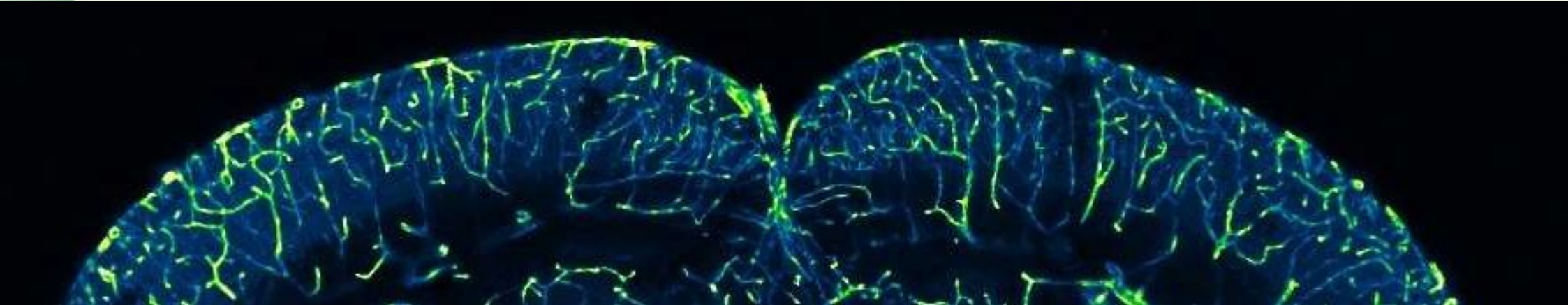


**« TAMING THE UNKNOWN BY
UNVEILING THE UNSEEN »**



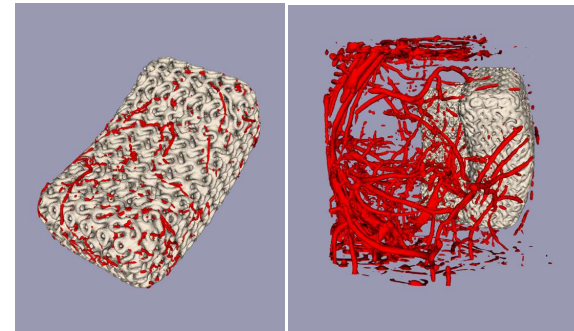
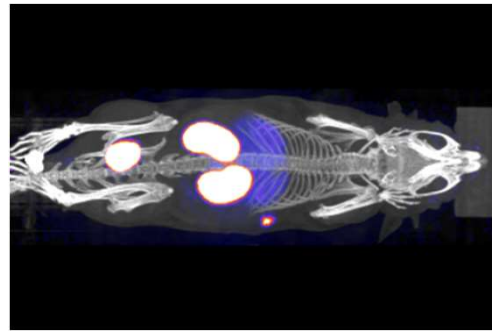
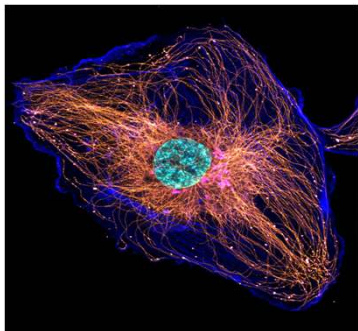
Center for Microscopy and Molecular Imaging

Support throughout R&D process and post-production controls

Preformulation testing

In vivo
characterisation

Comprehensive
understanding of
bio-mechanism

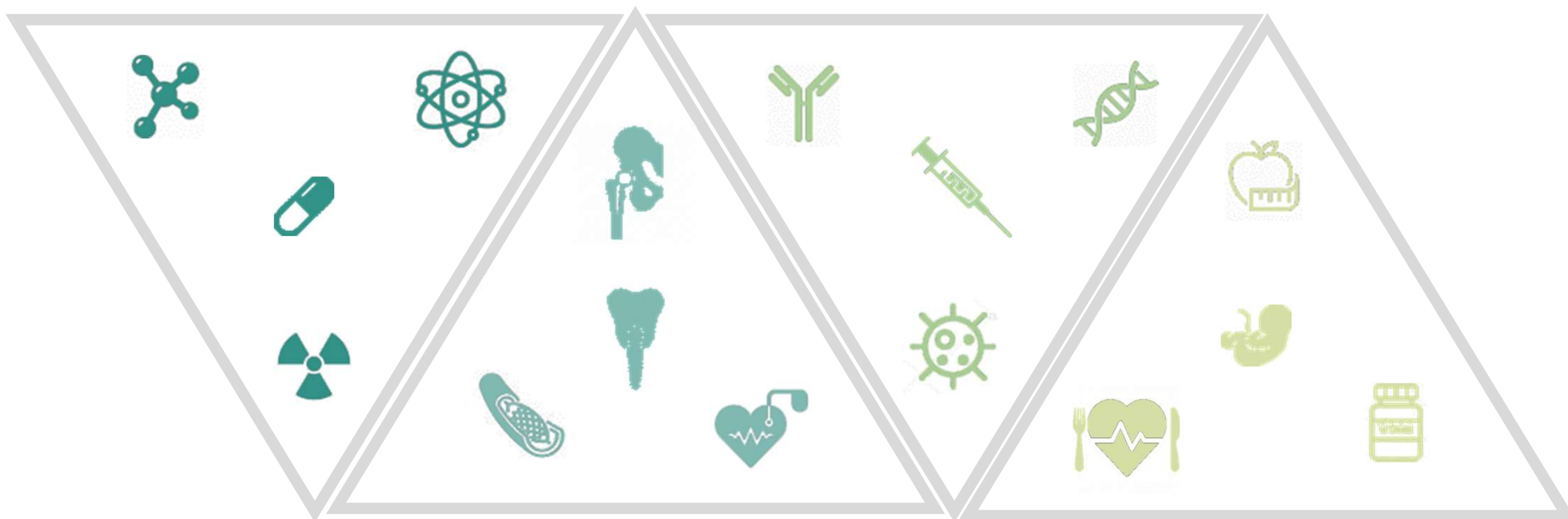


CMMI

Broad life-sciences expertise

PHARMA

BIOTECH

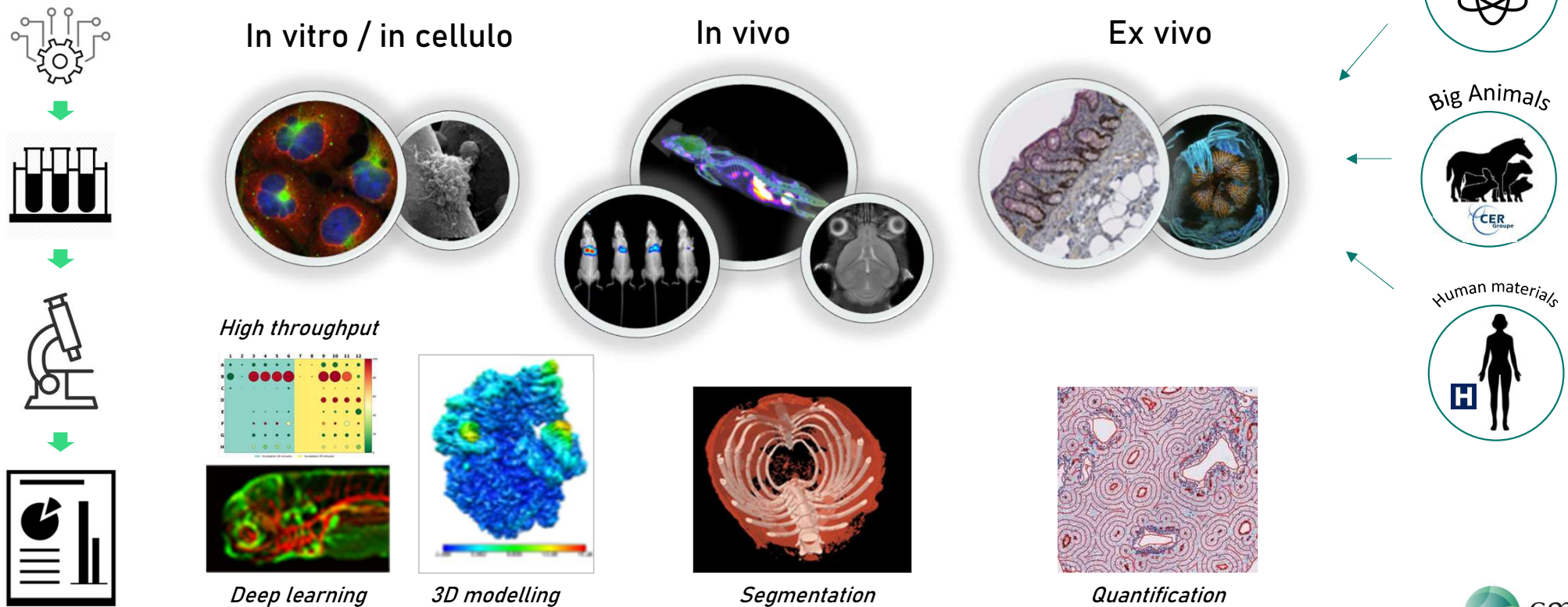


MEDTECH

WELLNESS

CMMI : An integrated approach

From experimental design to image analysis



CMMI – in vivo

High-end equipments and multidisciplinary expertise in preclinical imaging

Nuclear & X-Ray imaging

- ❑ **Positron Emission computed Tomography (PET) and Single Photon Emission Computed Tomography (SPECT):**
 - ✓ Multimodal nanoScanPET-CT and nanoSPECT Plus (Mediso)
 - ✓ Generation of 3D images with spatial resolution ranging from 500 to 800µm
 - ✓ Detection and quantification of radioactive signals emitted from PET (¹⁸F, ⁶⁸Ga and ⁸⁹Zr,...) and SPECT (^{99m}Tc, ¹¹¹In, ¹²³I,...)
 - ✓ Molecular and functional imaging: metabolism, inflammation, neurology, cell homing and trafficking,...
- ❑ **Computed X-Rays Tomography**
 - ✓ Scanner µCT Skyscan 1276 (Bruker, USA)
 - ✓ Generation of high resolution 3D images (spatial resolution till around 10µm)
 - ✓ Anatomical and functional imaging
- ❑ **In vitro uptake and ex vivo biodistribution investigations :**
beta and gamma counting approaches

- ❑ **Tailor-made experimental plan proposal with animals follow up**
- ❑ **Images analysis by (semi)-automatic approaches**
- ❑ **Statistical analysis of the results and project report generation**

Non-ionising imaging

- ❑ **Optical imaging :**
 - Bioluminescence (BLI), NIR Fluorescence (FLI) & Cherenkov (CLI)
 - Up to 10 mice at a time
 - Optical addons modules :
 - ✓ MACROLENS for very high spatial resolution
 - ✓ 4-views simultaneous visualization
 - ✓ X-Ray (2D) radiography
- ❑ **MRI :**
 - 2 magnetic fields : 9.4T & 1T
 - Morphological MRI, volume measurement
 - Molecular, contrast agents
 - DCE-MRI (Dynamic contrast-enhanced)
 - DW-MRI (Diffusion-weighted)
 - fMRI (functional)
 - MRS in development (Magnetic Resonance Spectroscopy)
- ❑ **Multispectral Optoacoustic Tomography (MSOT) :**
 - Functional imaging (oxygenation)
 - DCE-MSOT
 - Molecular (melanin, exogenous chromophores, ...)

In vivo - nuclear Molecular Imaging & X-ray

Pre-imaging

Co-design markers

Consultance in Radiochemistry



+

Animal models

Animal models for various defects
Tumor models
Genetically engineered mouse models



Preclinical imaging

Medical expertise

- Oncology imaging
 - Diagnostic
 - Response to treatment based on clinical PERSIST parameters
 - Theranostic approach: Vectorized therapy
- Inflammation imaging
- Neuroimaging
 - Semi-automatic brain segmentation
 - Volume quantification
- Scintigraphy (Thyroid, ...)
- Biodistribution
- Radiotracer evaluation

Imaging for Pharma and Biotech

- Anatomic & functional imaging by X-Ray for lung, heart, fat, ...
- Cell therapy (Bone and liver regeneration, ...)
- Animal phenotype characterisation

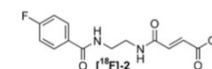
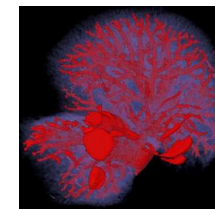
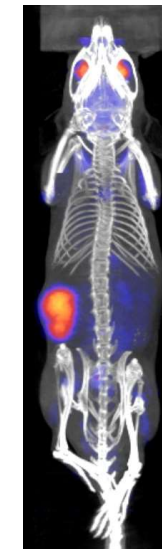


Image processing

Absolute and Relative
Quantification of the 3D images
Semi-automatic brain segmentation
tool

Continuous development of
algorithms for (semi-)automatic
images processing

Statistical analysis of the results



In vivo - Non-ionising Molecular Imaging

Pre-imaging

Co-design markers

Contrast agents (MRI)
Fluorescent dyes (MSOT/FLI)



+

Animal models

Tumor models
Luciferase expressing cells



Preclinical imaging

Imaging for Pharma & Biotech

- ❑ Pharmacokinetics & biodistribution (*in vivo* & *ex vivo*) of novel compounds
- ❑ Monitoring of cancer treatment efficiency
- ❑ Molecular imaging of diseases' biomarkers
- ❑ Tracking of stem cells or infectious agents

High performance

- ❑ High throughput imaging with BLI
 - ✓ 120 mice/day
 - ✓ Results in <48h
- ❑ High spatial resolution
 - ✓ Up to <100 microns in MRI in 3D
 - ✓ Up to ±4 microns using MACROLENS in BLI/FLI
 - ✓ Up to 75 µm using MSOT
- ❑ Real-time imaging using MSOT

Technology breakthrough

- ❑ Water Diffusion (MRI)
- ❑ Biomarker identification using MRS in development
- ❑ Angiogram, cardiac function, ...
- ❑ Dynamic oxygenation studies (MSOT)

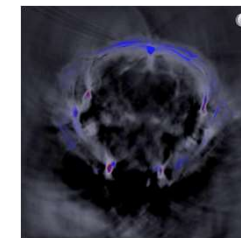
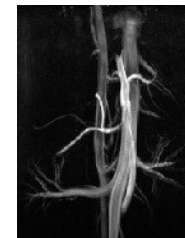
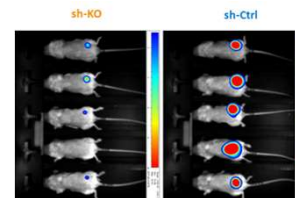
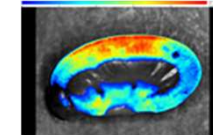
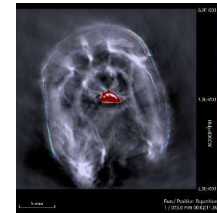
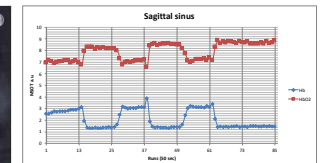
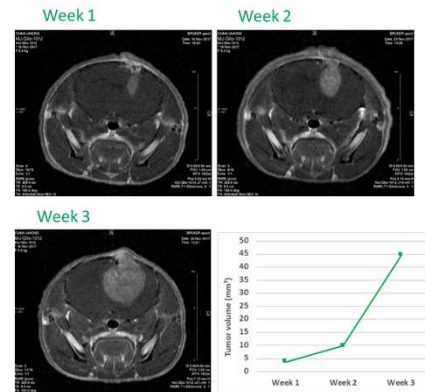


Image processing

Segmentation
Volume quantification
Signal intensity quantification
Statistical information



- ✓ Academic platform UMONS/ULB
- ✓ ~ 20 imaging experts
- ✓ Network of ~ 150 scientists
- ✓ > 10 Millions € of high-end Equipment
- ✓ ~ 120 requests / yr (1/3 industrial)
- ✓ Training for ~ 100 researchers / yr
- ✓ 750 m² in BSCB at Gosselies
- ✓ ~ 20 publi / yr


Who are we ?



- 40.000 people employed, €50bn in value exported and €4bn invested in R&D
- <https://biopark.be/en>

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Excellence in Preclinical Imaging

