

# THERANOSTICS INSIGHTS

## $^{177}\text{Lu}$ -PP-F11N



### Radioisotope

Lu-177, lutetium-177  
Transition metals  
 $T_{1/2}$  : 6.71 days

### Production

In nuclear reactor:  
 $^{176}\text{Yb} (n, \gamma) ^{177}\text{Yb}(\beta^-)^{177}\text{Lu}$

### Radiation

Beta particles ( $\beta^-$ )  
Gamma photons ( $\gamma$ )

### Use

In clinical study for advanced medullary thyroid carcinoma (MTC), expressing cholecystinin-2 receptors (CCK2R).

### Target/Mechanism

Cholecystinin 2 receptor (CCK2R) plays a functional role in the regulation of gastric acid secretion, and may be crucial for parietal cell maturation, migration, and for the release of a few paracrine mediators. The medullary thyroid cancer (MTC) expresses, in 90% of the cases, CCK2R at a high density, and this makes of it a great target for radiolabelled with gastrin analogs. Once bound to the receptor, the compound gets internalized and releases the beta radiation closer to the nucleus, to cause the single-strand DNA breakage and death of cancer cell.

### Insight

**Background:** The Lumed is an interventional, single arm, phase I clinical trial (NCT02088645), involving in total 24 patients, diagnosed with MTC expressing CCK2R or well differentiated gastropancreatic neuroendocrine tumor (GEP-NET) with low expression of SST2-receptors.

**Objective:** determine the use of  $^{177}\text{Lu}$ -PP-F11N for imaging and therapy of patients with advanced medullary thyroid carcinoma (MTC)

- **Phase 0** (proof-of-concept) reporting on scintigraphic visualisation of metastasis, in-vivo stability and correlation with histology. Determine kidney protection protocol and dosimetry studies for the phase I study.
- **Phase I** : Dose escalation study, determination of maximum tolerated dose of  $^{177}\text{Lu}$ -PP-F11N, and safety evaluation.

**Results:** (Only Phase 0 available): Adverse reaction reported were self-limiting and not higher than grade 1 (mainly hypotension, flushing and hypokalemia), resulting in a safe administration  $^{177}\text{Lu}$ -PP-F11N in all six examined patients. Visualization of metastasized/recurrent disease in all patients supports the theranostic potential of  $^{177}\text{Lu}$ -PP-F11N.

