

Service Description Clinical Dosimetry

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The services offered by Curie Science Center for clinical dosimetry in therapeutic radiopharmaceutical applications are described below.

In general, all services are provided remotely and in co-operation with the technician or medical physicist or medical physician working in the department of the cooperation partner. The option for on-site services exists.

Requirements: Imaging protocol (and Quantification) must be set up and validated by Curie Science Center Team, see following imaging protocol services.

1. ⁹⁰Y Radioembolization Applications

Our dosimetry service for radioembolization can be provided for both **resin** and **glass microspheres**.

1.2 Pre-Dosimetry

1.2.1 ^{99m}Tc SPECT Imaging Protocol

Service specifications:

- Per each SPECT/CT camera
- Setup of the imaging protocol
- Validation of the acquired scans performed with the pre-defined imaging protocol

1.2.2 ^{99m}Tc Dosimetry

Service specifications:

- Per Patient for each treatment cycle
- Absorbed Dose calculation for organs at risk and tumors:
 - o Healthy Liver Tissue
 - o Tumor Tissue
 - o Perfused Tissue
- Full segmentation analysis (CT, MRI or PET/CT based volume quantification, SPECT/CT based uptake/count quantification)
- Lung Shunt Fraction: Based on site preference, it could be performed via either whole-body planar based approach or SPECT/CT scan based approach
- Report

1.3 Post-Dosimetry

Post-Dosimetry can be performed based on either SPECT/CT or PET/CT.

According to the preference of the site, both approaches could be performed for the same patient in case both SPECT/CT and PET/CT scans are provided.

1.3.1 ⁹⁰Y SPECT Imaging protocol

Service specifications:

- Per each SPECT/CT camera
- Setup of the imaging protocol
- Validation of the acquired scans performed with the pre-defined imaging protocol

1.3.2 ⁹⁰Y PET Imaging protocol

Service specifications:

- Per each PET/CT camera
- Setup of the imaging protocol
- Validation of the acquired scans performed with the pre-defined imaging protocol

1.3.3 ⁹⁰Y Dosimetry

Service specifications:

- Per Patient for each treatment cycle
- Absorbed Dose calculation for organs at risk and tumors:
 - o Healthy Liver Tissue
 - o Tumor Tissue
 - o Perfused Tissue
- Full segmentation analysis (CT, MRI or PET/CT based volume quantification, SPECT/CT or PET/CT based uptake/count quantification)

- Lung Shunt Fraction: Based on site preference, the ^{99m}Tc based value could be used or other alternative approaches could be used.
- Report

2. ^{177}Lu

2.1 ^{177}Lu SPECT Imaging Protocol and Quantification

Service specifications:

- Per SPECT/CT camera
- Setup of the imaging protocol
- Validation of the acquired scans performed with the pre-defined imaging protocol
- SPECT/CT camera sensitivity quantification
- Blood counter sensitivity quantification

2.2 [^{177}Lu]Lu-PSMA Application

2.2.1 Pre-Dosimetry

Service specifications:

- Per Patient for each treatment application
- Pre-Dosimetry based on either:
 - o Small amount of administered activity-based approach including multiple SPECT/CT scans
 - o First cycle fix-activity administration-based approach activity including multiple SPECT/CT scans
- Absorbed Dose calculation for organs at risk and tumors:
 - o Kidneys
 - o Bone Marrow (option: 1 blood based, option 2: image based, option 3: both)
- Full segmentation analysis (CT, MRI or PET/CT based volume quantification, SPECT/CT based uptake quantification)
- Report
- OPTIONAL:
 - o Absorbed dose calculations for salivary glands and tumors
 - o Dosimetry without segmentation, segmentation performed by department of cooperation partner¹

2.2.2 Post-Dosimetry

Service specifications:

- Per Patient for each treatment application
- Post-Dosimetry based on either:
 - o Full Dosimetry Approach including multiple SPECT/CT scans
 - o Full Dosimetry Approach including multiple whole-body planar scans in combination of one SPECT/CT scan

- Full Dosimetry Approach including multiple whole-body planar scans
- Simplified Dosimetry Approach either:
 - Single time point SPECT/CT scan (full dosimetry for treatment cycle 1 is suggested, rest could be based on single SPECT/CT based approach)
 - Single cycle full dosimetry-based approach (full dosimetry for treatment cycle 1 will be done and the absorbed dose coefficients Gy/GBq will be used to estimate the doses for the next treatment cycles)
- Absorbed Dose calculation for organs at risk and tumors:
 - Kidneys
 - Bone Marrow (option: 1 blood based, option 2: image based, option 3: both)
 - OPTIONAL: Salivary Glands, Tumors
- Full segmentation analysis (CT, MRI or PET/CT based volume quantification, SPECT/CT based uptake quantification)
- Report
- OPTIONAL:
 - Absorbed dose calculations for salivary glands and tumors
 - Dosimetry without segmentation, segmentation performed by department of cooperation partner¹

2.2 ¹⁷⁷Lu labelled SSTR Positive Agents

The same specification as [¹⁷⁷Lu]Lu-PSMA application applies for the dosimetry analysis concerning the ¹⁷⁷Lu labelled SSTR Positive Agents, with exception of Salivary Glands analysis (since Salivary glands are not the organs at risk for ¹⁷⁷Lu labelled SSTR applications).

3. Other Agents

Other agents like ²²⁵[Ac]Ac-PSMA or ²²⁵[Ac]Ac-SSTR Positive Agents or ¹⁶⁶Ho or ⁶⁸Ga or etc. on request.

4. Cooperation on scientific research projects

Conditions for a cooperation in the context of a clinical research project on request.

¹ If segmentation is performed by department of cooperation partner, Curie Science Center can take no responsibility of the calculations. Before this option is chosen, a preliminary discussion with the department of cooperation partner has to take place.

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