investigated by intravenously injection to wild-type rats via their tail veins. In this study, the absorbed dose of  $^{177}\text{Lu}$ -PL3 to human organs was estimated by RADAR method.  $^{177}\text{Lu}$  was prepared with a specific activity of 2.6-3 GBq.mg<sup>-1</sup> and radionuclide purity of 99.98 %. The  $^{177}\text{Lu}$ -PL3 complex can prepare with high radiochemical yield (> 99 %) at optimized conditions. The results show that liver and spleen have received the highest absorbed dose of 1.051 and 0.441 mSv/MBq, respectively. The absorbed dose values for these two dose-limiting tissues suggest more biological studies special in tumor-bearing animals.

**Keywords :** internal dosimetry, Lutetium-177, radar, animals

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