

# Radiotracer development

Radiotracer development is focussed on radiolabelling any chemical, biochemical, biological or material vector for the purpose of radiotracing.

This capability includes the development and optimisation of radiolabelling entities from small molecules to cells, the development /discovery of novel radiochemistry labelling strategies, synthesis of radiotracer cold standards and labelling precursors and modifying pharmaceuticals for radiopharmaceutical applications.

This capability utilises radioisotopes from the OPAL reactor and the 18 MeV cyclotron in conjunction with our radioisotope development capability: this allows access to an array of radioisotopes (see [Radioisotope Provision](#)) for radiotracer research, development and delivery.

Our expertise in the application of microfluidic processes for radiochemistry development allows reduced time frames for  $^{18}\text{F}$ -radiotracer optimisations and our expertise in developing automation hardware and procedures allows us to provide radiotracers for campaigns of research.

Our areas of expertise in radiotracer research include:

- Development of new radiotracers, including the production of cold standards and precursors
- Radiolabelling by way of radiolabelled synthons
- Novel  $^{11}\text{C}$ ,  $^{18}\text{F}$  and radioiodine radiochemistry methodology development
- Metal ligand conjugation, conjugate evaluation and radiometal labelling development
- Modifying pharmaceutical structures and synthesising small compound libraries for enhancing and optimising radiotracer properties including absorption, distribution, metabolism, clearance and toxicity
- Development of automated procedures for the production of known radiotracers for campaigns of research (See [Radiotracer production](#)).

Our capability includes the opportunity to undertake radiolabelling development of the following targets:

- small molecules and peptides
- biomolecules: proteins, antibodies and antibody fragments
- particles: nanoparticles to macroparticles of polymers, inorganics or hybrids
- cells
- materials.

Successfully developed radiotracers can be deployed for basic research, transferred to automation to perform campaigns of pre-clinical research or undergo tech transfer (see [Radiotracer production](#)).

The radiotracer development team shares facilities and accesses instrumentation listed in the Radiotracer production and Radioanalytical measurement capabilities. The Radiopharmaceutical Development team is housed in four synthetic laboratories with flow chemistry, NMR, LCMS, GCMS, preparative and analytical HPLC capabilities as well as general laboratory equipment for organic and inorganic synthesis.

We welcome your contact with ideas and/or enquiries that lead to the co-development of novel radiotracers or radiolabelling methods, new radiotracer application areas (beyond medical) for project collaborations and partnering, and joint undergraduate and post-graduate student co-supervision.

## Capability selections

- Radiolabelling
- Radiotracer methods
- Translation of radiotracers for clinical research
- Radiopharmaceutical development.

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