

Technical Project Summary- SDI

Project title

IMAGING4DRUGS: Integrated molecular imaging infrastructure for accelerated drug development

Acronym (optional)

IMAGING4DRUGS

Project leader + organisation

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File number:

10920012510008

Key words

Infrastructure
Molecular imaging
Pharmacometrics
Drug and biomarker development
Spatial multi-omics

Domain 4D Map ([link](#))

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| ☐ A. Basic Science & Target Identification | ☐ F. Regulatory review |
| ☒ B. Target Pharmacology | ☐ G. Post-marketing |
| ☐ C. Lead Identification | ☐ H. Medical Landscape |
| ☐ D. Lead Optimization | ☐ I. Commercial Manufacturing & Distribution |
| ☒ E. Clinical Research & Development | |

Theme investmentagenda (if applicable)*Investeringsagenda SDI 2025 ([link](#))*

- ☒ 2025. "Molecular Diagnostics and Imaging"
- ☐ 2025. "Early Discovery Infrastructure"
- ☐ 2025. "Small scale (shared) manufacturing facilities, "Bioprocessing and fermentation" and "Sustainable manufacturing"

Aims and objectives**User group and application**

IMAGING4DRUGS will establish an integrated infrastructure to accelerate drug and biomarker development by combining tracer development and GMP production, clinical-grade PET and advanced optical imaging, biosampling, spatial multi-omics, data storage/compute capacity, and AI-enabled analyses. The goal is to generate quantitative, multi-scale evidence on drug biodistribution, target engagement, and pharmacodynamic effects in humans. This will support earlier, evidence-based dosing and go/no-go decisions, reduce attrition, and advance safe, effective therapies more efficiently.

Impact

The infrastructure serves academic groups, SMEs, BioTech, MedTech, and Pharma engaged in drug or biomarker development. Users can access facilities covering GMP-compliant tracer development and production, PET and optical imaging, serial biosampling, spatial omics, secure FAIR-by-design data storage, high-performance computing, and AI-enabled imaging, omics, and pharmacometric modeling. Projects may include (pre)clinical trials, dose-finding studies, or translational research requiring integrated imaging and omics readouts. Access is coordinated through a single-entry office with transparent tariffs, ≥50% capacity reserved for external users, and comprehensive expertise and

support for project design through execution, enabling efficient use by experienced and first-time imaging/omics users.

Technical description of the shared infrastructure

Providing leadership, expertise, innovation, and cross-sector connections with SMEs, BioTech, MedTech, and Pharma, IMAGING4DRUGS establishes an interoperable, high-performance infrastructure combining seven core components to accelerate drug and biomarker development.

- 1) Coordination office – a single-entry point managing intake, feasibility, costing, scheduling, governance, consultancy and user support, ensuring efficient access and $\geq 50\%$ capacity for external users.
- 2) Tracer development & GMP manufacturing – expanded and automated radiotracer synthesis and QC under GMP, covering diverse targets and indications, with tech-transfer capability for clinical translation.
- 3) Optical imaging – advanced fluorescence imaging platforms for high-resolution, real-time visualisation of drug distribution at tissue and cellular levels across multiple organ systems, including GI, lung, skin, and joints.
- 4) Biosampling – scaled, standardised serial biosampling workflows with harmonised SOPs, QA/QC, and cross-department training for blood, tissue, and other sample types.
- 5) Spatial multi-omics – integrated transcriptomics, proteomics, and metabolomics from the same tissue section, enabling spatial mapping of drug distribution and pharmacodynamic effects.
- 6) Data & compute – a secure, FAIR-by-design repository integrating imaging, omics, and clinical metadata; interoperable services for remote analysis; and high-performance computing capacity.
- 7) Analytics pipelines – AI-enabled workflows for imaging (segmentation, radiomics), multi-omics processing, and pharmacometrics modelling, including PBPK and PK–PD simulations.

All components are linked, enabling seamless multi-modal workflows from whole-body to single-cell resolution. The infrastructure is designed for high-throughput, GxP-compliant operation and is supported by expert staff with extensive experience in multi-partner projects. This integration reduces fragmentation, accelerates decision-making, and provides robust, human-relevant evidence for dose selection, target engagement, and regulatory submissions.

Project group and collaborating partners

Led by Rudolf Fehrmann, medical oncologist, professor in AI for precision oncology, and leader of large scale infrastructures, the consortium unites complementary expertise. Clinical PET imaging: Derk Jan de Groot, Elisabeth de Vries, Riemer Slart, Andor Glaudemans, and Adrienne Brouwers. (Pre)clinical tracer development and GMP manufacturing: Marjolijn Lub-de Hooze, Gert Luurtsema, Bart Cornelissen, and Erik de Vries. Optical imaging (gastro/lung): Wouter Nagengast and Frederike Bensch. Cardiology pharmacology/imaging: Daan Westenbrink. Auto-immune diseases: Elisabeth Brouwer. Infectious diseases: Marjan Wouthuyzen. Advanced cell therapies & molecular imaging: Tom van Meerten. Biosampling: Stefan Willems, Bert van der Vegt, and Joyce Doorn. Spatial omics: Marco de Bruyn and Floris Foijer. Data infrastructure: Morris Swertz. Pharmacometrics modelling: Paola Mian. Business development: Peter Ketelaar. Partners: iPsomics (omics integration), IMED (training), and LIFE Cooperative (business development and outreach support). Consortium aligns with FORESIGHT and DECISIVE initiatives, ensuring complementarity, scalability, and national impact.

Innovation and Distinctiveness

IMAGING4DRUGS is the first Dutch infrastructure to operationally integrate GMP tracer production, PET/optical imaging, spatial multi-omics, biosampling, and AI-enabled analytics into a single, accessible chain for drug development. It complements programs such as FORESIGHT (funding research projects) and DECISIVE (national roadmap for nuclear medicine translation) by delivering the operational infrastructure, SOPs, and capacity to realize roadmap goals, while ensuring open access for external users at market-conform conditions—reducing attrition and fostering innovation across therapeutic areas.

Alignment PharmaNL programme (optional)

IMAGING4DRUGS is closely linked to the submitted Human Capital Growth program via IMED, which trains professionals in molecular imaging, tracer development, pharmacometrics modeling, and AI based analytics. IMED trainees can gain hands-on experience within IMAGING4DRUGS projects, ensuring a skilled workforce to sustain and expand infrastructure use. This alignment ensures that technological advancements are matched with human expertise, strengthening both innovation capacity and long-term impact within the PharmaNL ecosystem.

Additional Information

