

MOLECULAR IMAGING FOR BETTER TRANSLATION



TNO innovation
for life

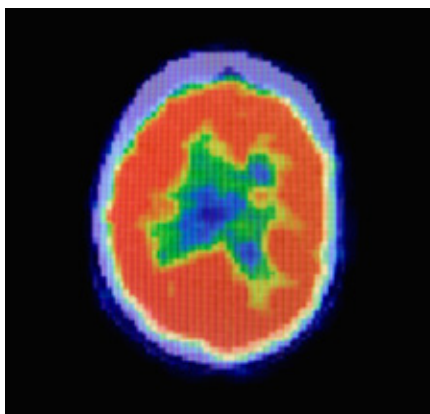
In drug development it is highly important to minimise clinical stage failure of novel drugs. To achieve this it is essential to correctly translate results from preclinical (animal) studies to pharmacokinetics, toxicity and effects in the clinical situation. Molecular imaging can increase the translational power of preclinical research and provides ways of non- or minimally invasive analyses of biological processes in humans, animals and cellular models.

Through collaboration with several Dutch imaging centres we offer access to a wide array of preclinical and clinical imaging technologies. Combined with our expertise, technologies and *in vivo* models, molecular imaging is especially useful in assessing various drug effects within the (human) body.

MULTIMODALITY IMAGING IN DRUG DISCOVERY AND DEVELOPMENT

Multimodality imaging—combining the strengths of the various technologies available—improves our understanding of physiological processes.

High-resolution techniques such as PET, SPECT and optical imaging can be used to study pharmacokinetics and pharmacodynamics *in vivo*. Especially the interface of these techniques with other *in vivo* imaging modalities such as MRI and CT allows a wide range of cellular and molecular events *in vivo* to be monitored at a high spatial and temporal resolution. Depending on your research question, the most useful technique or combination of techniques can be chosen to study (one or more) mechanisms *in vivo* or *in vitro*.



PET-CT scan of the human brain.

MORE RELEVANT DATA, FEWER ANIMALS NEEDED

Being non- or minimally invasive, as well as clinically available, molecular imaging creates several advantages:

- Increased translational power of preclinical efficacy, toxicity and pharmacokinetics research in laboratory animals and cellular models.
- Processes can be followed longitudinally within individual subjects, thereby eliminating inter-individual differences, increasing statistical power and reducing the amount of subjects needed for a study.
- Analysis of physiological processes in humans and animals, also in tissues that are otherwise inaccessible for research purposes (e.g. drug delivery and/or efficacy in the human brain).
- For drug discovery, efficacy, kinetics and safety studies, imaging technologies enable rational drug development as well as personalised treatment and monitoring of patients in clinics.

CUSTOM-MADE MOLECULAR IMAGING SOLUTIONS AT TNO

In drug discovery and development every target tissue, drug candidate and/or molecular process has its own specific challenges. To assist companies address these challenges with molecular imaging, TNO collaborates with several Dutch imaging centres and provides access to a wide range of (preclinical and clinical) imaging modalities. These various combinations of modalities are intelligently employed by TNO researchers who have specific knowledge on various research areas.

Examples of imaging studies at TNO:

- PET-CT imaging to study the activity of ABC transporters at the blood-brain barrier.
- MRI/MRS to assess liver-fat content in mouse models of metabolic syndrome.
- Combinations of PET and MRI data to assess developmental toxicity signs in the brain of mouse and rat pups.

Overall, our scientists can help you to design a set-up for the most relevant imaging study, which often needs fewer animals than conventional studies, provides more useful information and, last but not least, contains ways to study the same biological processes in human subjects.

TNO.NL

TNO HEALTHY LIVING

TNO initiates technological and societal innovation for healthy living and a dynamic society.

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