UCL-MIRO RADIOTHERAPY : CLINICAL RESEARCH

The centre of Molecular Imaging, Radiotherapy, and Oncology (MIRO) focuses on several lines of research aiming at 1) improving the radiation delivery, 2) better understanding the role of the tumour microenvironment in radiation response, 3) comparing the biological efficacy of hadron and photon beams, and 4) integrating molecular imaging with various PET tracers in the radiation treatment process.

Research axes & expertise

Taking advantage of the increasing importance of molecular imaging in radiation oncology, MIRO develops several competences and fields of expertise, like target volume delineation, respiratory motion modelling, automatic image processing and segmentation, reference dosimetry and Monte Carlo simulations, as well as dose painting and adaptive radiotherapy. Radiobiological aspects are investigated in parallel, with a focus on tumour radio-response and metabolic profile, radio sensitization mechanisms, and potential benefits from hadron therapy.

Application fields

MIRO is driven by the will to improve the efficacy of cancer treatment by radiotherapy, while individualizing it to each patient and reducing its side effects. For this purpose, our research develops and validates automatic methods of target delineation on PET images, advanced techniques of image registration to permit adaptive treatment, and Monte Carlo simulations of dose delivery in IMRT or proton therapy.

Major projects/partnerships/collaborations

MIRO closely collaborates with the services of radiotherapy and nuclear medicine of all UCLouvain-affiliated hospitals (Saint-Luc Brussels, Saint-Pierre Ottignies, Mont-Godinne, etc.). MIRO also participates in several international multi-centric studies in head and neck cancer, as well as lung cancer. MIRO develops several research projects with industrial partners, both in photon and proton therapy.

Key figures

- Two Tomotherapy systems and 2 Elekta systems on two sites
- 5 physicians, 5 physicists
- IMRT, targeted therapies, image processing, Monte-Carlo simulations for photon/proton/hadron therapy, radiobiology.

Contact

- Prof. Vincent Grégoire, vincent.gregoire@uclouvain.be
  Phone: +32 2 764 9443