

The QIPCM radionuclide therapy and theranostics research and development program is in collaboration with UHN's Radiation Medicine Program.

## THERANOSTICS R&D INCLUDES

### **PATIENT STRATIFICATION VIA IMAGING**

Imaging is increasingly being used in order to identify the right patients for the right clinical trial. Our team is currently working with collaborators collecting  $^{68}\text{Ga}$ -Dotatate PET/CT to assess suitability for peptide receptor radionuclide therapy (PRRT) for patients with neuroendocrine tumours (NETs) and will be transferring this knowledge to other areas utilizing imaging stratification.

### **PERSONALIZED DOSIMETRY WITH IMAGING**

Individualized dosimetry can be used to tailor treatment to maximize the dose to tumours while limiting dose to the organs at risk. In order to obtain quantitative dosimetry results from serial and cyclical SPECT images there are a number of technical variables that must be controlled to get reliable results. Our team has developed tools and methodologies to ensure accurate dosimetric measurements from SPECT-CT images acquired across various institutions and scanners.

We have developed customized, readily adaptable, software tools for personalized dose planning and patient report generation built upon a validated and regulatory compliant commercial software for organ and tumour segmentation and review.

This work has been translated to a clinical trial involving personalized dosimetry of patients undergoing  $^{177}\text{Lu}$ -DOTATATE therapy.

### **QUALITY ASSURANCE**

To enable accurate  $^{177}\text{Lu}$ -DOTATATE dosimetry across multiple sites and SPECT-CTs camera sensitivity measurements need to be performed and validated. A custom clinically-applicable scanner validation procedure was developed and applied to all the SPECT-CTs to be used for the trial.

To ensure dosimetric quality throughout the duration of a clinical trial, ongoing calibration and image quality checks are required. The QIPCM team has developed techniques for ongoing quality assurance during theranostic clinical trials. Each SPECT-CT scan contains a standardized source which is quantitatively measured by QIPCM trial analysts and quality control charts are generated to flag any camera/scanner deviations before dosimetry is performed.

## IMAGING SCIENCE EXPERTISE

Theranostics requires a multidisciplinary approach. The QIPCM team consists of experienced researchers, physicists, clinical trial experts and regulatory experts to enable success in theranostics clinical trials.

## CONTACT

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