

LUTETIUM-177



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About us

CMR (Center of Molecular Research) was founded in 2001 by the group of professional scientist and specialists in nuclear medicine and international economic relations spheres firstly, focusing on production and distributing of Oxygen-18 water with Isotopic Enrichment $\geq 98\%$ and other medicine isotopes. After more than 20 years of development today CMR is a vertically constructed united group of companies having its representatives and offices in many countries of the world.

Nowadays CMR is not only one of the world's largest manufacturers of Oxygen-18 water but also the qualified supplier of a wide range of products including STABLE AND RADIOACTIVE ISOTOPES, PEPTIDES AND CHEMICAL KITS, which completely satisfy the needs of medicine centers and hospitals, scientist and technologists in isotopic fields.

Lutetium-177 (^{177}Lu)



Intended use

Treatment of neuroendocrine tumors with metastases. The drug is administered intravenously. Also, the patient receives a protective medicine to reduce the radiation load. The drug has a strong effect on destroying cancer cells. In some cases, complete recovery occurs, but in general, Lu-177 is used to remove clinical manifestations of cancer.

Half-Life: 6.73 days

Production methods

There are 2 ways of Lu-177 production.

Lu-176 (n, γ) Lu-177	Yb-176 (n, γ) Yb-177 $\rightarrow$ Lu-177
The Lu-176 isotope is irradiated in a reactor and is produced by direct reaction Lu-176 (n,γ) Lu-177. As a result - Lu-177 with a sufficiently high specific activity. However, this method has a number of disadvantages: - As a result – Lu-177 with carrier, which limits its sphere of application in nuclear medicine. - This method leads to appearance in the received Lu-177 impurity long-lived activity of Lu-177m with a half-life of 160 days.	The Lu-177 isotope is obtained by the reaction Yb-176 (n,γ) Yb-177 followed by beta decay Yb-177 till Lu-177. Compared with the previous method, this method has several advantages: - When implementing this scheme, theoretical specific activity is much higher than in the previous method. - In the implementation of this scheme, Lu-177 is formed without a "harmful" carrier.

The main characteristics

- Chemical form – Lutetium chloride, solution in hydrochloric acid 0.04 M
- Half-life – 6.734 days.
- Radiochemical purity – not less than 98 %
- Specific activity – not less than 81.08 Ci/mg



(QC TYPICAL)

Description and code of goods	Type of packages	Package No.	Unit	Quantity	Volume, in ml
Lutetium-177 ($^{177}\text{LuCl}_3$) Trichloride in 0.04 M HCl solution, carrier free	Type A	1	mCi	As per contract	As per contract

TEST	SPECIFICATION
Appearance	Clear, colorless
Radionuclide Identification	A major photo peak at 0.208 MeV
Radioactive concentration, Ci/ml (GBq/ml)	Not less than, 1.0 (37.0)
Specific activity, Ci/mg (GBq/mg)	Not less than, 81.08 (3000)
Radionuclide Purity, other gamma impurities, %	>99.9
Radionuclide Purity, other gamma impurities, (^{58}Co , ^{60}Co , ^{65}Zn , ^{54}Mn , ^{59}Fe , ^{51}Cr) %	0 (The lack of ^{58}Co , ^{60}Co , ^{65}Zn , ^{54}Mn , ^{59}Fe , ^{51}Cr is guaranteed by the production technology)
^{175}Yb to ^{177}Lu , activity ratio, %	Not more than 1×10^{-6}
The total content of inactive impurities Fe, Cu, Zn, Pb, ^{176}Yb	Not more than 0.1 $\mu\text{g/ml}$
Solvent (hydrochloric acid) concentration, mol/l	0.04
pH	1.4–1.5
Radiochemical purity	$\geq 98\%$
Expiration date	21 days
Endotoxin level	$\leq 0.25 \text{ IU/ml}$
Sterility	Sterile

Notes:

- The solution is dispensed in a vial and placed into the container KT 1–10.
- Storage: Lutetium-177 trichloride solution should be kept at room temperature in accordance with regulations for radioactive materials.



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