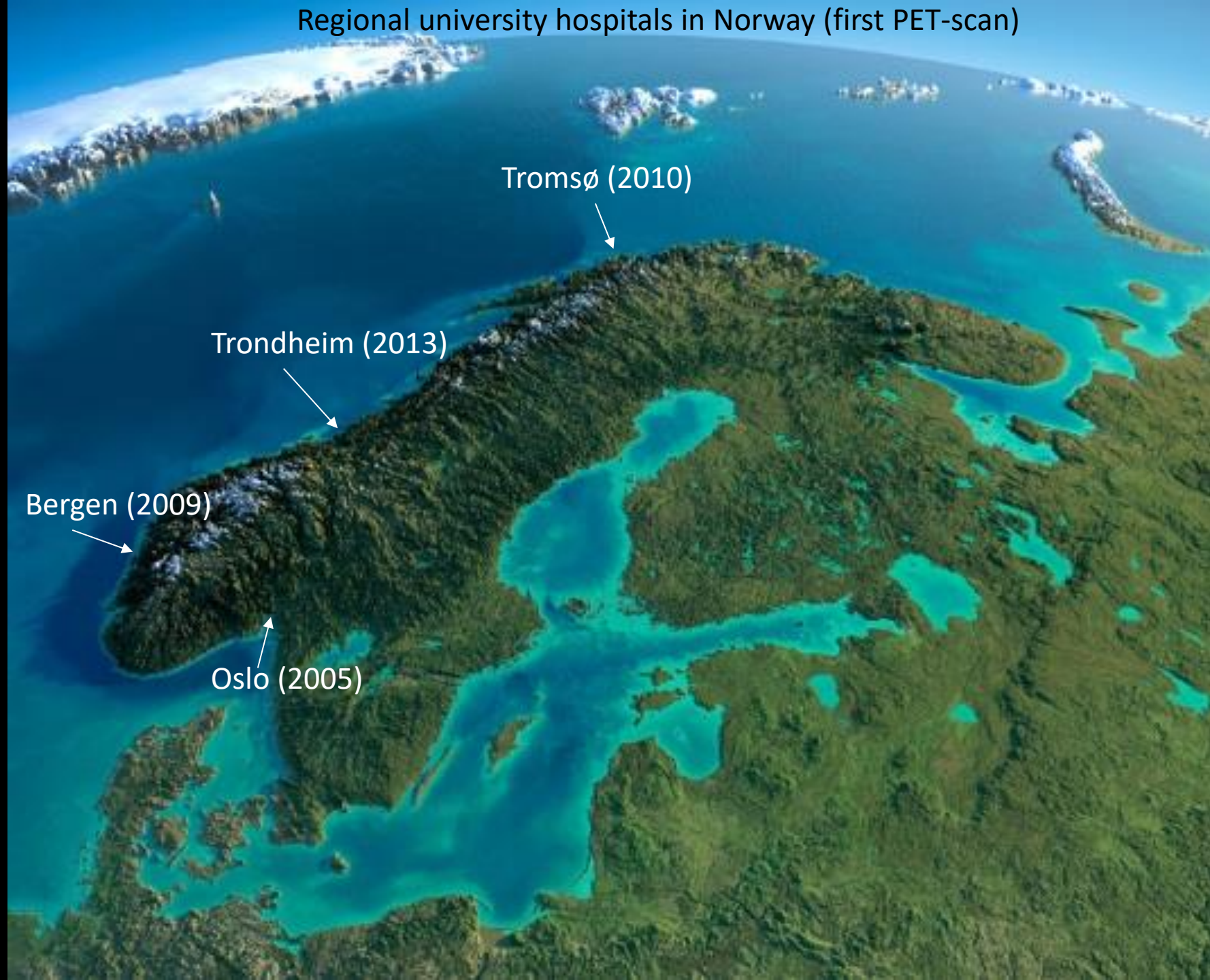
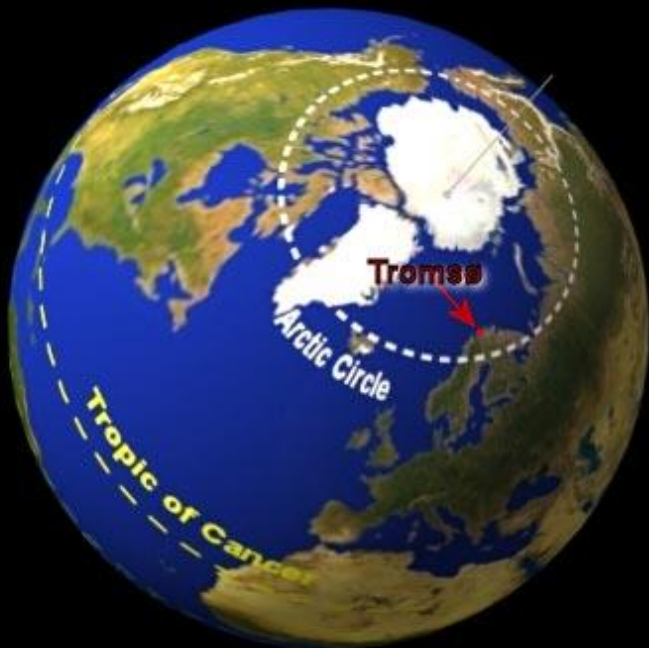


Nuclear medicine in Tromsø

-
The world's northernmost
PET-imaging center





UNIVERSITETSSYKEHUSET NORD-NORGE
UNIVERSITY HOSPITAL OF NORTH NORWAY



UiT The Arctic
University of Norway

University Hospital of North Norway

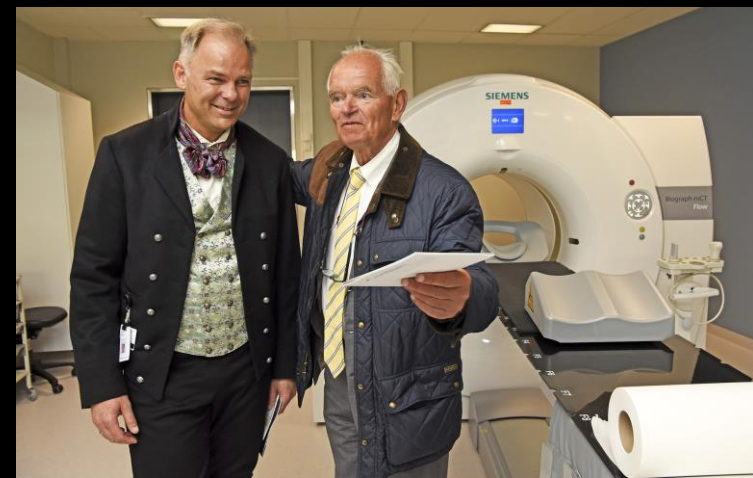
UiT The Arctic University of Norway

Tromsø PET Imaging Center

PETcore

Animal facility

2018: PET Imaging Center

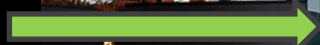


~ 4000 m²

Preclinical

Clinical

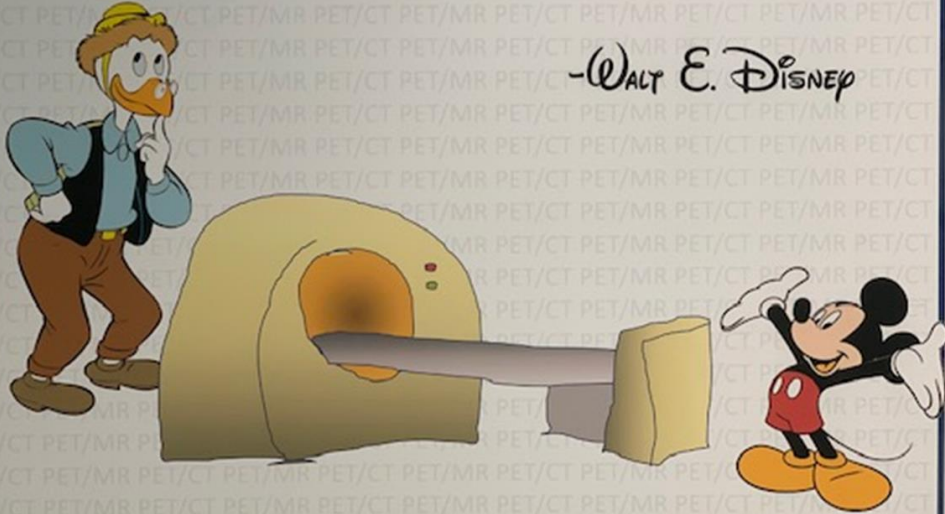
Radiopharma



Preclinical

IF YOU CAN DREAM IT YOU CAN DO IT.
ALWAYS REMEMBER THIS WHOLE THING WAS STARTED
WITH A DREAM AND A MOUSE.

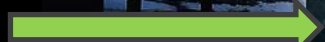
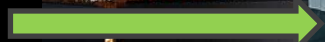
-WALT E. DISNEY



Preclinical

Clinical

Radiochemistry



Preclinical PET core facility

PET/SPECT/CT



PET/MRI



External irradiator



Animal housing inside the PETCore facility

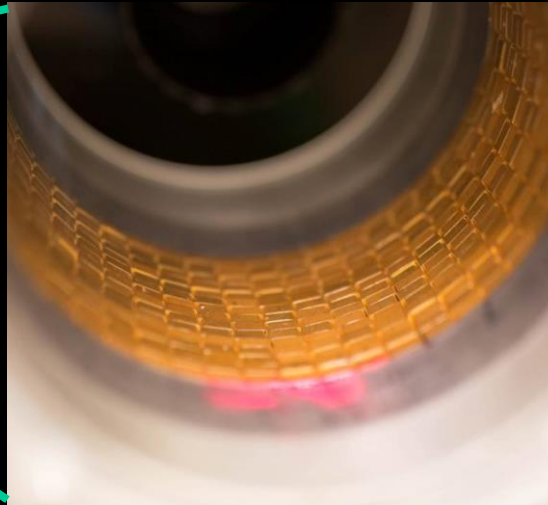


- Capability to house both mice and rats
- Additionally, direct connection by a sky bridge to the animal facilities at AKM
- Everything in one animal barrier, making it easy to perform longitudinal studies
(A major advantage to our PET core facility compared to many others in the world.)

Trimodality: PET/SPECT/CT



Photo: UiT / Christian Halvorsen



PET-detectors

- In-house made PET-tracers



SPECT-detectors

- Commercial SPECT-tracers

External irradiator



- Subject-specific radiation treatment planning
- Adaptive, and image-guided radiotherapy
- Volumetric modulated arc therapy
- Bioluminescence imaging



PET/MRI

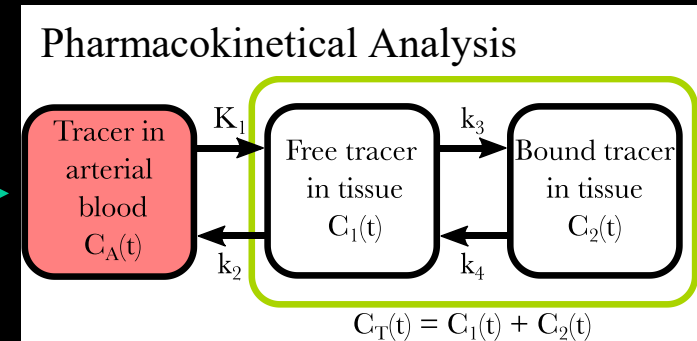
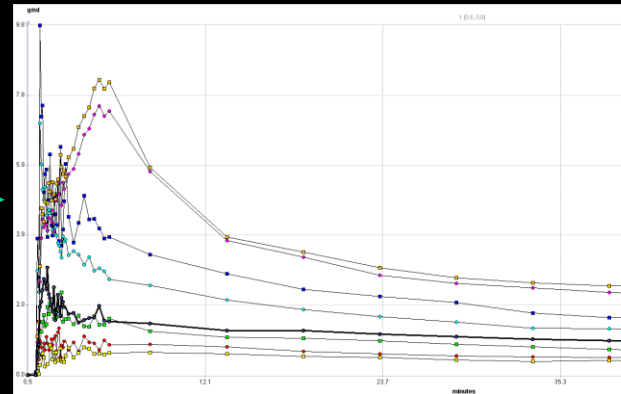
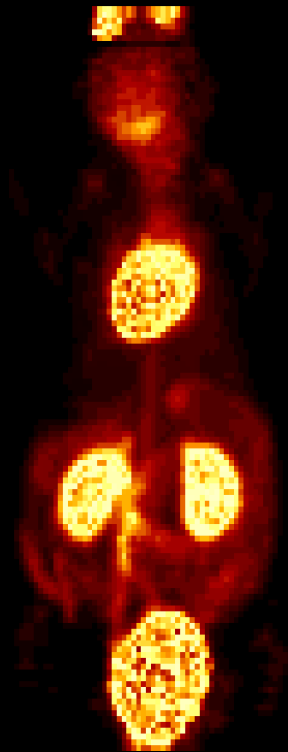


- State-of-the art 7T PET/MRI with a dry magnet
- Whole-body mouse and rat imaging with PET/MRI
- Variable magnetic field which allows for translational imaging
- MRI Spectroscopy
- Dynamic PET, simultaneous with MRI

Photo: UiT / Christian Halvorsen

Image Analysis

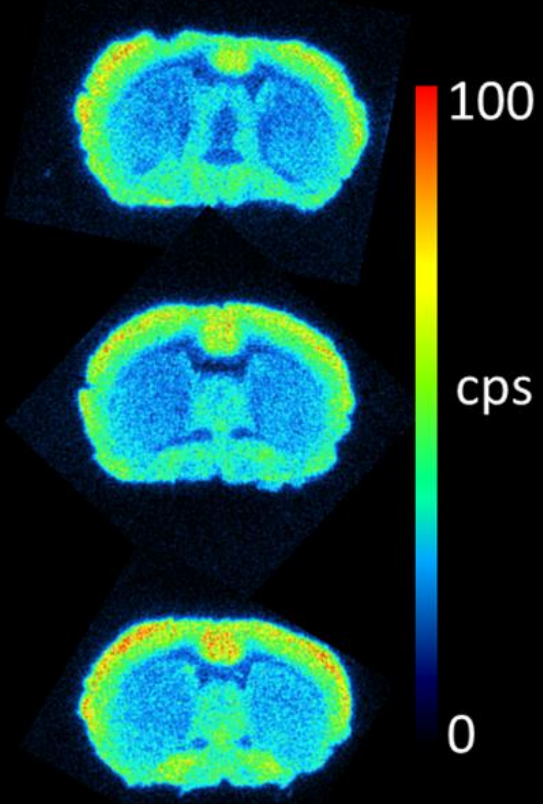
- PETCore staff can train researchers on advanced PET, SPECT, CT, and MRI image analysis as well as pharmacokinetical analysis using kinetic modeling



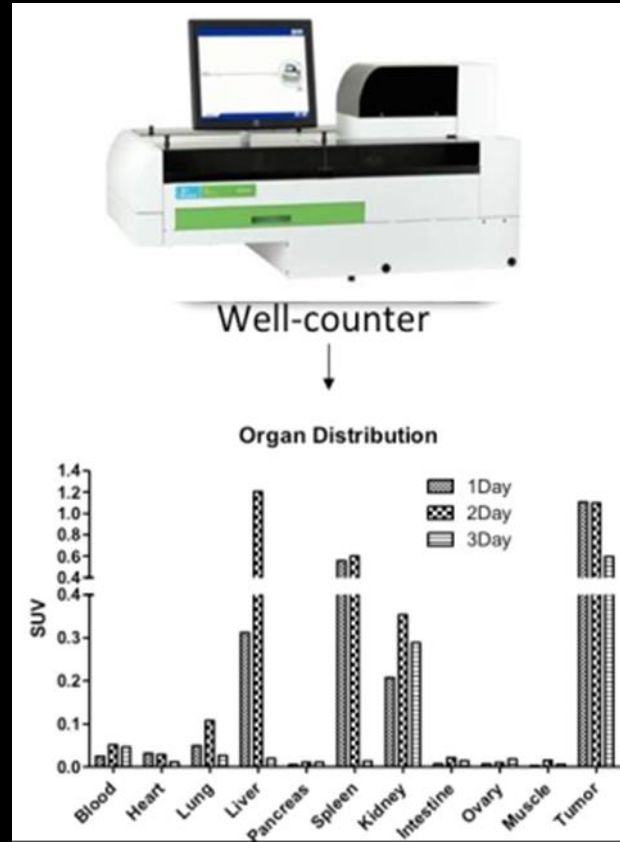
Validation methods

Authoradiography

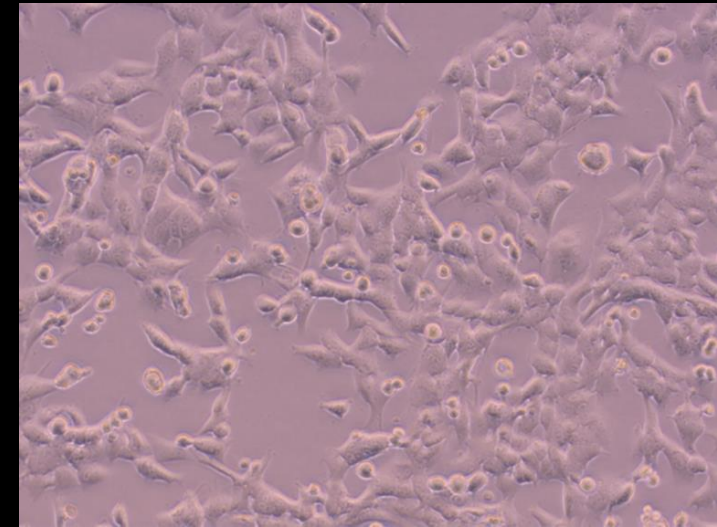
healthy mouse brain



Biodistribution



Cell culturing



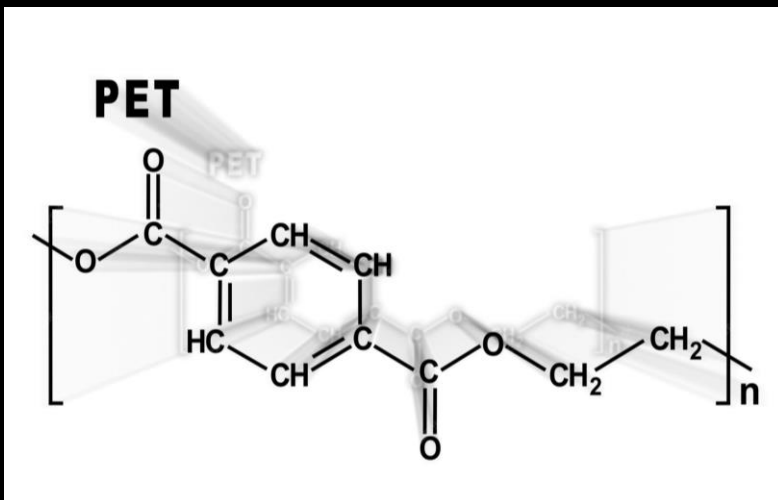
- 20 μ m brain slice
- 50 μ m imaging resolution

Who can use PETCore and its services?

- Any researchers, let it be internal from UiT/UNN or external from all around the world
- Any company/vendor

Contact petcore@uit.no for further information!

Radiochemistry



Preclinical

Clinical

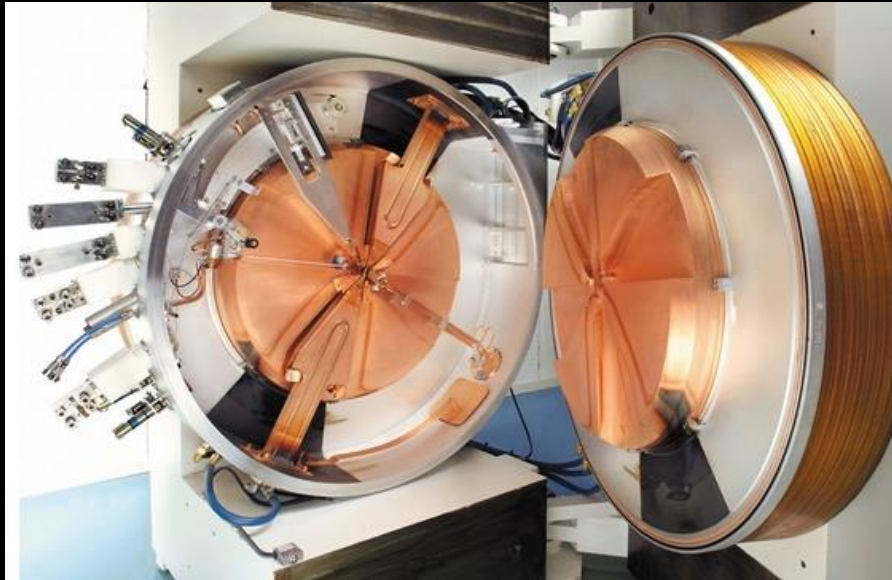
Radiochemistry



Cyclotron: GE PETtrace 860

Isotopes:

- ^{18}F
- ^{11}C
- ^{13}N
- ^{15}O
- ^{64}Cu
- ^{67}Cu



Modules for chemical synthesis

GE chemical synthesis modules

FASTlab 2 (incl. developer) and TRACERlab FX2 C/N



Comecer Alceo
Cu64 solid target system



Trasis AllinOne
Support for >40 tracers



Hotcells for
radiometals

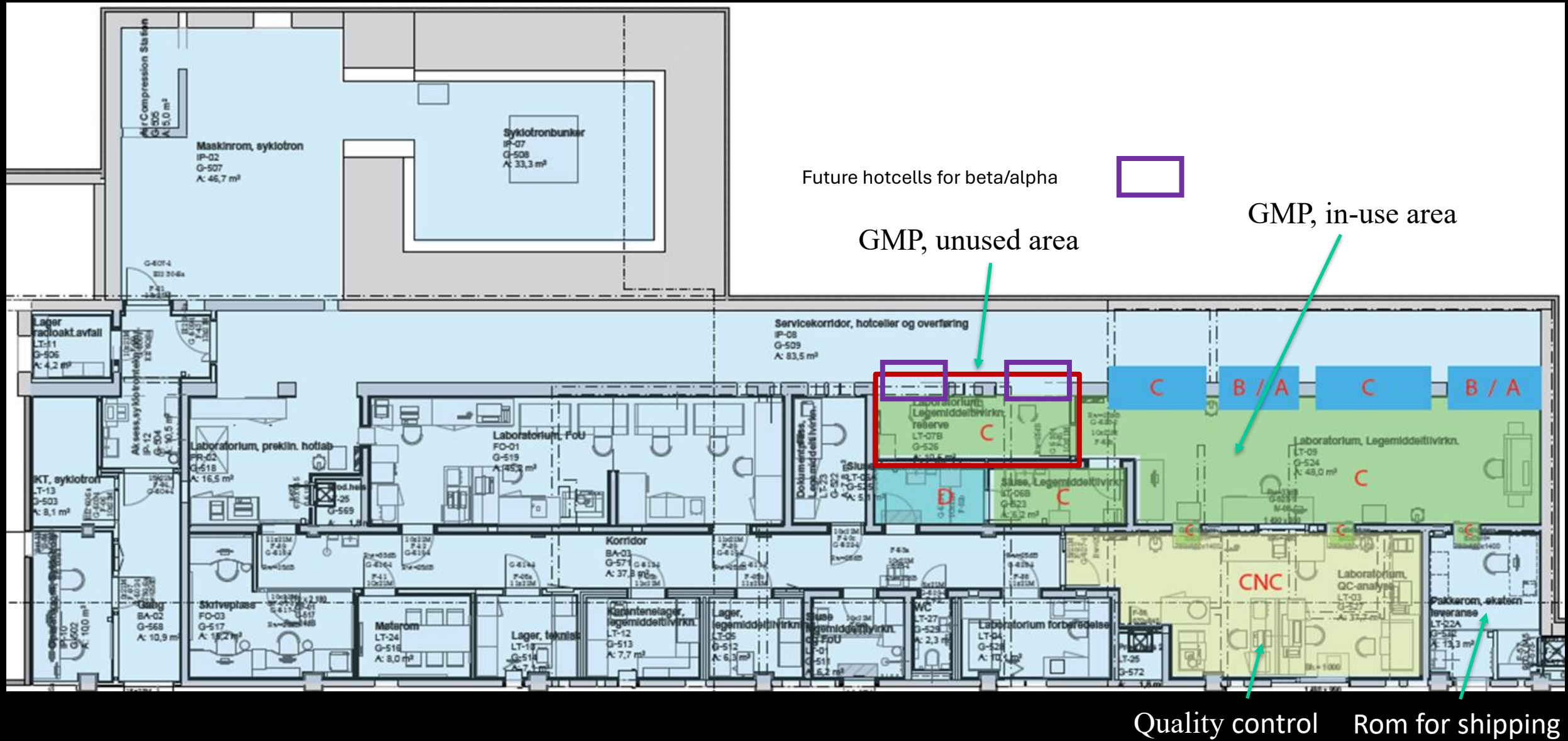


PET-tracers

Available Tracer	Application
[¹⁸ F]-FDG	Cell metabolism
[¹⁸ F]-F-Cholin	Various cancer types
[¹⁸ F]-FMISO	Tissue hypoxia
[¹⁸ F]-FLT	Cell proliferation
[¹⁸ F]-NaF	Bone metabolism
[¹⁸ F]-DOPA	Dopamine biosynthesis
[¹⁸ F]-AlF-FAPI [*]	Tumor microenvironment
[⁶⁸ Ga]-GaCl ₃	Radiolabeling
[⁶⁸ Ga]-PSMA-617	Various cancer types
[⁶⁸ Ga]-DOTATOC	Neuroendocrine tumor
[^{64/67} Cu]-CuCl ₂ [*]	Various cancer types and Cu-metabolism disorders
[¹¹ C]-YG-RC1 [*]	Epithelial Growth Factor Receptor (EGFR) and Tyrosine Kinases (TK) in various cancer types
[⁸⁹ Zr]-Zr-Oxalate	Radiolabeling
[¹⁵ O]-H ₂ O	Brain perfusion and heart function



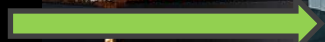
Beta and alpha production



Clinical



Preclinical



Clinical



Radiochemistry



Clinical nuclear medicine

PET/CT, PET/MRI, SPECT/CT



But also radioactive treatment
(to treat what you see)

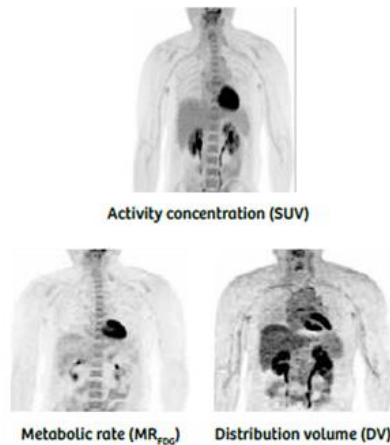
New PET-scanners in 2026

Total body PET/CT



**Capture
more organs
dynamically**

Data courtesy of Inselspital,
Bern University Hospital, Bern, Switzerland.



**Observe relationships
between organs and
tracer kinetics**

Data courtesy of Yale University,
New Haven, Connecticut, USA.



**Asses potential of
novel and new
radiopharmaceuticals**

Data courtesy of Inselspital,
Bern University Hospital, Bern, Switzerland.

PET/MRI



Excel PET precision

Excellent PET performance¹

Ultra-fast TOF²

Accelerate MR performance

New level in clinical productivity
with **Deep Resolve 2D & 3D**

Simplify PET/MR workflow

First truly-unified PET & MR workflow

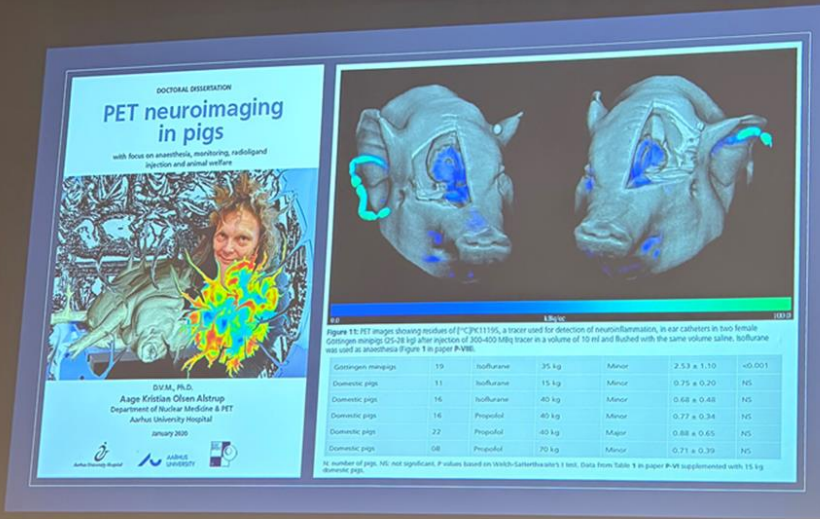
Impact clinical care

Offering a **one-stop-shop** solution
while theranostics & novel drug
therapies are changing care provision

PET-studies on Pigs

Collaboration with
Aarhus University
Hospital, Denmark

Aage K. O. Alstrup
Associate Professor,
Specialist in Laboratory
Animal Medicine,
Aarhus University Hospital



DOCTORAL DISSERTATION
PET neuroimaging in pigs
with focus on anesthesia, monitoring, radioligand injection and animal welfare

BVM, Ph.D.
Aage Kristian Olsen Alstrup
Department of Nuclear Medicine & PET
Aarhus University Hospital
January 2020

Figure 18 PET images showing results of ^{18}F -CPC11159, a tracer used for detection of neuroinflammation, in ear catheters in two female domestic pigs. The images show the distribution of the tracer in the brain and the ear catheters. The images are color-coded, with red indicating high uptake and blue indicating low uptake. The images are labeled with the pig's ID and the time point after injection.

Group	Anesthesia	Weight (kg)	Sex	Mean	SD	P-value
Domestic pigs	Isotrurane	35 kg	Minor	2.53 ± 1.10	<0.001	
Domestic pigs	Isotrurane	15 kg	Minor	0.75 ± 0.20	NS	
Domestic pigs	Isotrurane	40 kg	Minor	0.68 ± 0.43	NS	
Domestic pigs	Propofol	40 kg	Minor	0.77 ± 0.34	NS	
Domestic pigs	Propofol	40 kg	Major	0.88 ± 0.65	NS	
Domestic pigs	Propofol	20 kg	Minor	0.71 ± 0.39	NS	

NS: number of pigs; NS: not significant; P-values based on Welch-Satterthwaite's t test. Data from Table 1 in paper P-191 supplemented with 15 kg domestic pigs.

Tromsø, 14. nov 2025

Research project: Theracan

3,7 mill Euro
2026 – 2031



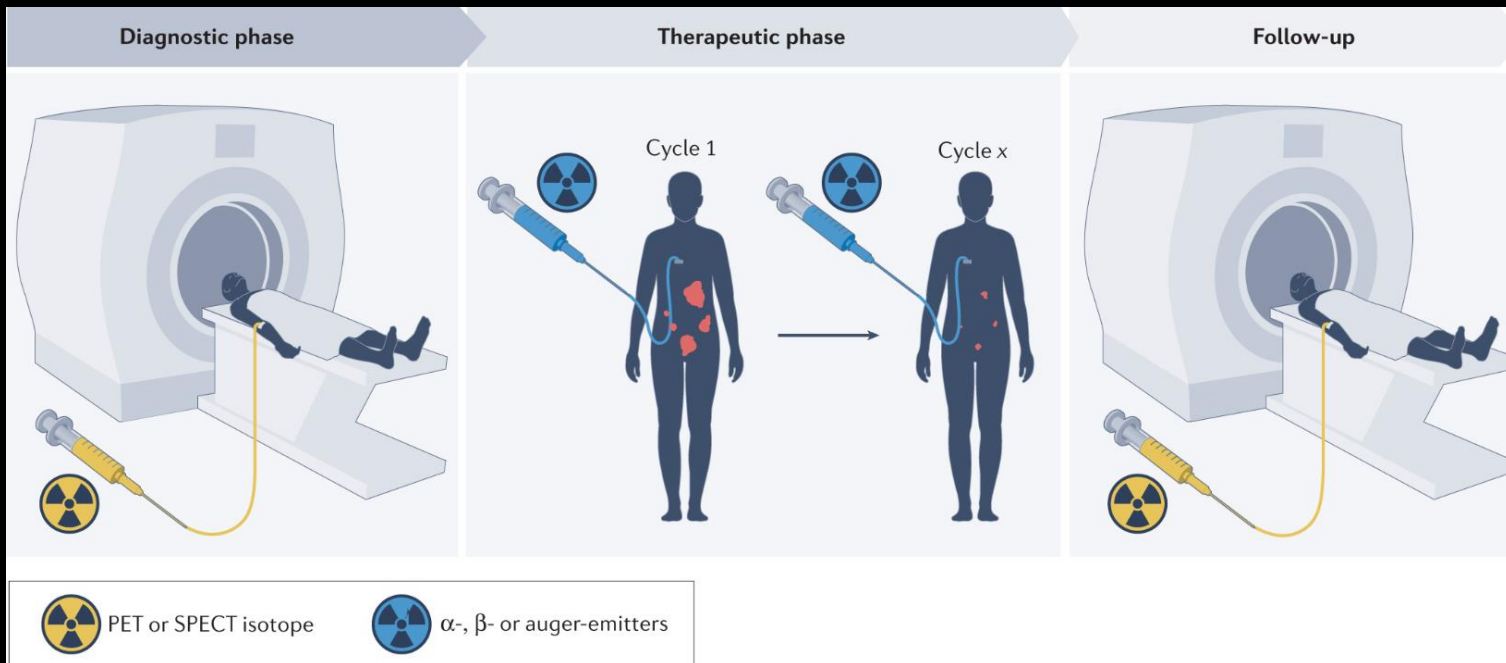
«Novel radio-
theranostic
systems for
precision
cancer
medicine»



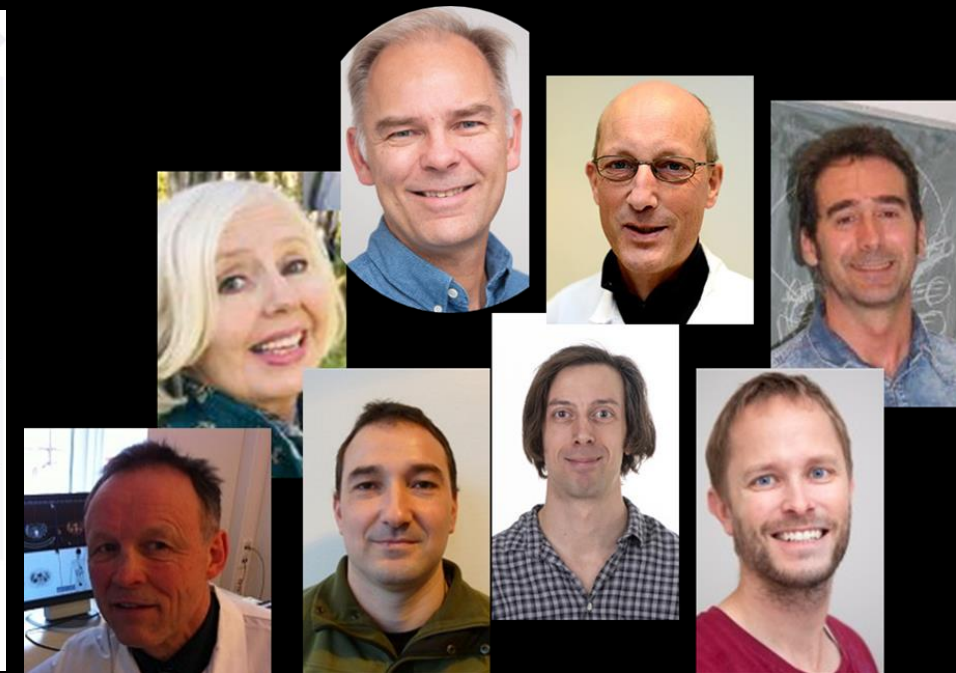
UiT The Arctic
University of Norway



Theracan: Radioligand therapy (RLT)

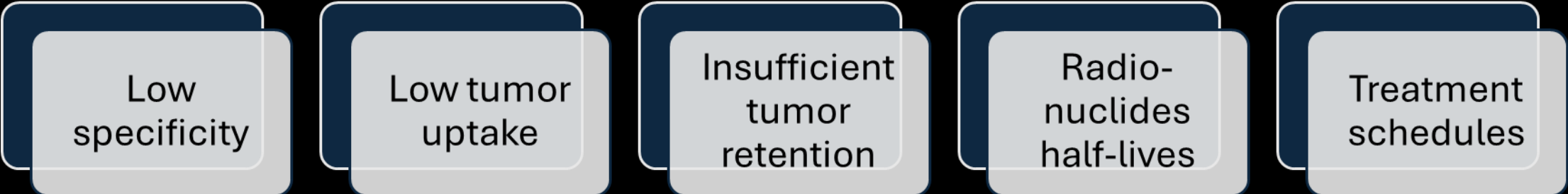


Bodei L. Nat Rev Clin Oncol, 2022



**Project team
Theracan**

Current challenges for RLT clinical translation



Low
specificity

Low tumor
uptake

Insufficient
tumor
retention

Radio-
nuclides
half-lives

Treatment
schedules

Opportunities

Search for
novel targets

- Targeting of the tumor micro-environment

Next-gen
radionuclides

- Alpha-emitting isotopes:
 - Terbium-161
 - Actinium-225
 - Astatine-211
 - Lead-212

Next-gen
binders

- Nanobodies & single domain antibodies
- Affibodies

Nanoparticle-
based
delivering

- Liposomes
- Nanometals

AI &
Dosimetry

- Improved treatment planning
- Response prediction

Combination
treatments

- DNA repair inhibitors
- Immuno-checkpoint inhibitors
- Chemotherapeutic agents

Tromsø PET Imaging Center



See us at YouTube.com

Tromsø PET Imaging Center University Hospital of North Norway & UiT – The Arctic University of Norway



 Tromsø PET Imaging Center University Hospital of North Norway & UiT – The Arctic University of Norway

Tromsø PET Imaging Center

