

Technology Centers
Radboudumc

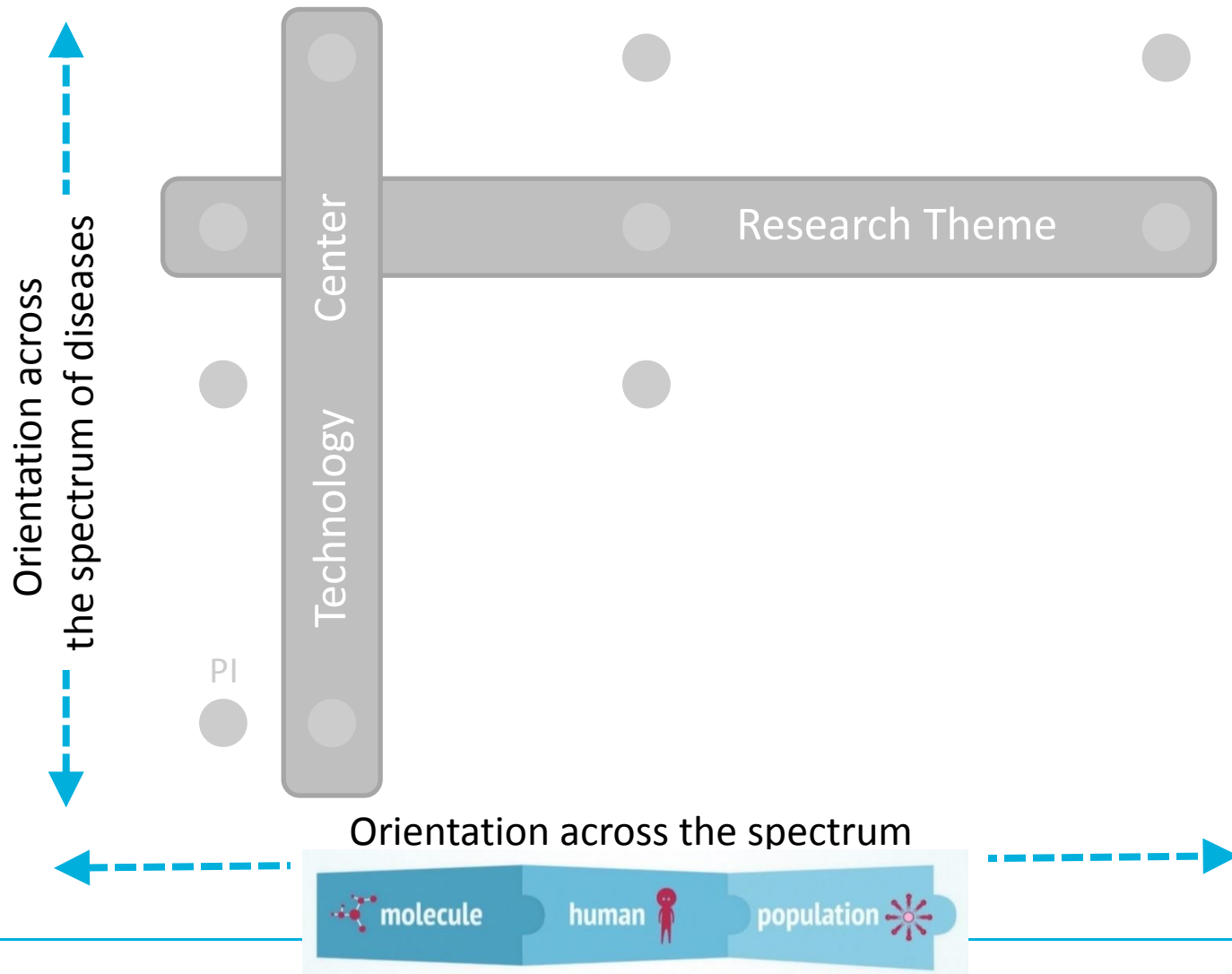
Matchmaking Day

Nijmegen, 15 January 2018

Prof Alain van Gool
Professor Personalized Healthcare
Coordinator Radboudumc Technology Centers

Radboudumc
university medical center

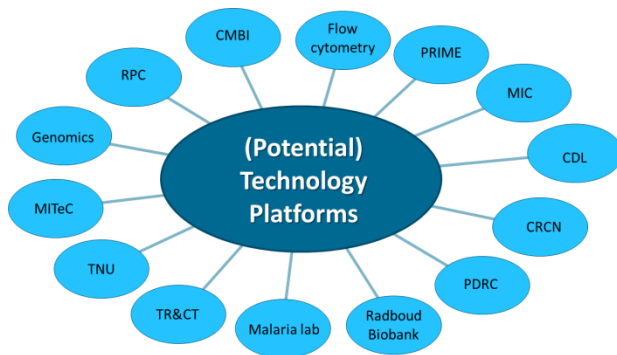
Research support by Technology



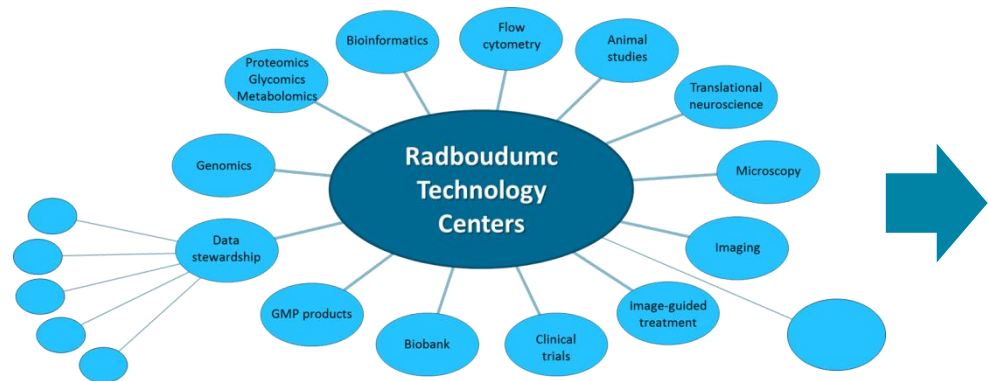
Radboudumc Technology Infrastructure

Get organised:

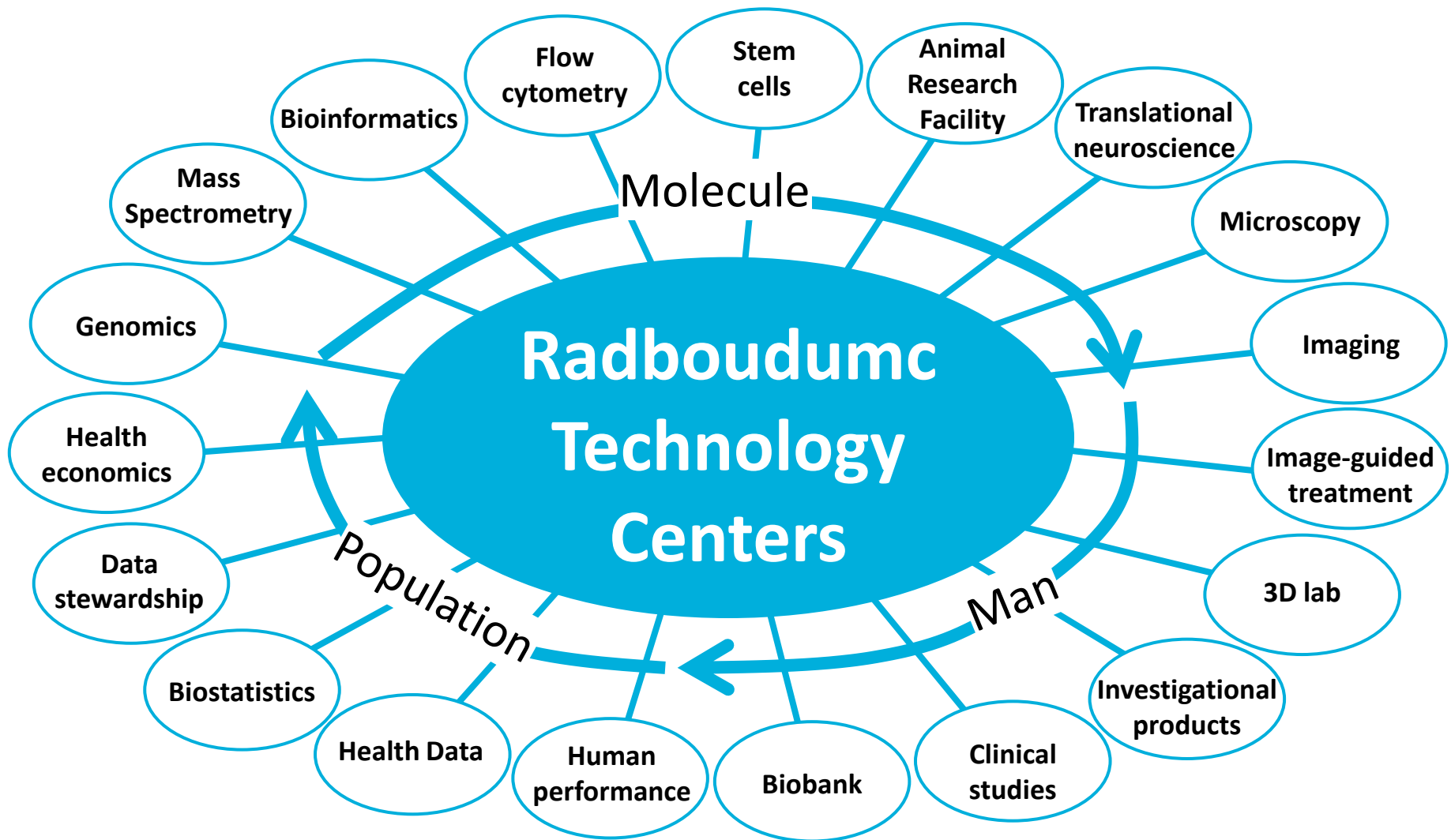
1. What **technological expertise** do we have and should we have ?
2. How should we **organise** this ?
3. How will we **communicate** this ?

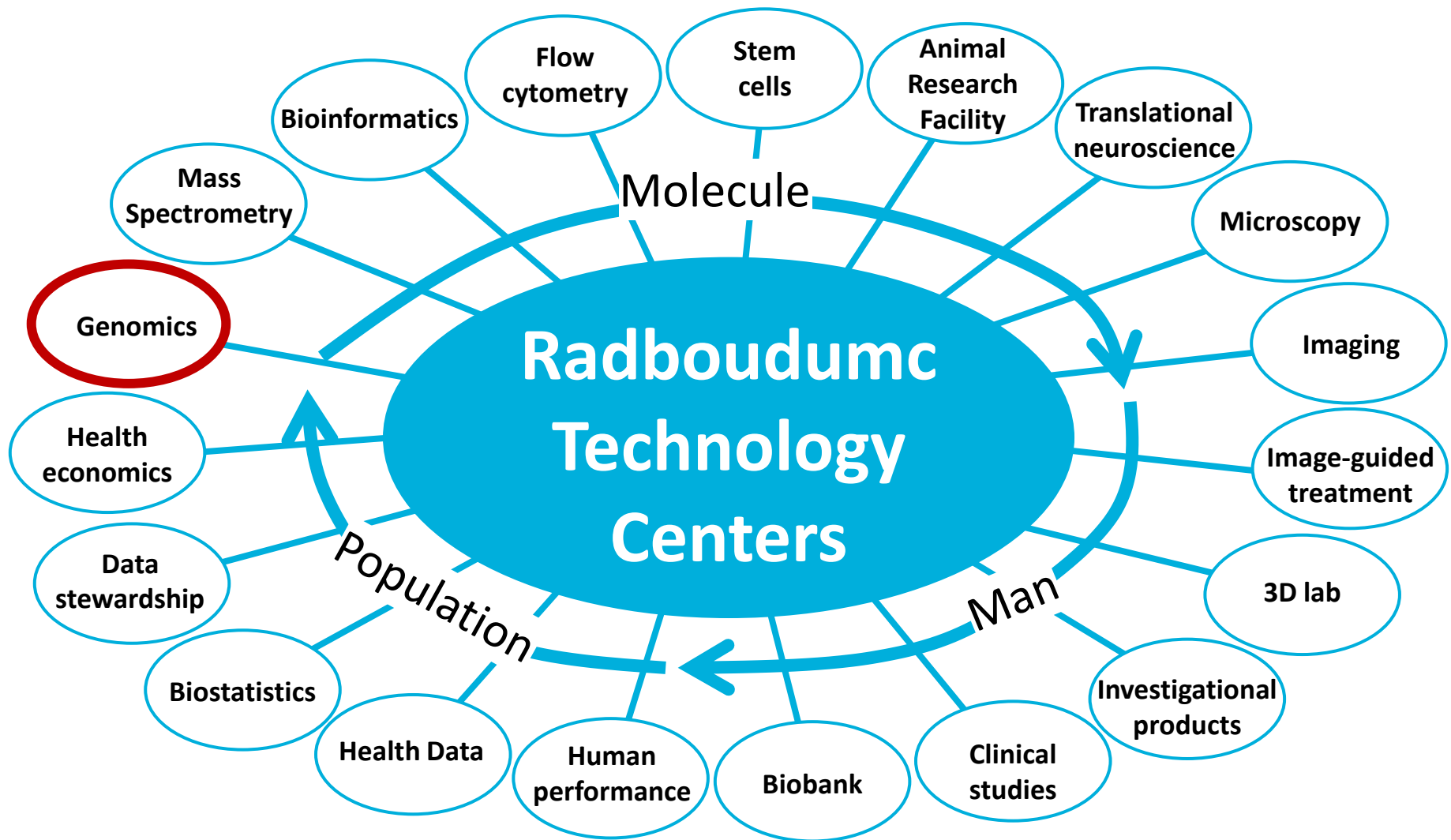


Starting phase (2014)



Forming phase (2014)





Radboud Genomics Technology Center

<https://www.radboudumc.nl/en/research/technology-centers/genomics>

Marcel Nelen

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Alexander Hoischen

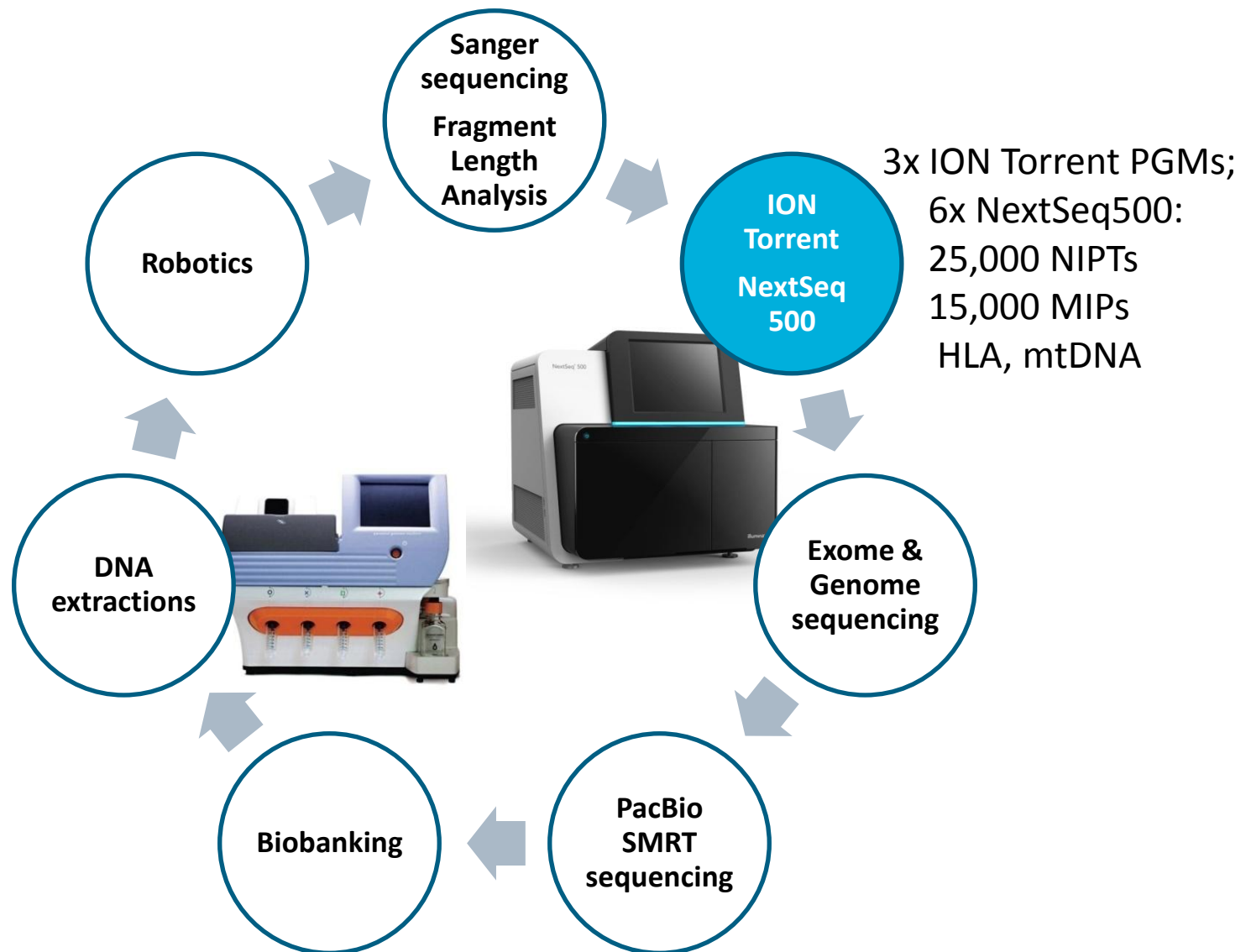
Alexander.Hoischen@radboudumc.nl

+31 24 3619639

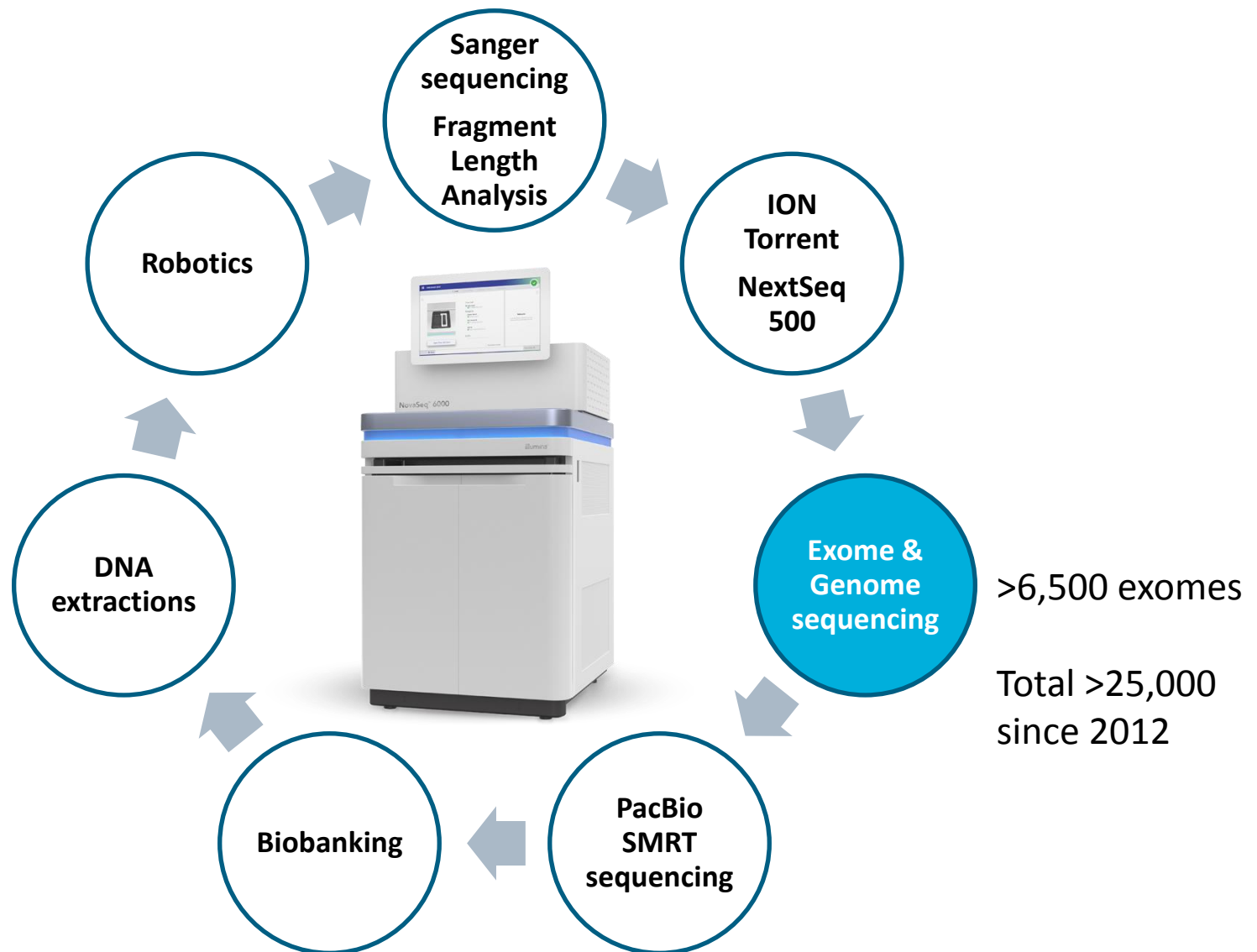
Services / Facilities



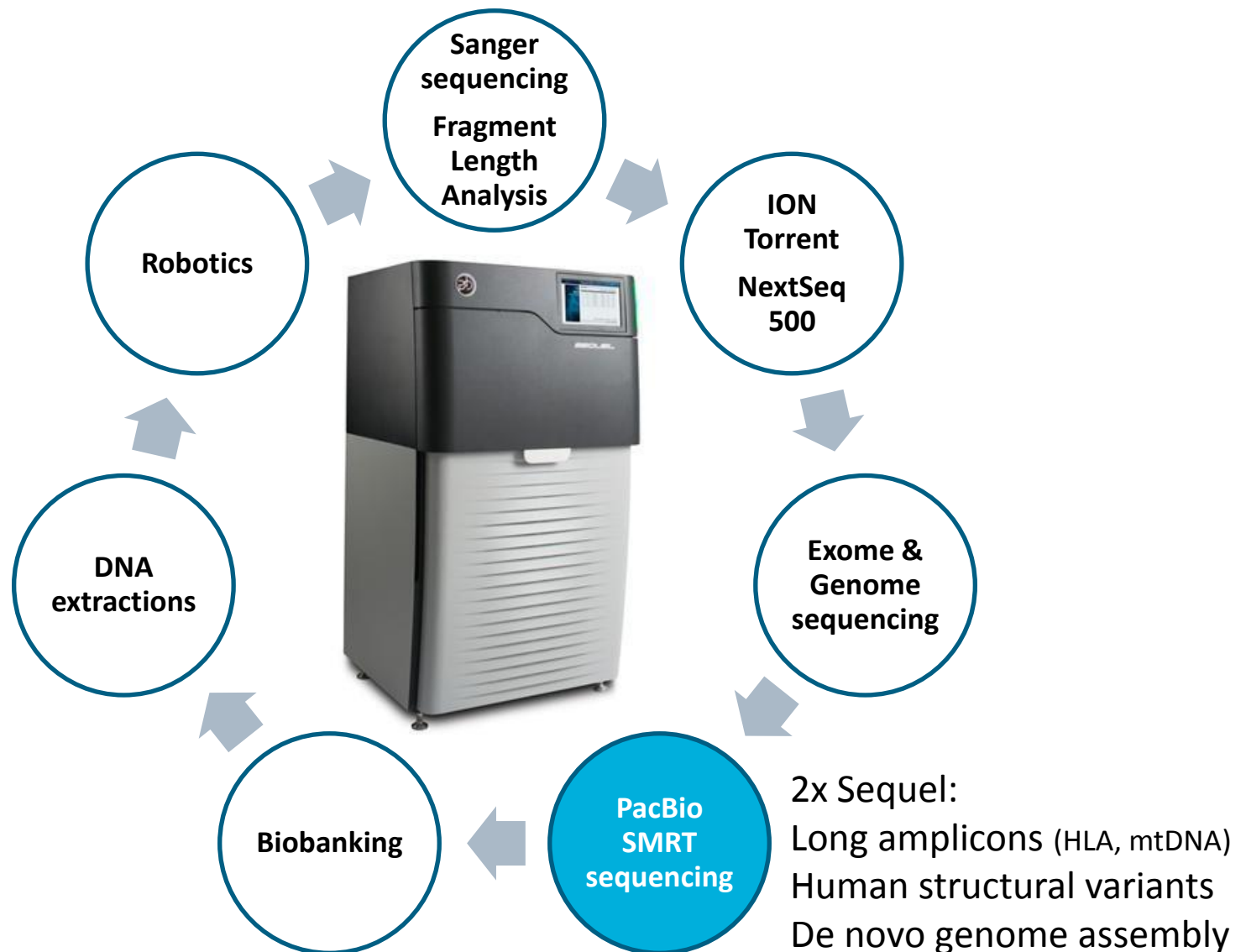
Services / Facilities



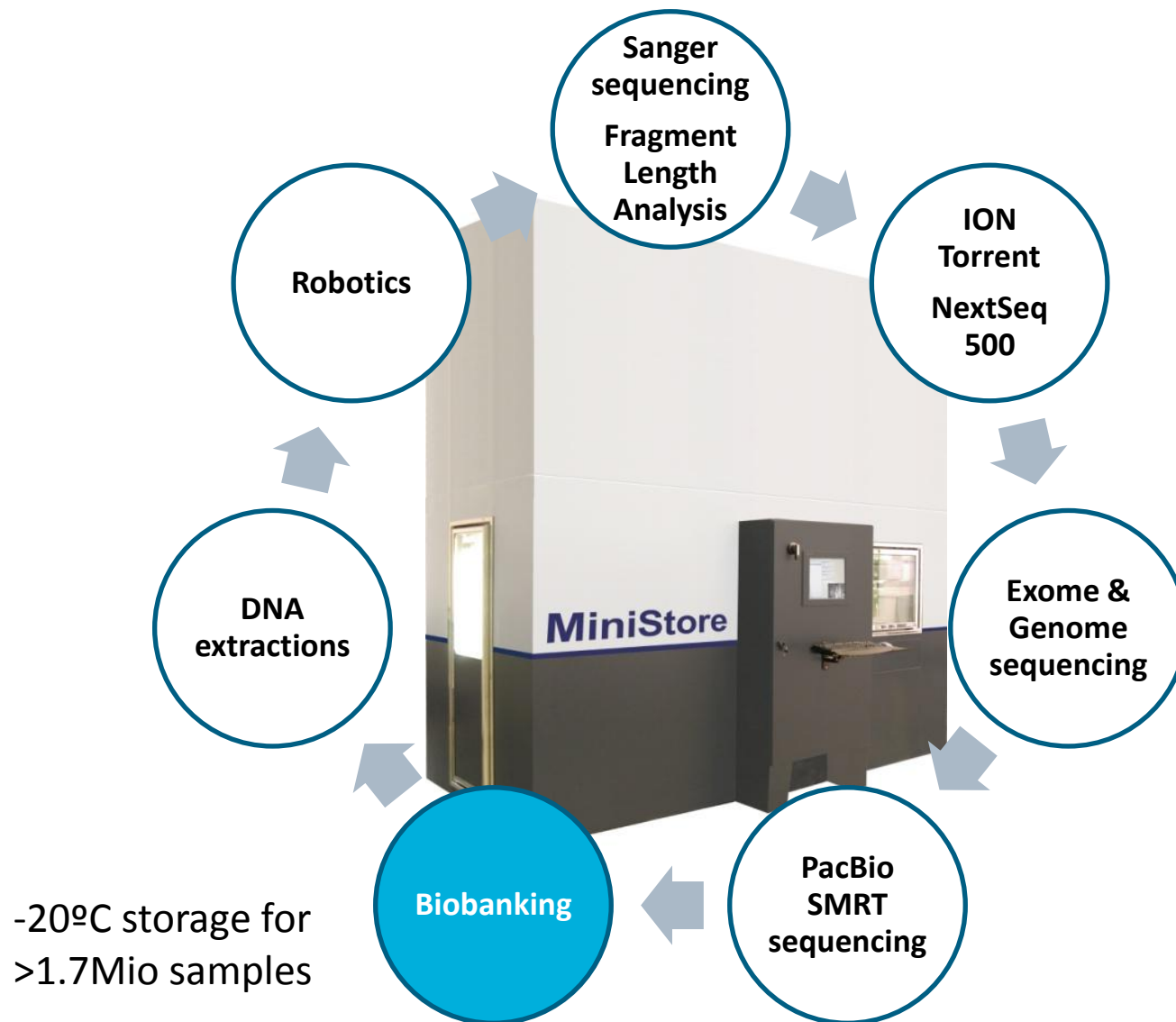
Services / Facilities



Services / Facilities

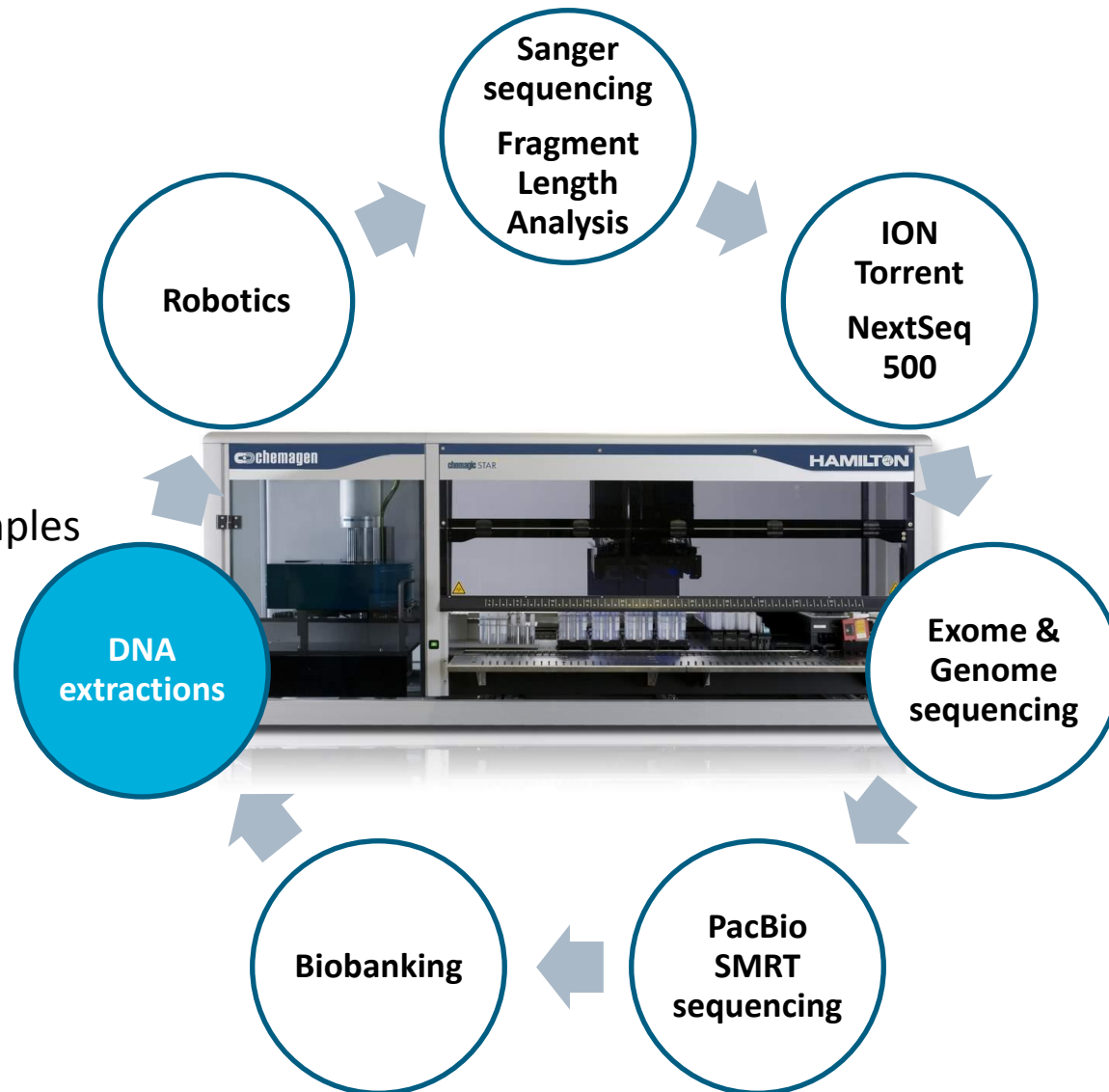


Services / Facilities



Services / Facilities

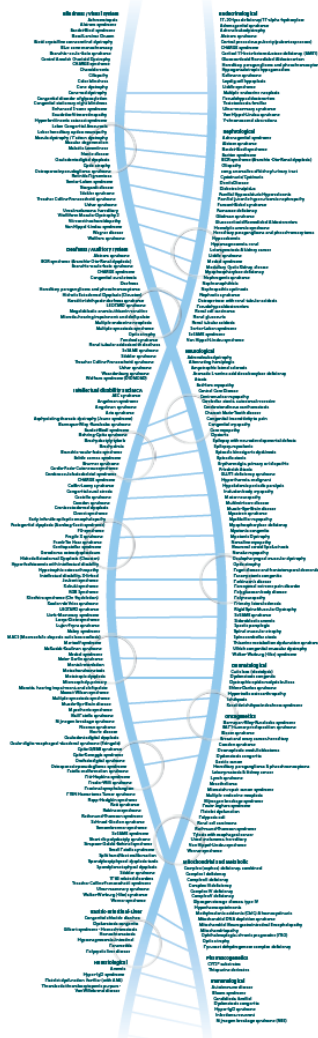
25,000 blood samples
Saliva
cfDNA
Urine
...



Services / Facilities



Routine tests offered via our facilities



Single gene tests >1000 genes

Genomewide tests (exome sequencing; microarrays, karyotyping, etc)

Disorders tested:

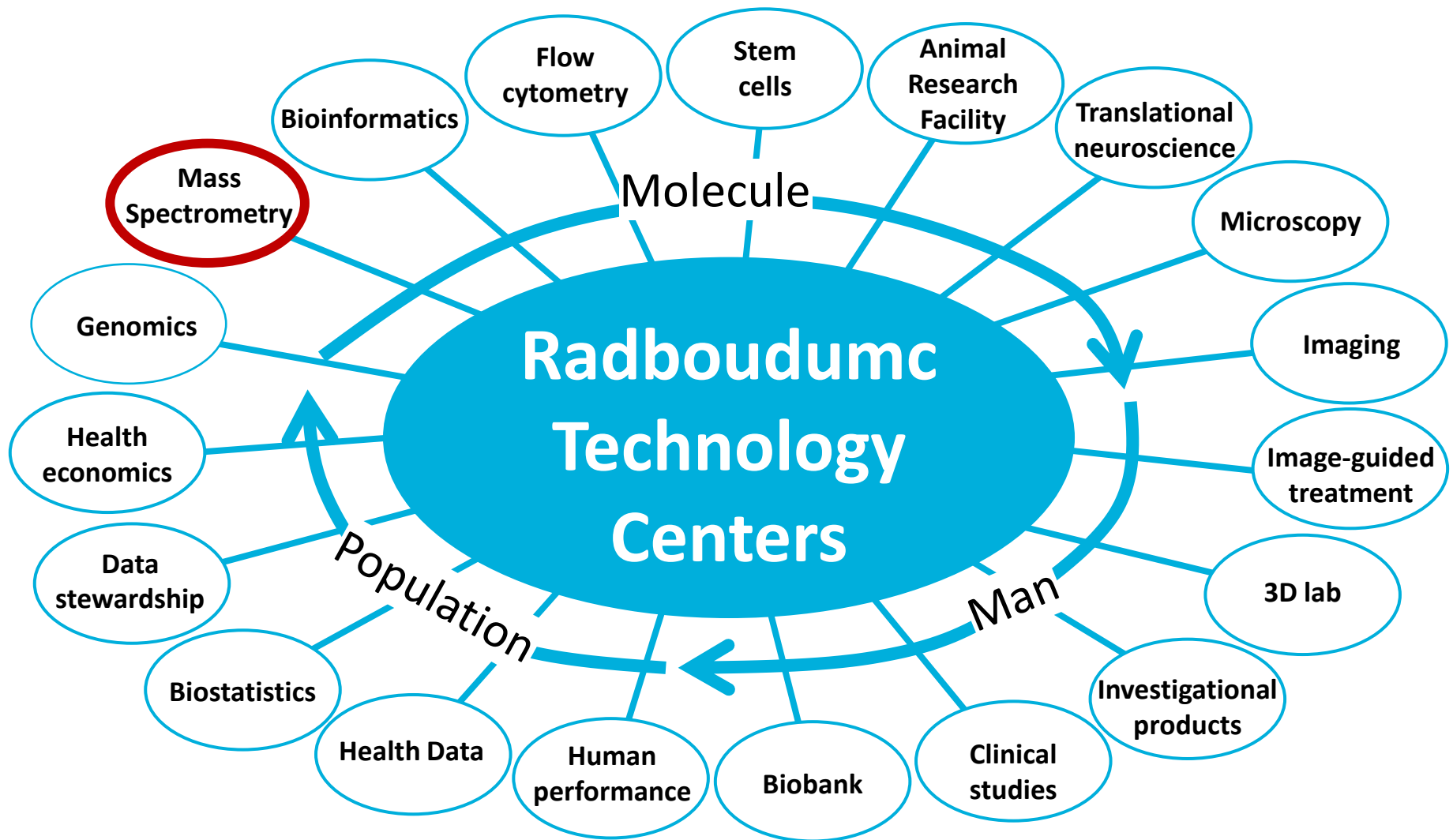
- Blindness / Visual system (40 disorders)
- Deafness / Auditory system (24 disorders)
- Dermatological (7 disorders)
- Endocrinological (19 disorders)
- Gastric-Intestinal-Liver (7 disorders)
- Hematological (5 disorders)
- Intellectual disability and MCA (90 disorders)
- Mitochondrial and Metabolic (15 disorders)
- Nephrological (37 disorders)
- Neurological (54 disorders)
- Oncogenetics (24 disorders)
- Pharmacogenetics (2 tests)

Techniques:

- Single gene analysis (Sanger + ION Torrent + MLPA)
- Gene Packages (Sanger + Ion Torrent)
- Whole exome analysis (NGS)
- Array analysis (SNP arrays)

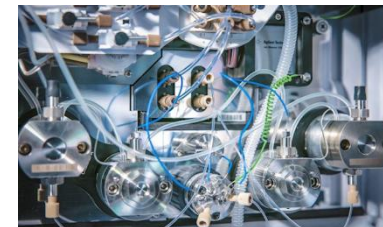
Full list of diagnostic tests:

www.genomediagnosticsnijmegen.nl



RTC Mass Spectrometry

- 23 Mass Spectrometers in 6 departments for research and biomedical applications
 - Laboratory medicine (15) – omics, biomarkers, diagnostics
 - Pharmacy (2) – drugs, therapy monitoring
 - Pharmacology & Toxicology (2) – bioanalysis of drugs and toxicants
 - Health Evidence (2) – toxicity
 - Pediatrics (1) – protein complexomics
 - Medical Microbiology (1) – bacterial typing



Highlights

Biomarker Development

Protein analytics

Complexome Profiling

Metabolomics

Xenobiotics Detection

Tissue Profiling

Molecular ADME-Tox

Drug monitoring

X-omics in Genetic Metabolic Disease

Targeted Proteomics

Pathogen Identification

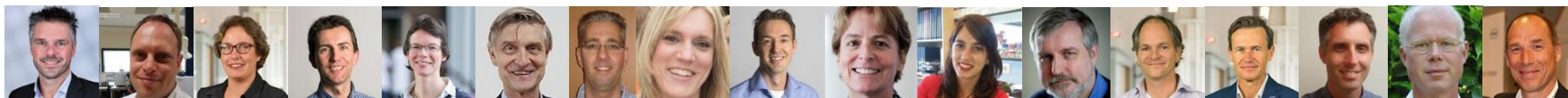
Proteomics

Glycomics

Next Generation Metabolic Screening

Personalized Glycopeptide profiling

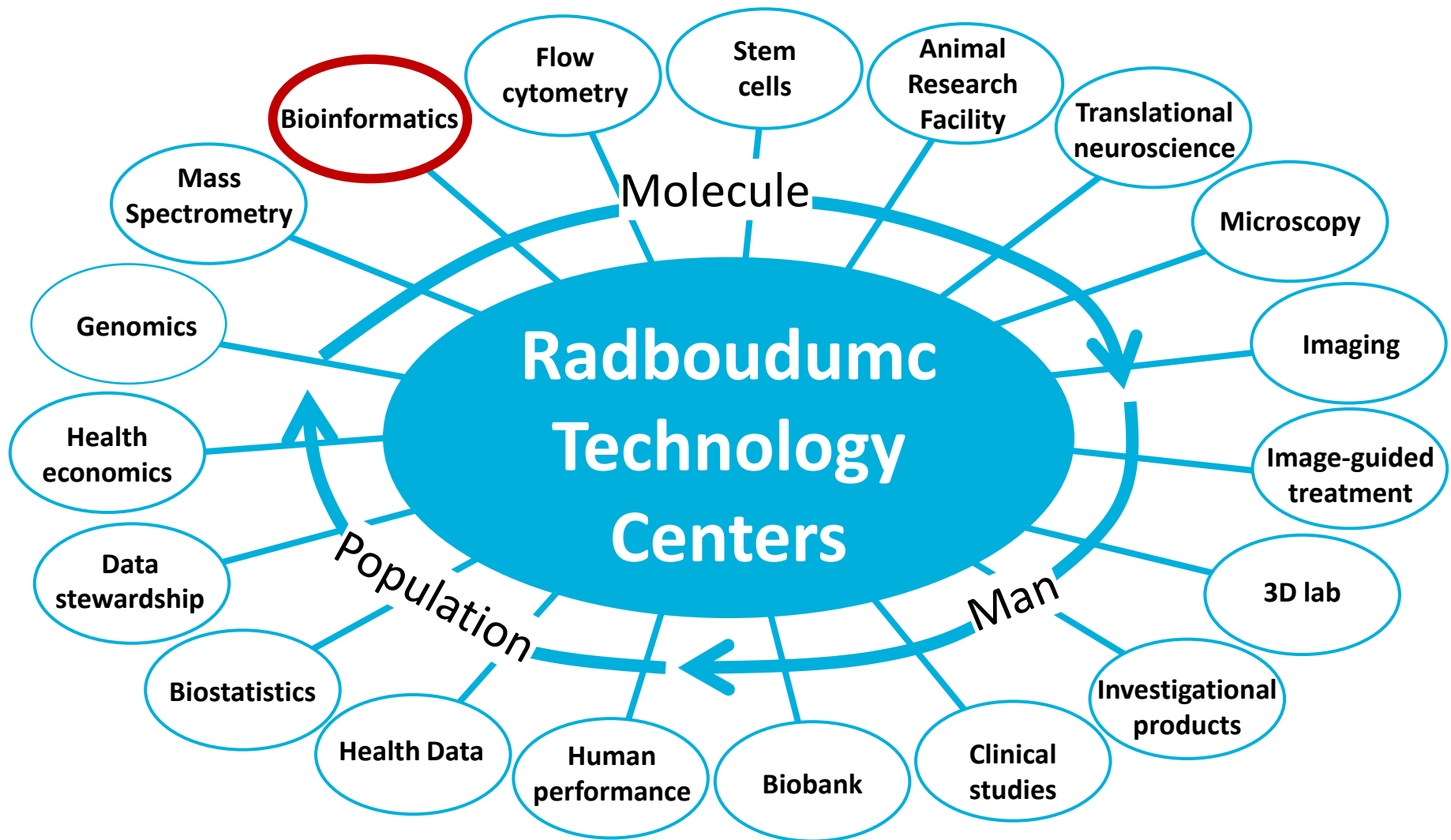
Post-Translational Modifications



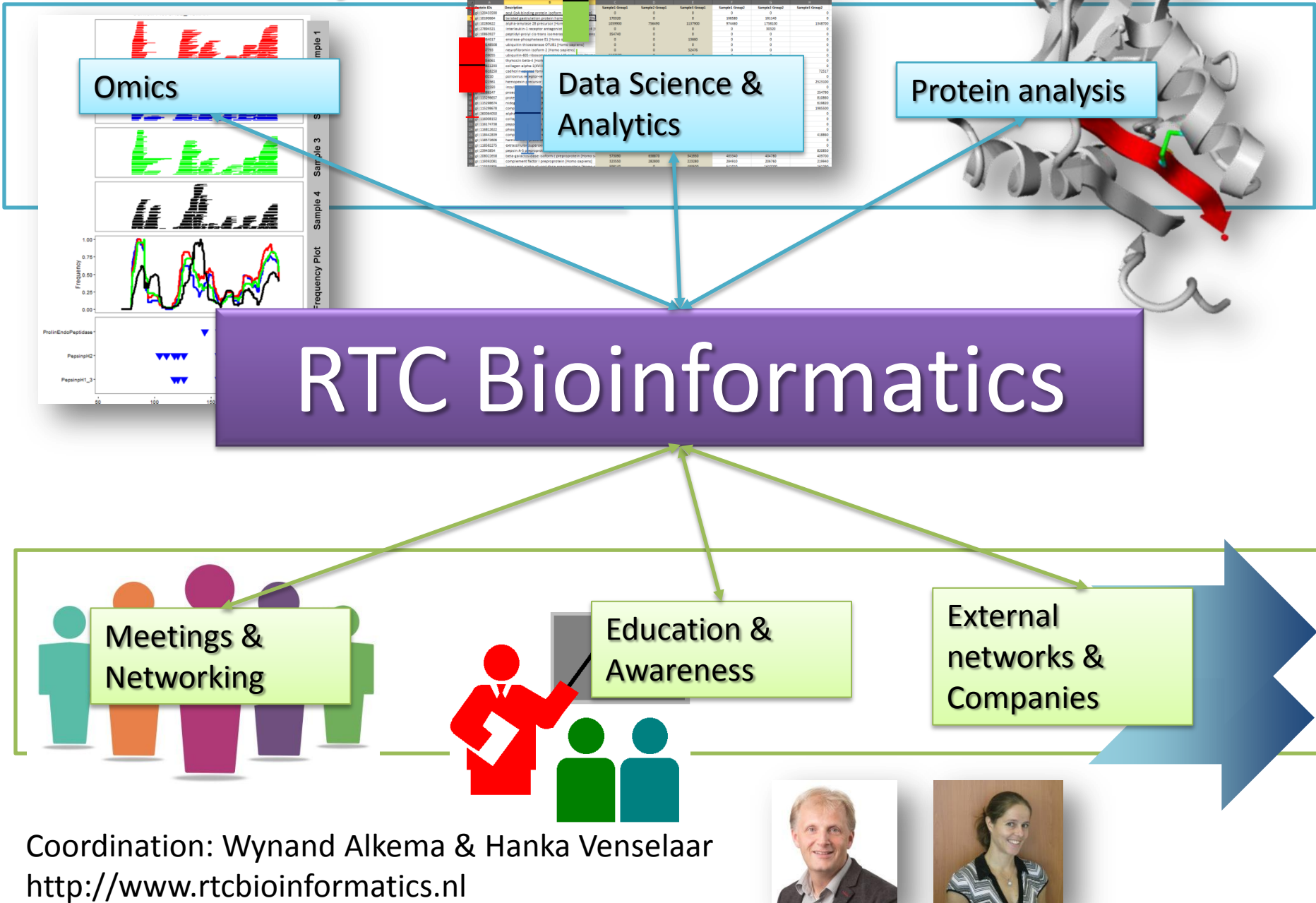
+ many expert lab technicians

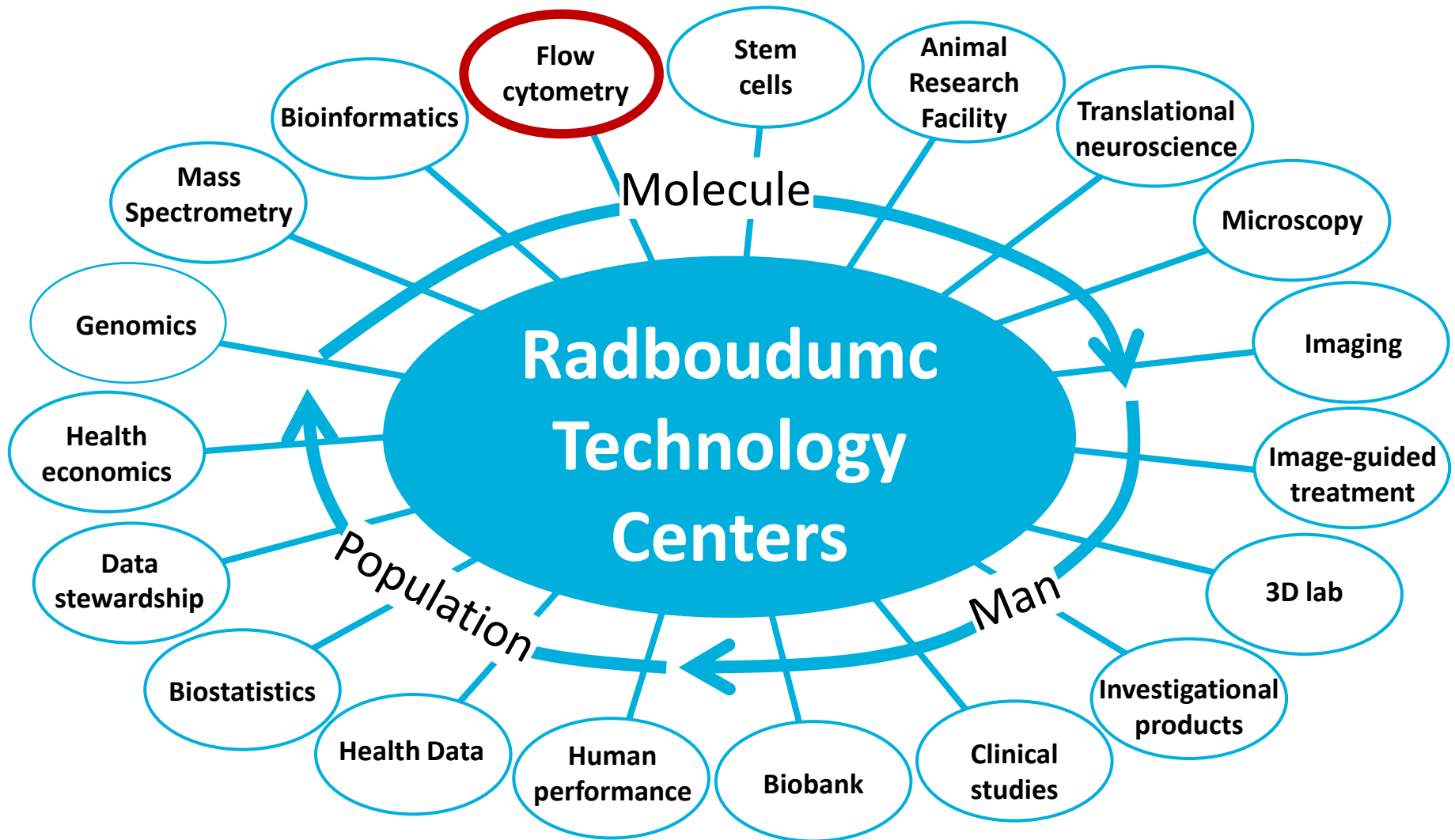


LC-MS, GC-MS, QTOF MS, QqQ MS



Research Projects





Radboudumc Flowcytometry Technology Center (RFTC)

Your partner in Flow Cytometry for basic and translational research as well as clinical practice and clinical trials at academic and corporate level

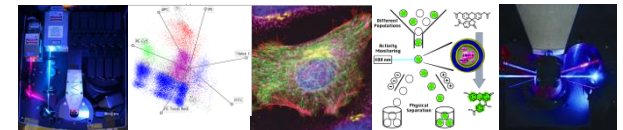
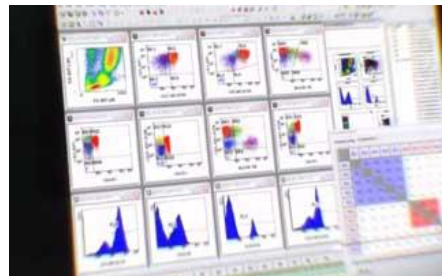
Our services

- Flow cytometry consultancy
- Research projects
- Contract research
- Supervised instrument use
- Training
- Education



Fields of research

- Immunology/Hematology
- Genetic and metabolic diseases
- Cell biology
- Molecular biology
- Microbiology
- Infectious diseases
- Gynaecology
- Biochemistry
- Chemistry (small particles)



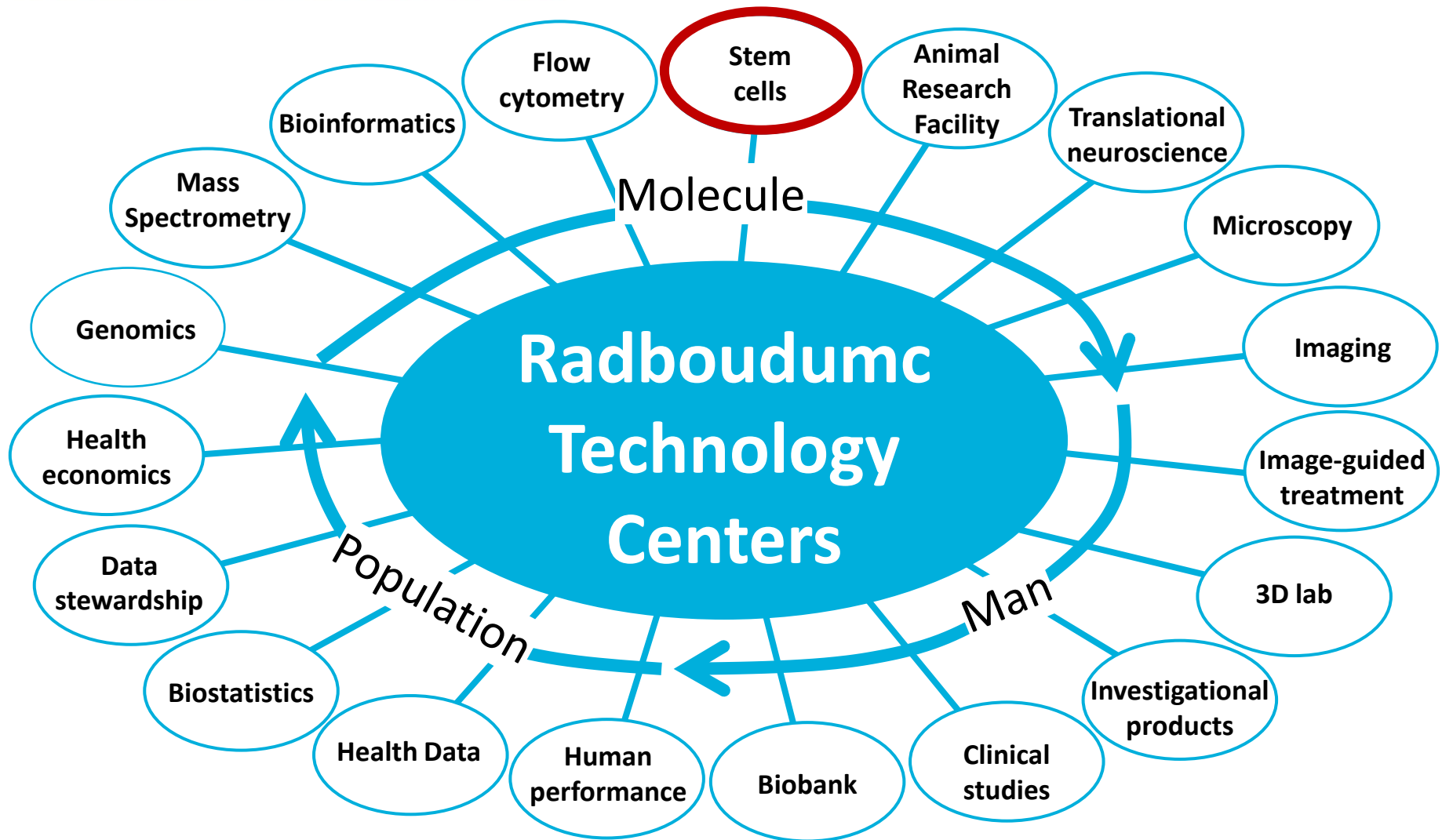
FC Applications

- Immune phenotyping of cells
- Immune profiling in health & diseases
- MHC-tetramer enumeration of T cells
- Intracellular cytokine analysis
- Transcription factor analysis
- Intracellular signaling pathway analysis
- Cell function analysis (calcium efflux)
- Nucleic acid analysis/Cell cycle analysis
- FRET measurements
- Cell sorting
- Index sorting single cells 6-384 well plates
- Small particles analysis and sorting

Contact : Harry Dolstra

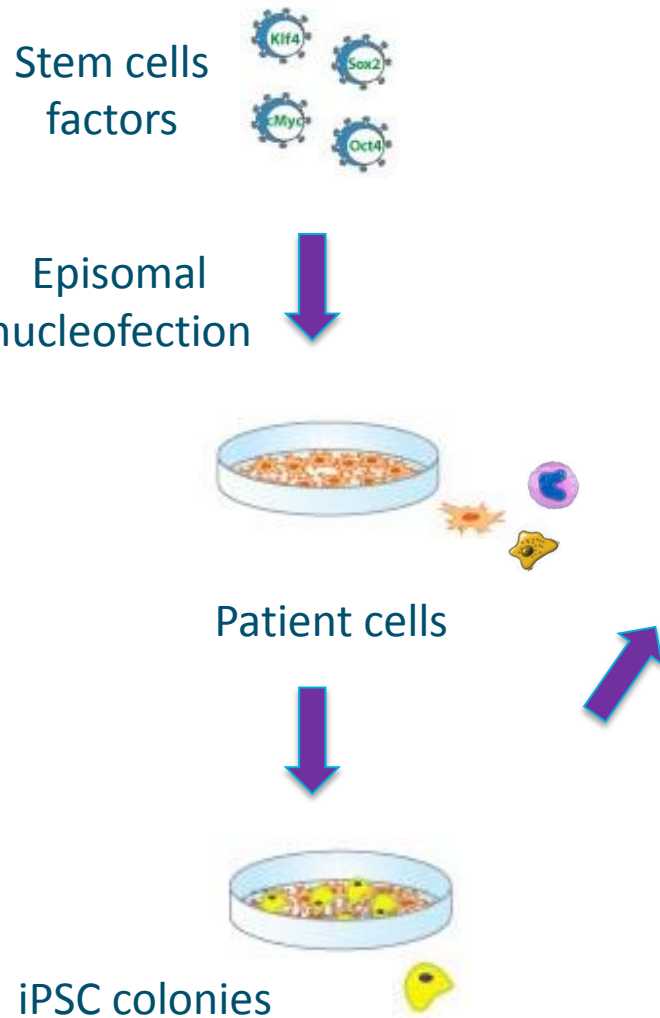
harry.dolstra@radboudumc.nl

www.radboudumc.nl/flowcytometry



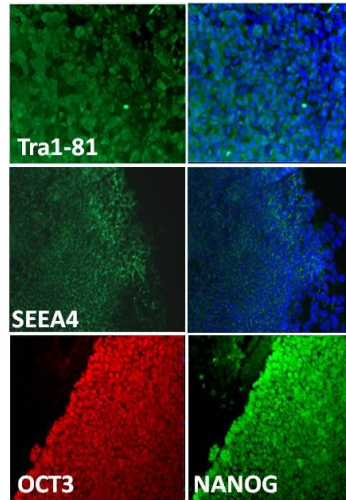
RTC Stem cells: Patient cell reprogramming, analysis and differentiation

Reprogramming

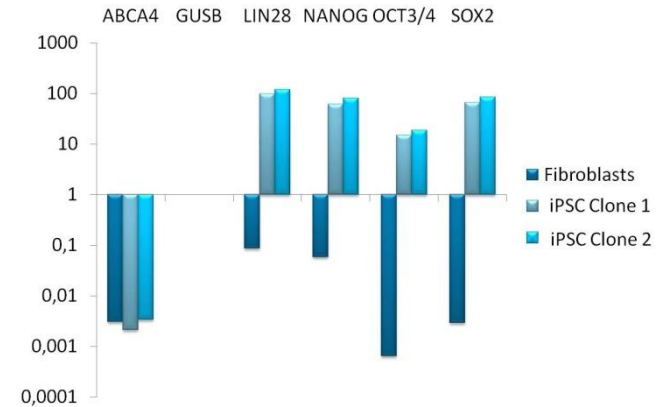


Characterization

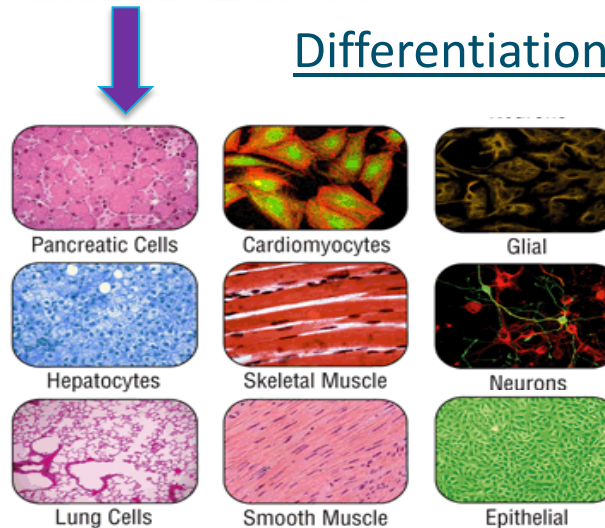
ICC



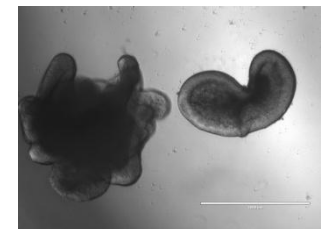
qPCR

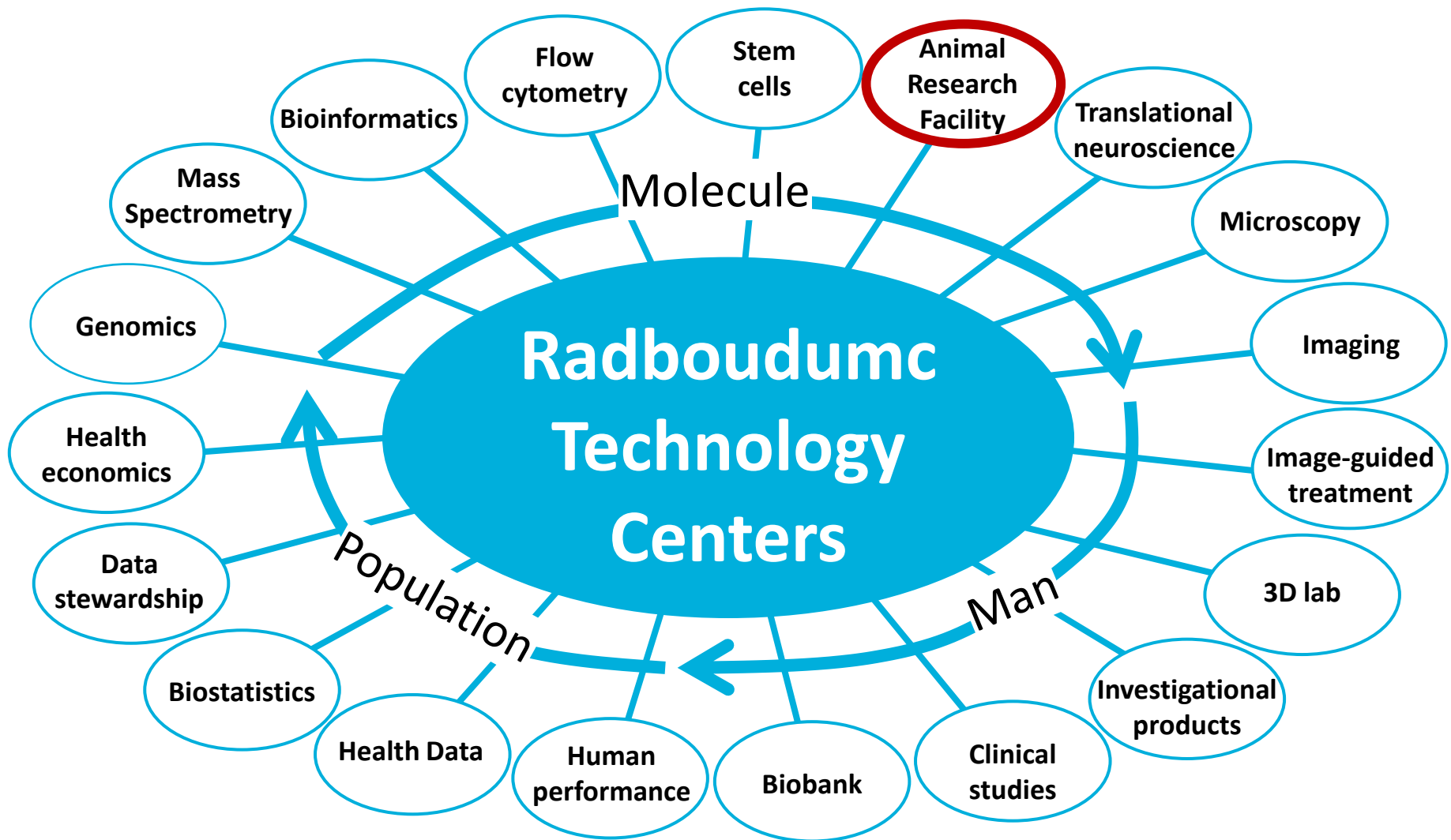


Differentiation



- Different cell types or
- Organoids







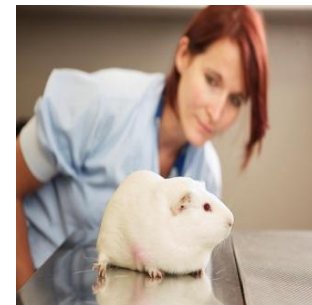
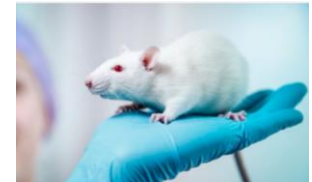
Facilities:

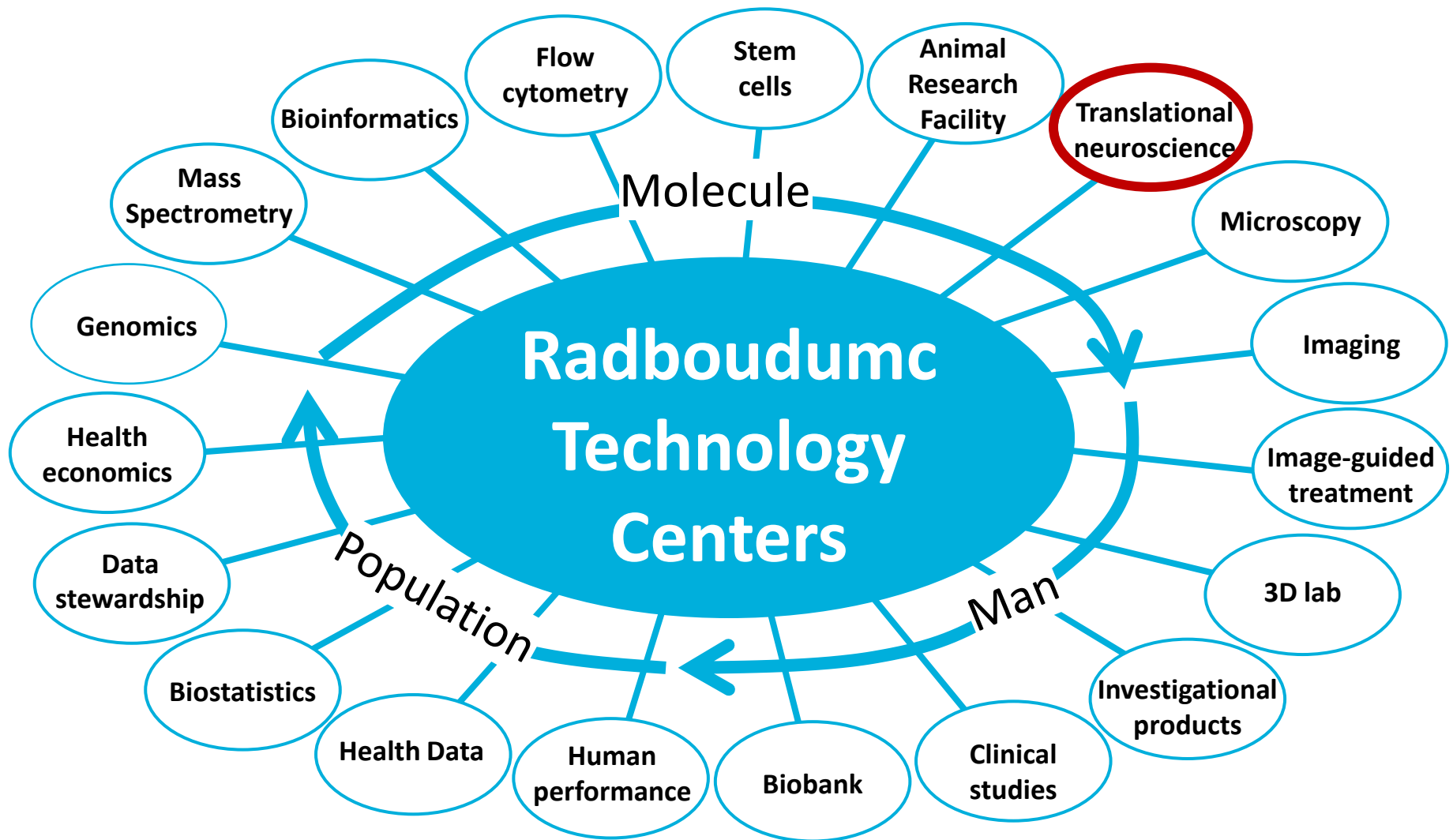
- Animal housing: mice, rats, rabbits, pigs, sheep, a.o.
- Breeding facility: 160 GMO mouse/rat strains (SPF, SOPF)
- Fully equipped operating rooms
- Microsurgery facilities
- Preclinical imaging: MRI, PET/CT, SPECT/CT, BLI, FI
- Quarantine unit/germ-free housing facilities



Animal models:

- Oncology: s.c., i.p., orthotopic, syngeneic tumor models
- Infection/inflammation: IBD, RA models
- Neurogenerative disease models: AD, PD
- Aneurysm models





Translational Neuroscience Unit (TNU)

The common goal of TNU is to create a collaborative atmosphere to optimize preclinical-translational neuroscience research

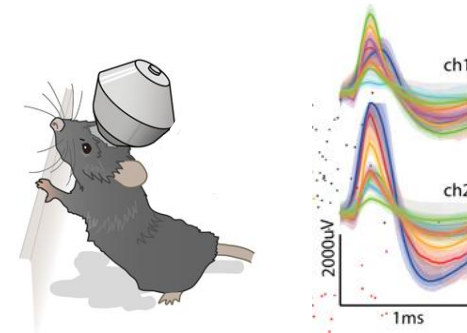
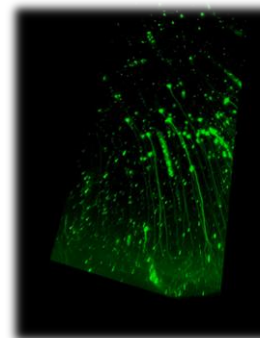
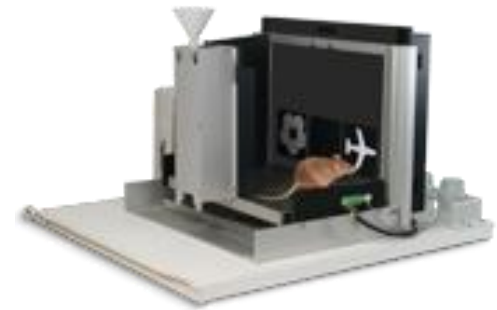
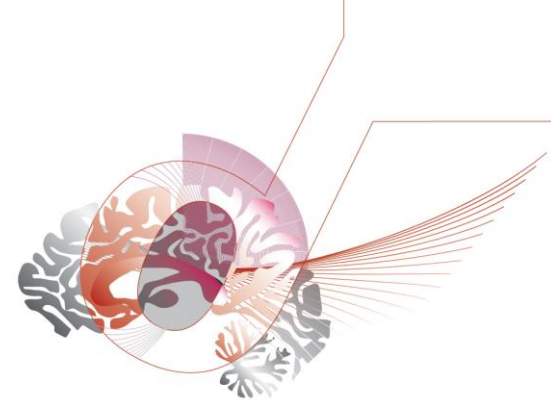
TNU offers infrastructure, transgenic animal models, equipment and expertise to measure behaviour and cognition, and in vivo and ex vivo brain mechanisms in rodents.

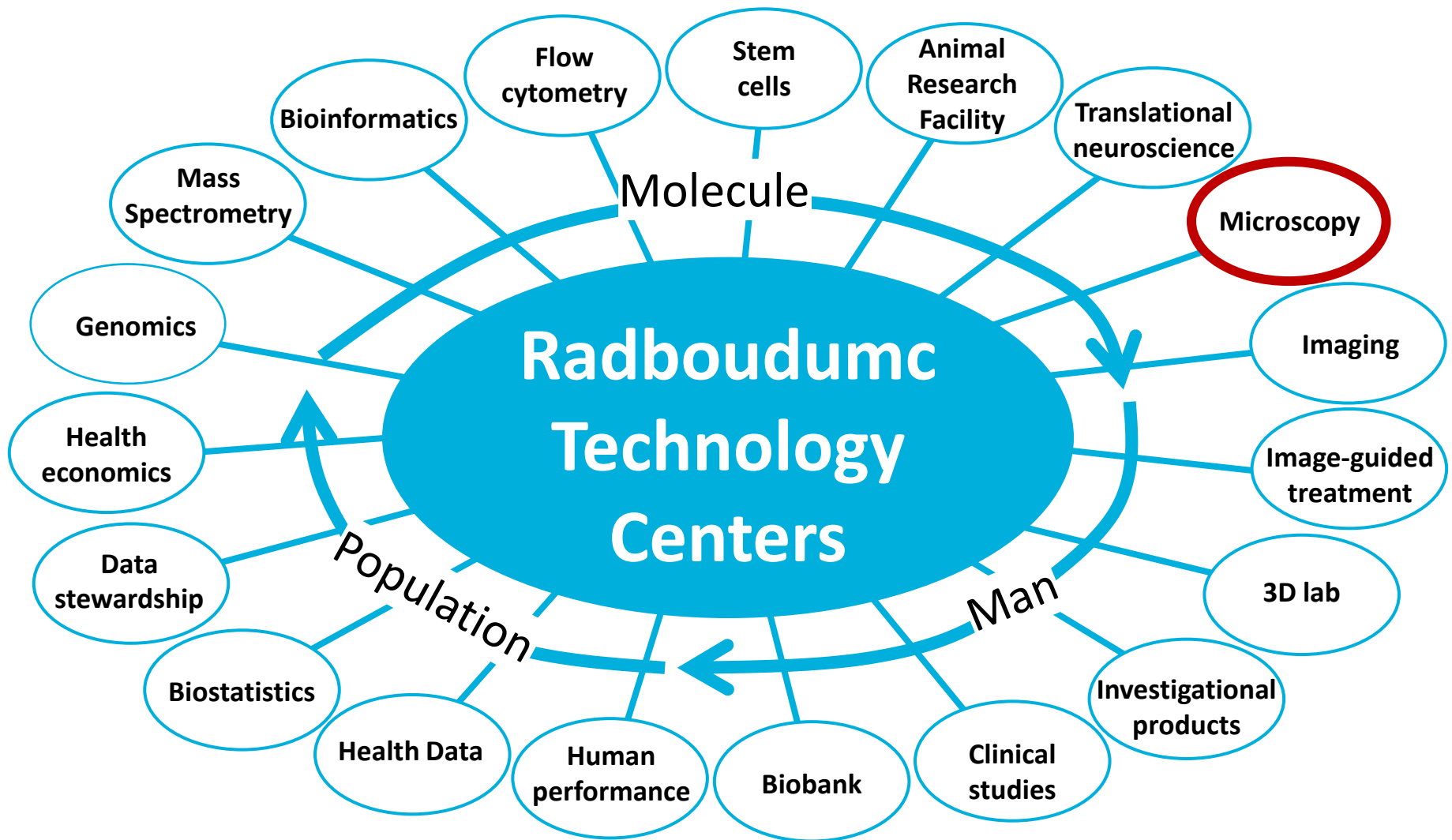
In Vivo:

- ✓ Operant boxes to measure cognitive functions like impulsivity, flexibility & memory
- ✓ Automated systems to measure sensory and motor function, emotion, social behaviour & memory
- ✓ Tools to measure and manipulate physiology, neurotransmitters & brain function

Ex Vivo:

- ✓ 3D neuroimaging of transparent brains
- ✓ mRNA and protein expression analyses

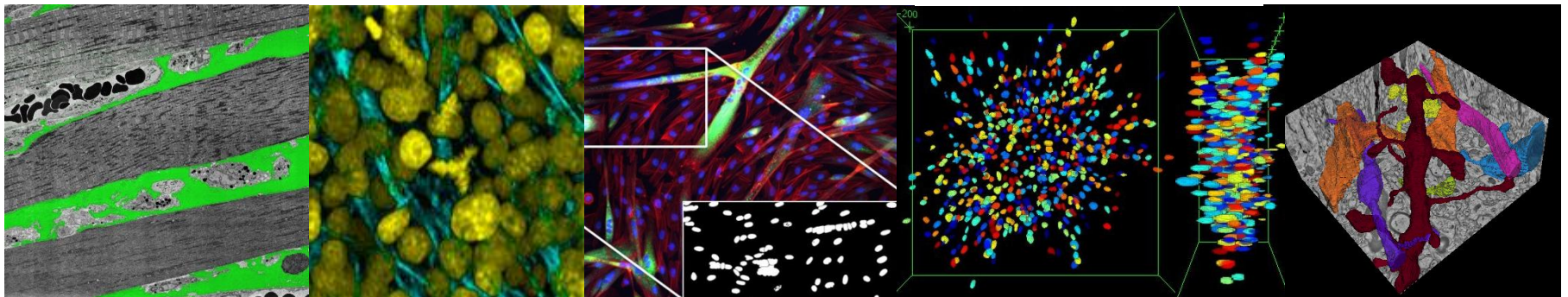


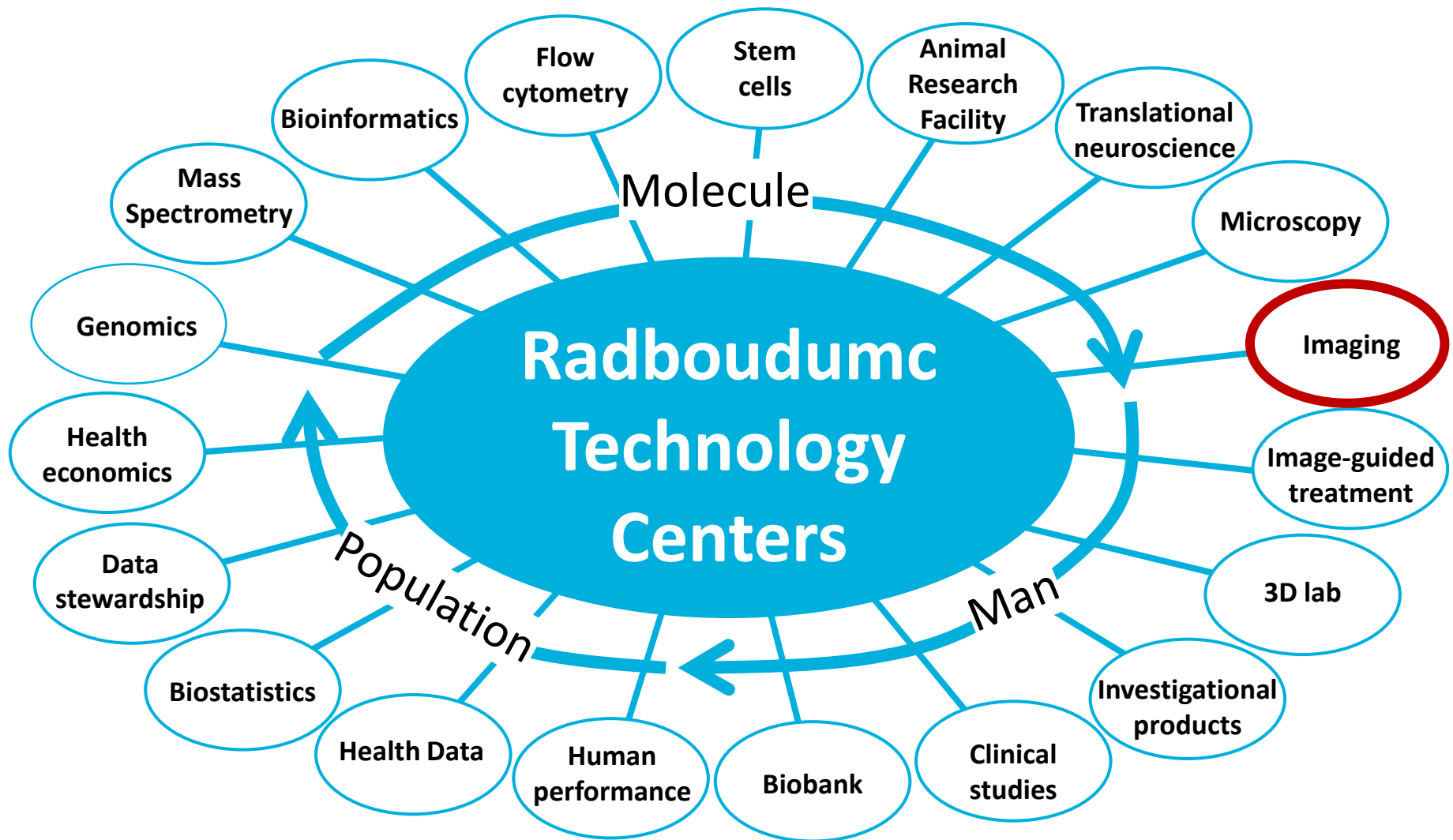


RTC Microscopy



- * Confocal microscopy
- * Electron microscopy, incl. FESEM, TEM, CLEM
- * Super resolution microscopy (STORM)
- * Atomic Force Microscopy
- * Dedicated (fluorescence) microscopes (Live imaging, HCS, light-sheet, FLIM, FCS)
- * 2D / 3D / live-cell / in vitro / in-vivo / ex-vivo cell and tissue biology
- * In-situ cellular biochemistry
- * Customized image segmentation and quantitative analysis; deep learning
- * Mechanical probing of cells and tissue structures (AFM)







Radboud Imaging

Develop - Evaluate - Implement
Imaging Innovations



Radboud Imaging

Our experience

8 professors

6 associate professors

25 post docs

68 PhD students

6 research groups

Supporting staff

Our performance 2017

>200 published papers

17 PhD theses

> 9M€ funding



MeVis
MEDICAL SOLUTIONS

Ulrich
medical

LI-COR

Medtronic

PROFOUND
MEDICAL

SENO
MEDICAL INSTRUMENTS INC.

Roche

SANOFI

SIEMENS



Technology Centers
Radboudumc

Our expertise

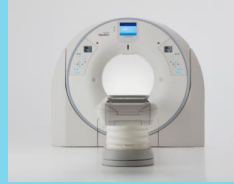


Radboud Imaging

Technology driven



MRI



CT



PET



Ultrasound

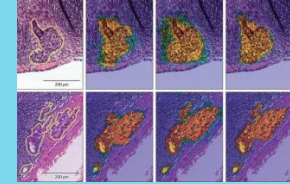


Image analysis

Indication driven

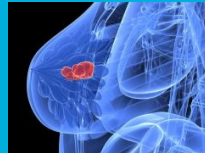
Oncology



Lung

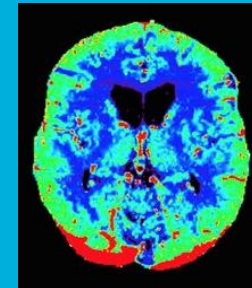


Prostate



Breast

Vascular



Pre-clinical

Translational

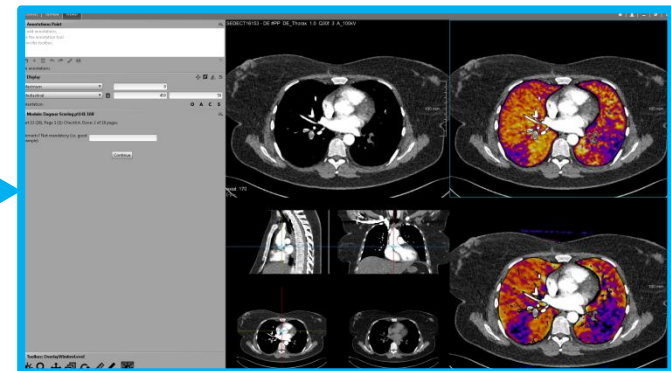
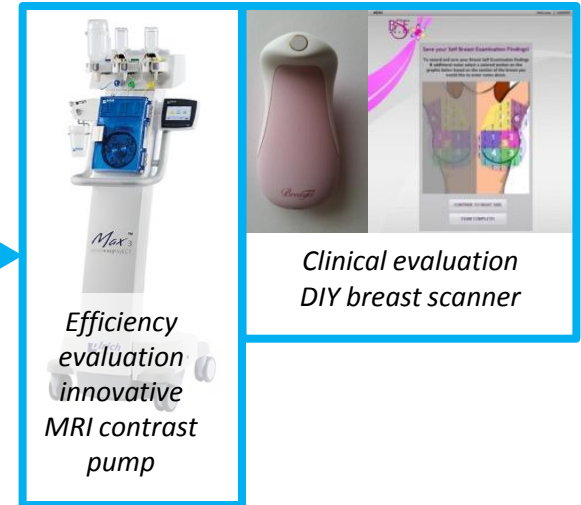


Clinical



Our services

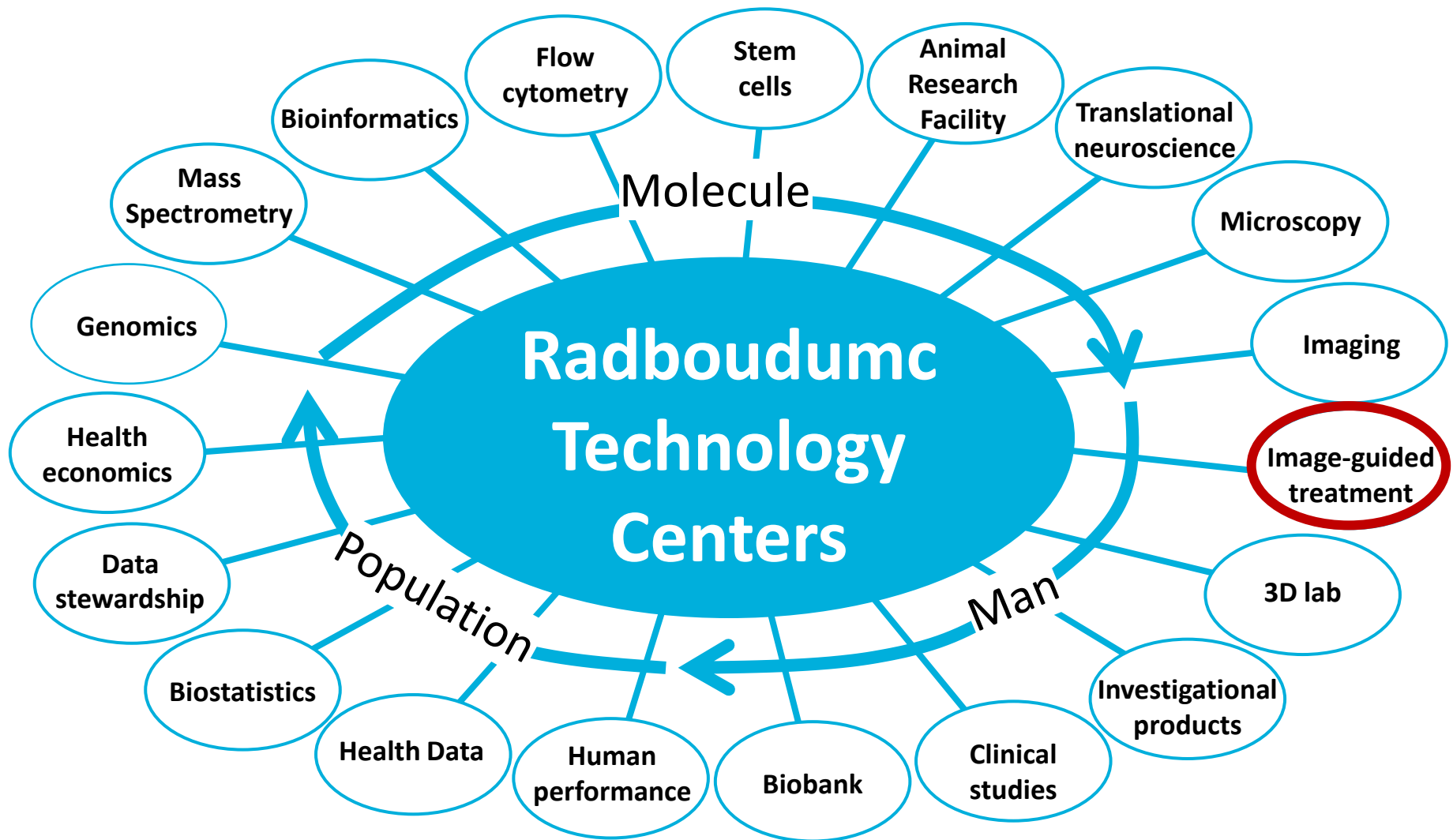
- Phase I clinical trials for new radiopharmacy
- Imaging as outcome measure for clinical trials
- Preclinical experiments on mouse models
- Clinical evaluation of new innovations
- Expert scoring
- Anonimization clinical imaging data
- Protocol development
- Development of expert scoring work stations
- Consultancy
- MRI/CT/PET scans



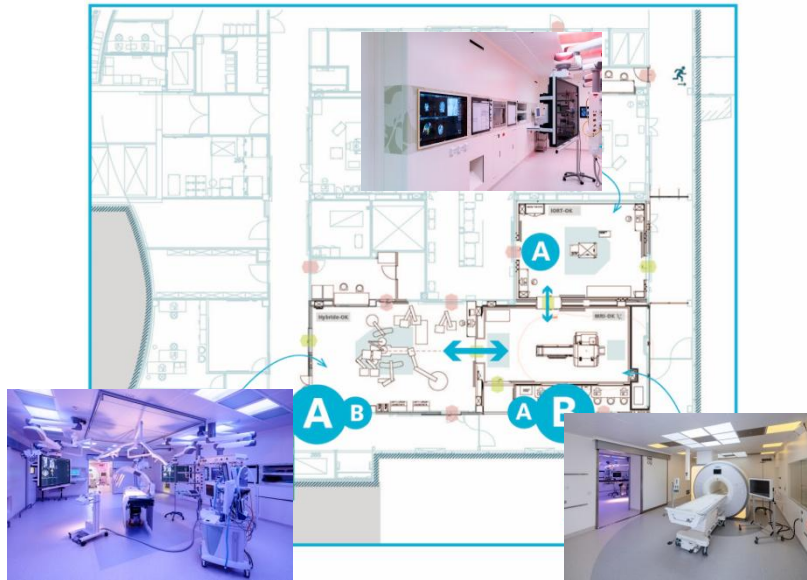
Contact:

<https://www.radboudumc.nl/en/research/technology-centers/imaging>

Barbara Janssen, PhD
Technology Center representative
+31 (0)24 363353
Barbara.janssen@radboudumc.nl



MITeC: Image guided treatment



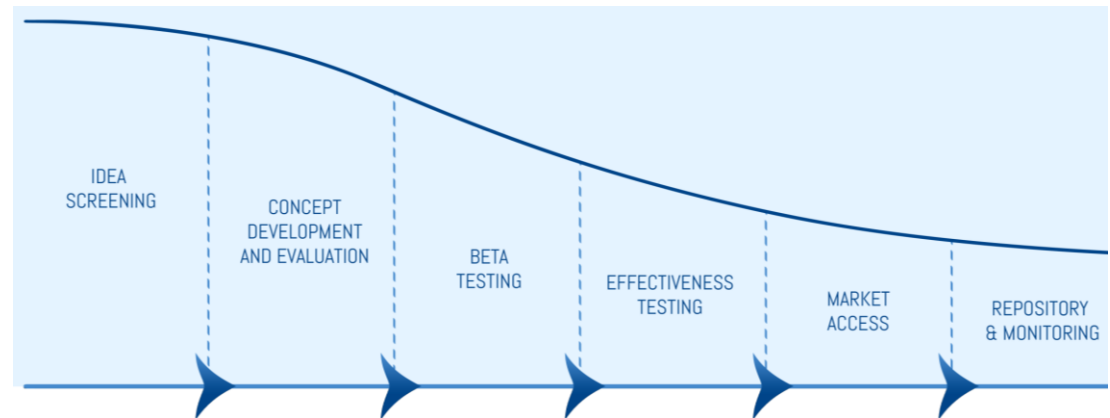
Our mission & vision:

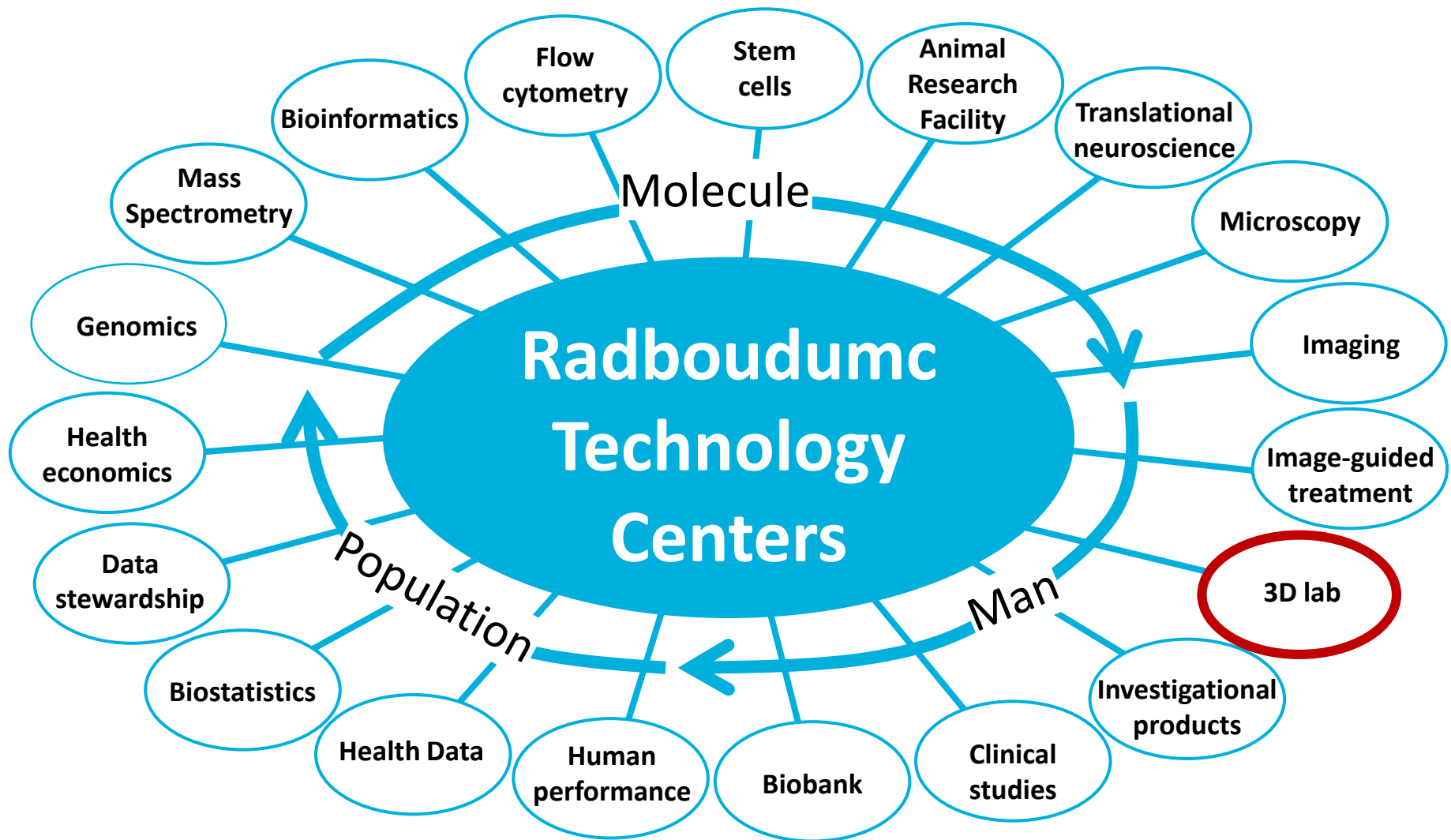
Minimal invasive image guided interventions to improve precision and effectiveness

Some of our projects:

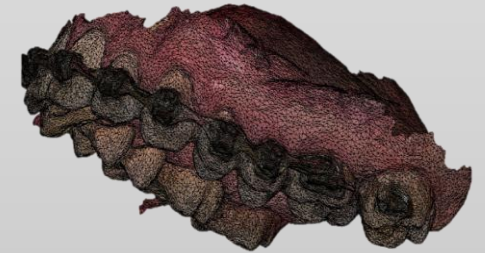
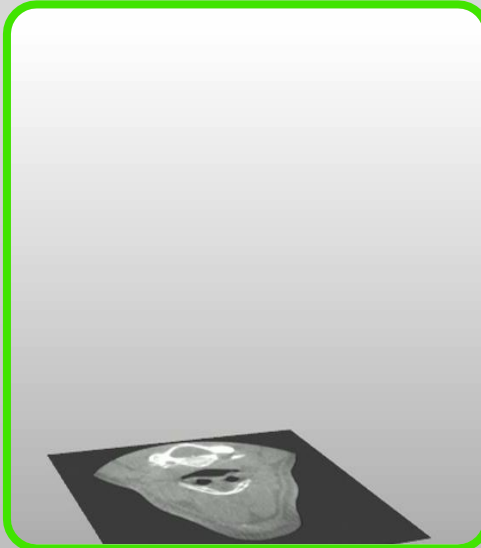
- MRI laser ablation
- MRI cryo ablation
- MRI controlled HIFU
- Perfusion imaging
- Navigated bone surgery
- Fluorescence guided surgery
- DBS

What we offer:

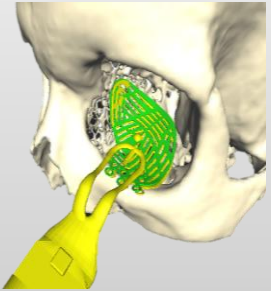




3D Imaging



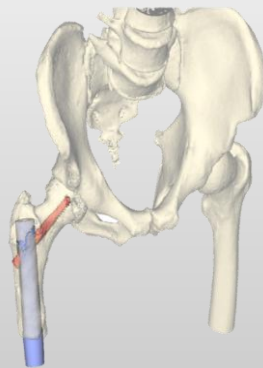
Expertise Teams



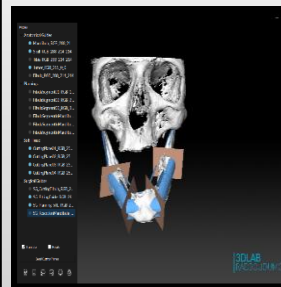
Navigatie



Augmented
Reality



PSI en
Surgical
Guides



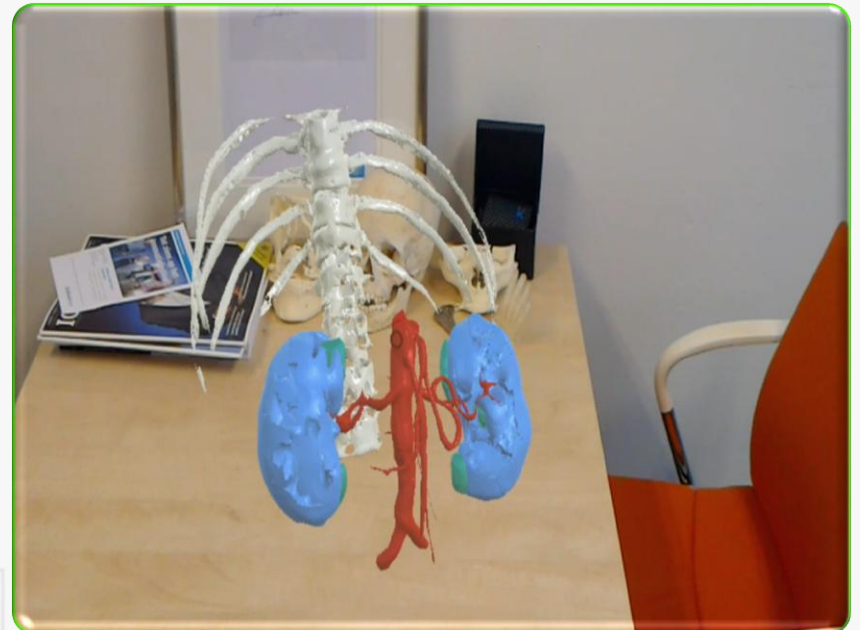
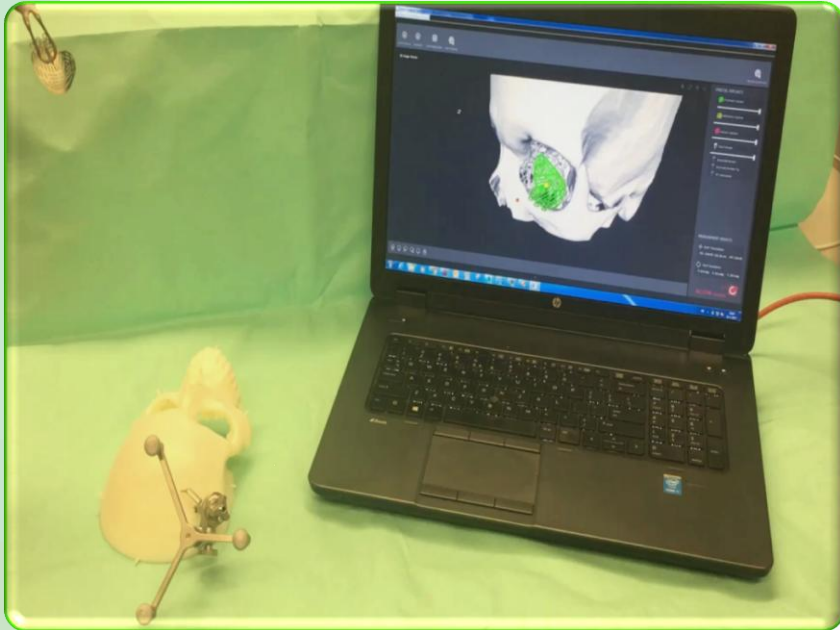
Software
Developme
nt

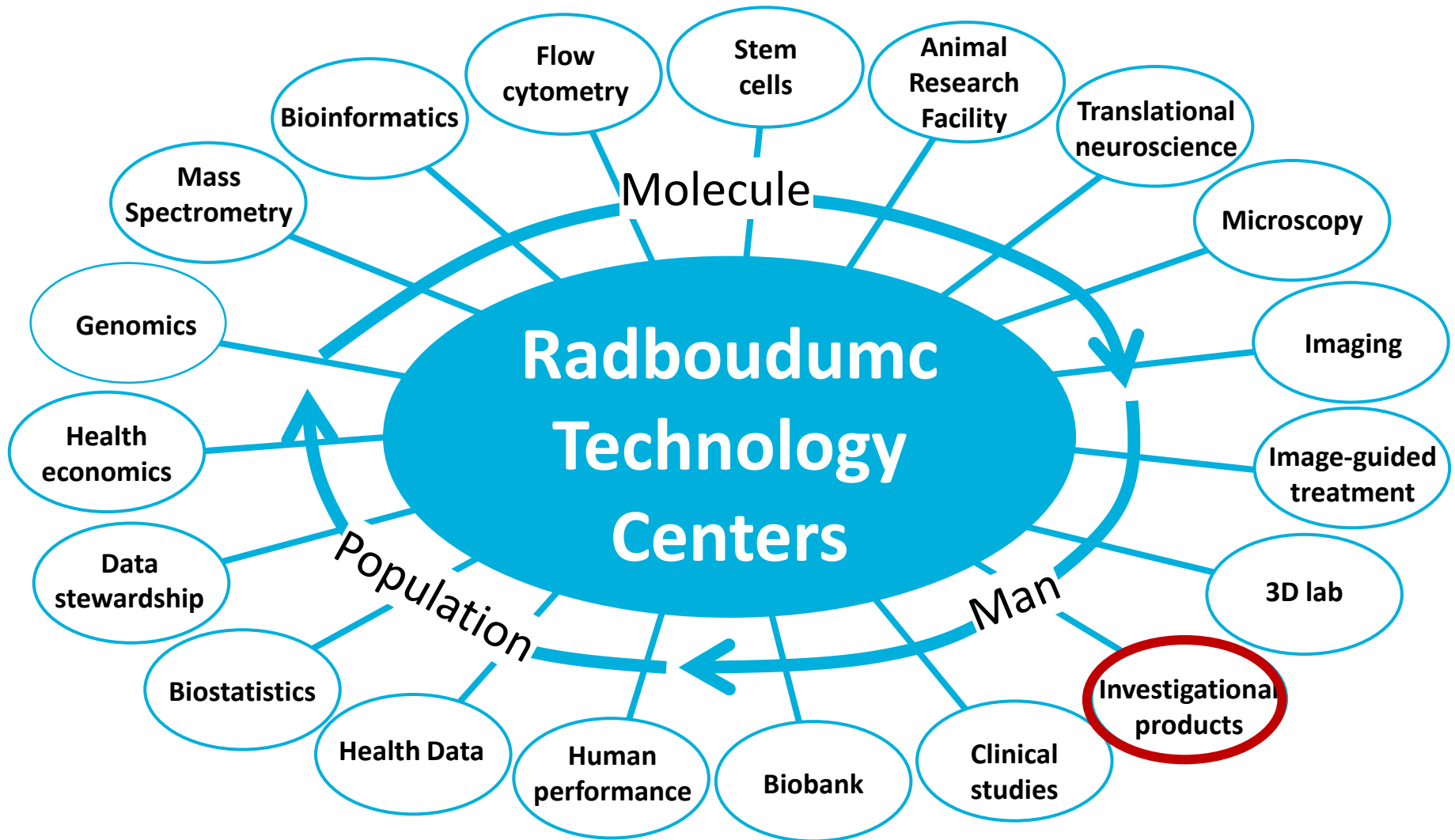


Robotica



3D en 4D
Imaging



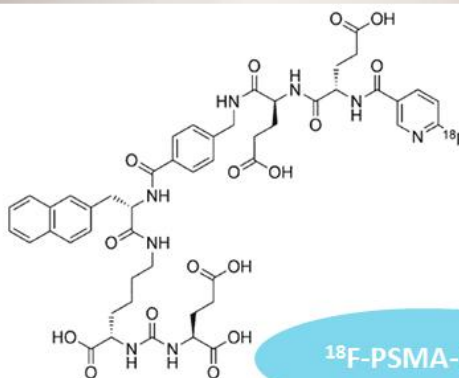
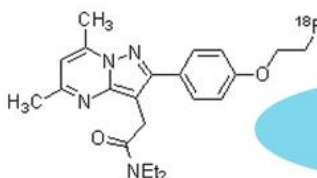


Cyclotron



$T_{1/2}=110$ min $T_{1/2}=20$ min $T_{1/2}=10$ min

- R&D Radionuclide Lab

¹⁸F-PSMA-1007¹⁸F-DPA-714

GMP Production Rooms
Quality Control Labs

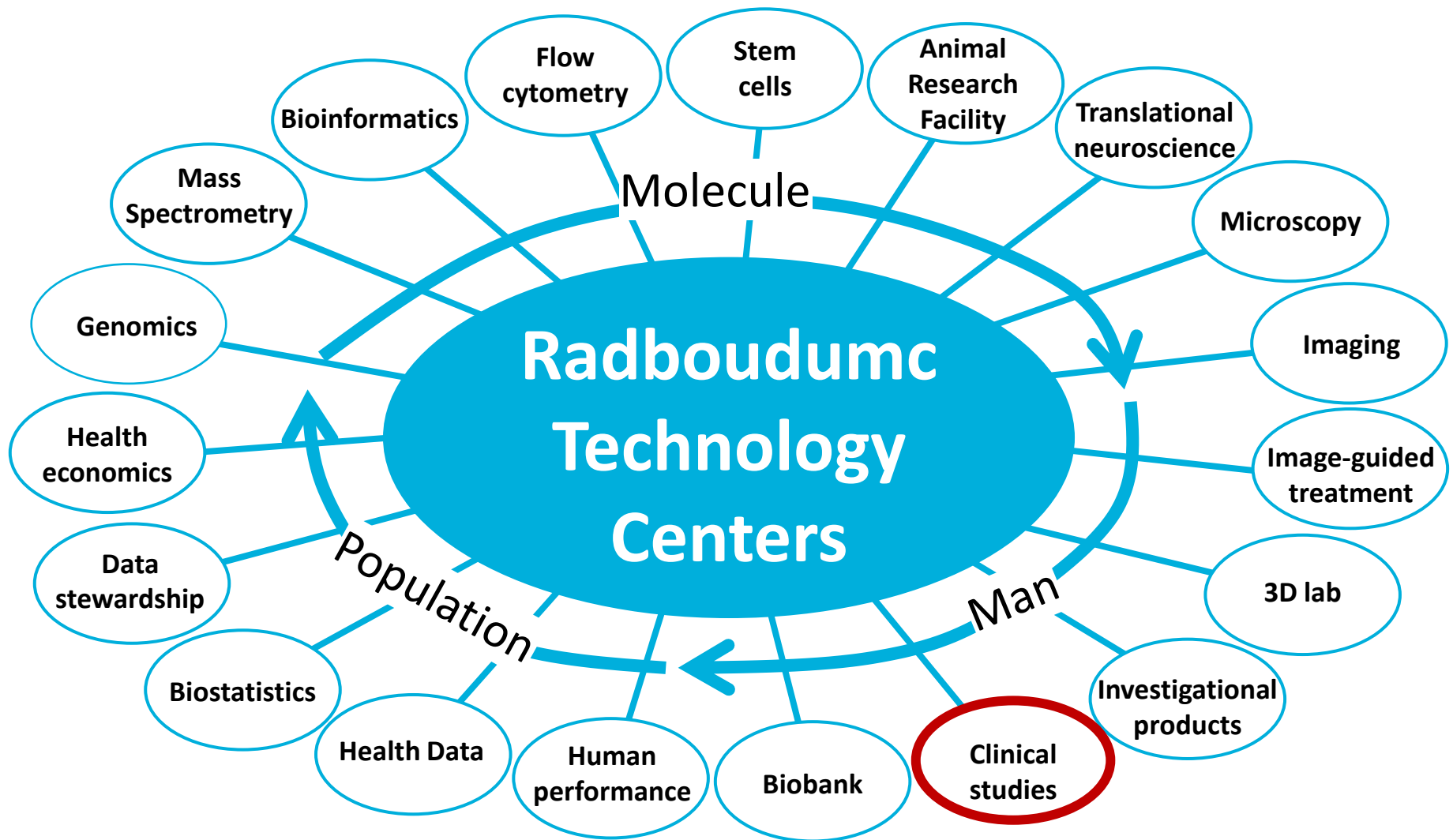
¹⁸F-FDC¹⁸F-FDOPA

- Drug Development (radiolabelled products)
- Investigational Medicinal Products (IMP)
- Generic Products
- Contract Research (tailored-made tracers)



Hier wordt geïnvesteerd in uw toekomst!





Radboudumc Technology Center Clinical Studies

Support Pis
Clinical Studies

Projectmanagement
Datamanagement
Researchnurse

ECRF building
Monitoring

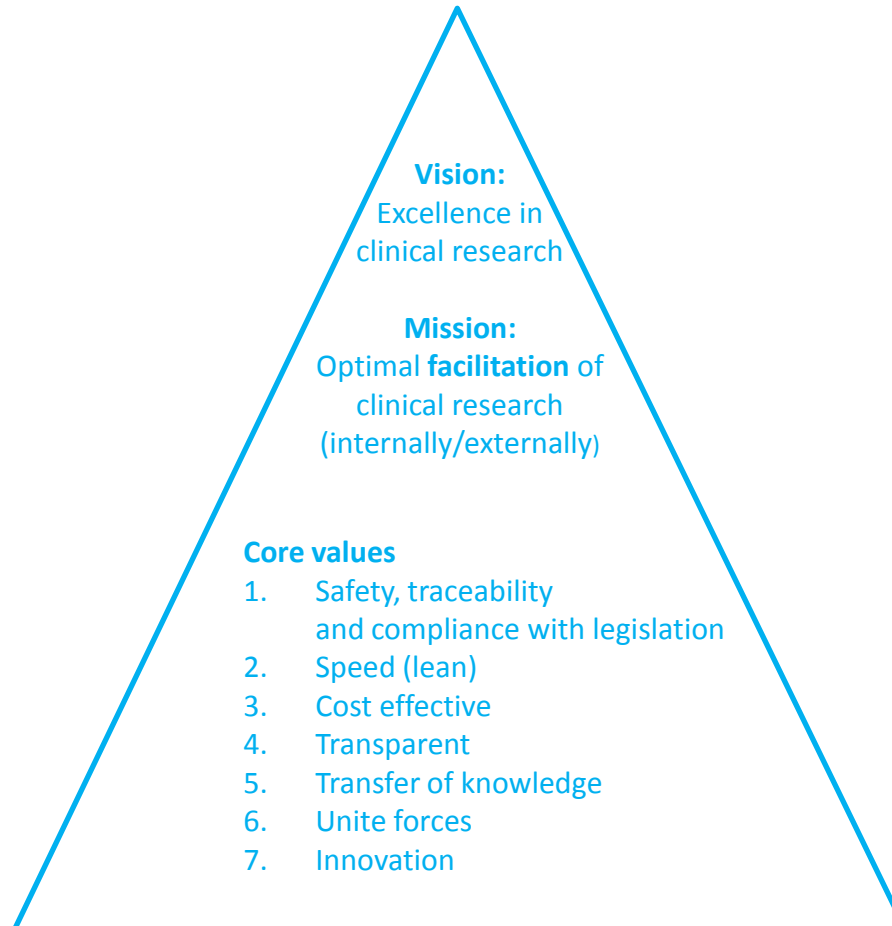
Medical Writing

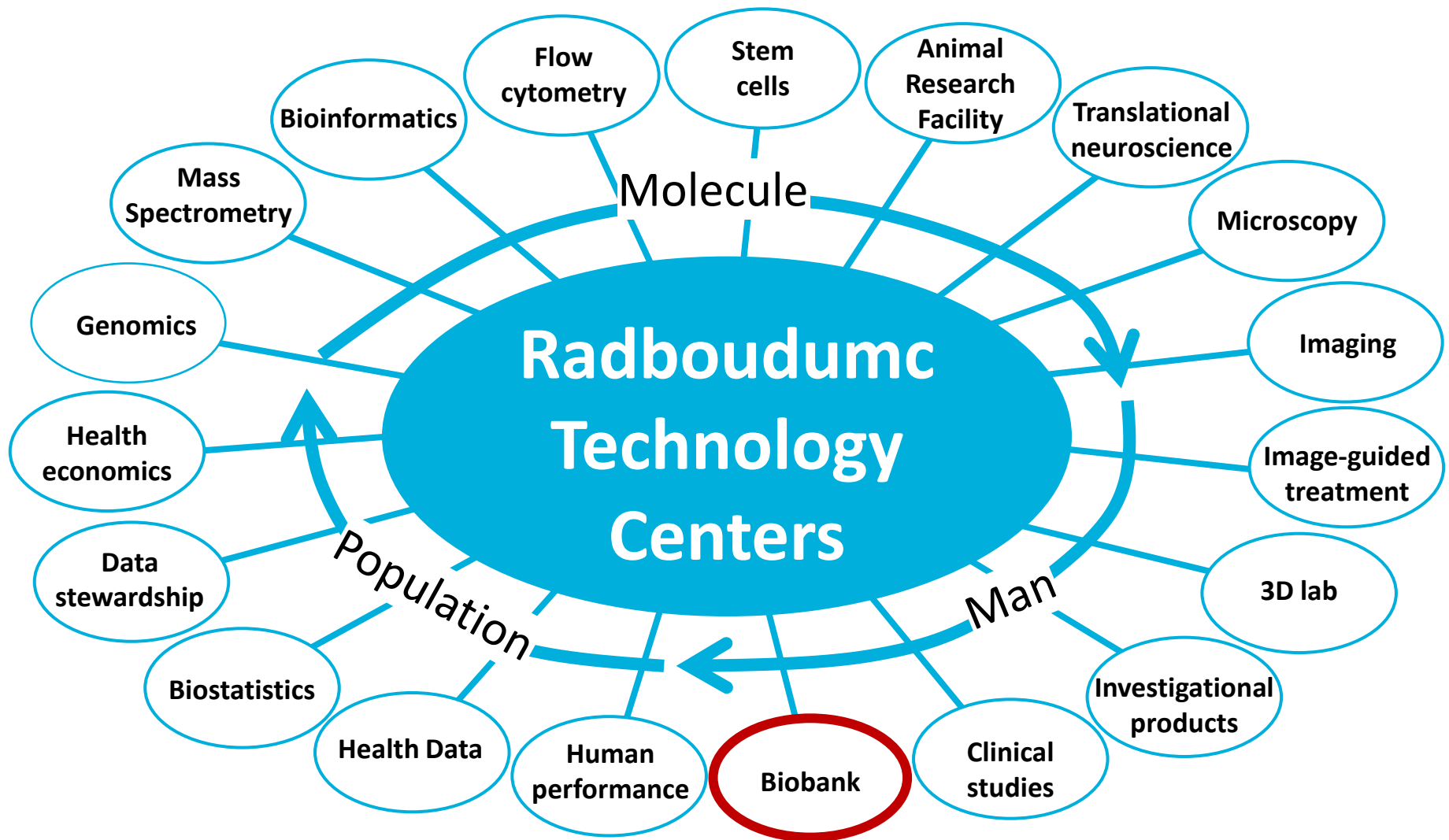
Support all research
personnel

Quality system

Helpdesk
Walk-in hours

Education
Brok/GCP
Medical students





Radboud Biobank

Biomaterial and clinical data of selected patients

Easy access to standardized collections of biomaterials of well documented patients

Our services

- High quality samples of well documented patients
- Worldwide delivery to investigators with a sound research proposal
- Support for investigators (e.g. request form, ethical approval)



Our expertise

- Proven track record in biobanking
- Quality assurance at all levels (sample and data management, ICT, ELSI)
- Standardization and harmonization of biomaterials according to the standards of the Parelsnoer Institute (www.parelsnoer.nl)

Access to samples

- Search the catalog www.radboudbiobank.nl
- Partner a senior fellow of the Radboudumc
- Apply for biomaterial and data
- Review by institutional review board
- Comply to rules for scientific cooperation



Some patient categories

- Oncology (e.g. colorectal, breast, leukemia)
- Diabetes Mellitus
- Parkinson's disease
- Anomalies in children
- Neuromuscular disorders (e.g. (i)FSHD)

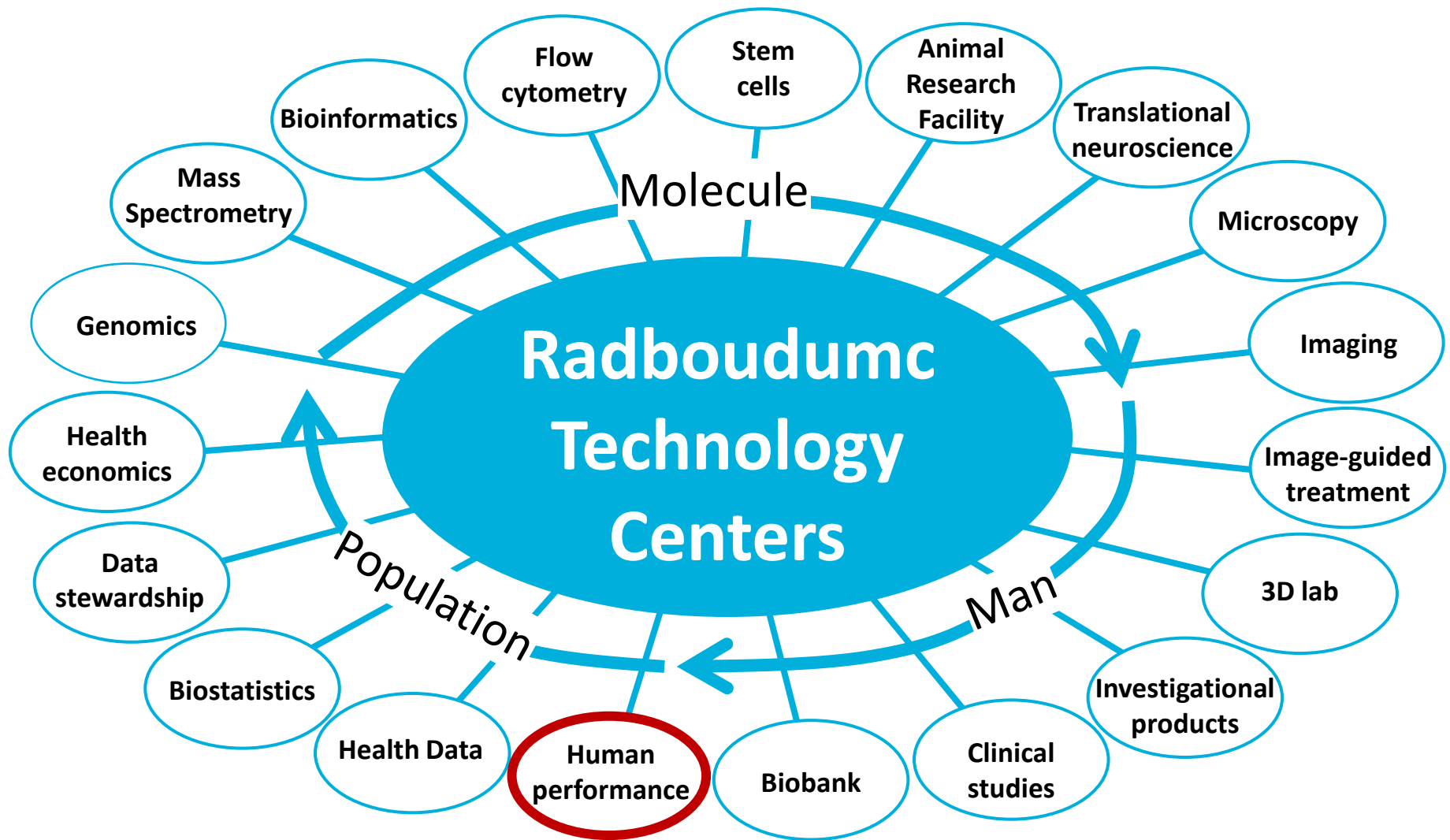
In addition: healthy controls

Biomaterials

DNA	Stock solution and normalized fraction 100ng/μl, stored at -20°C
Blood (plasma/serum)	5-6 aliquots (0.5ml), stored at -80°C
Cerebral Spinal Fluid	5-6 aliquots (0.5ml), stored at -80°C
Urine	6 aliquots (0.9ml), stored at -80°C
Tissue	FFPE and fresh frozen

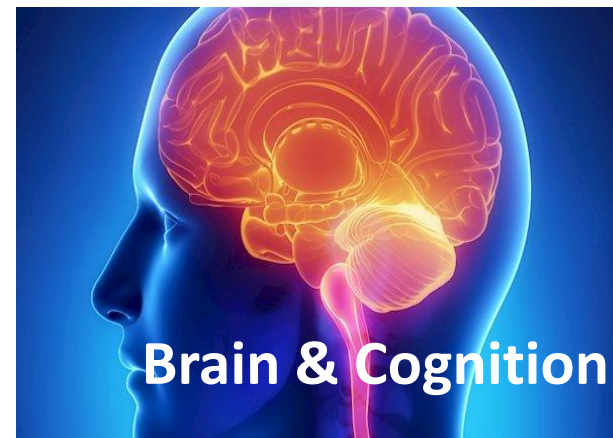
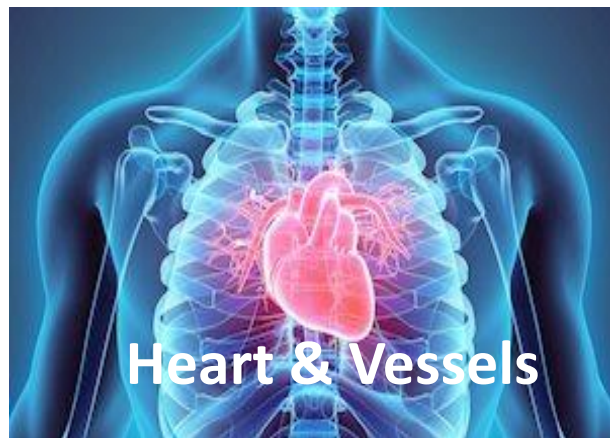
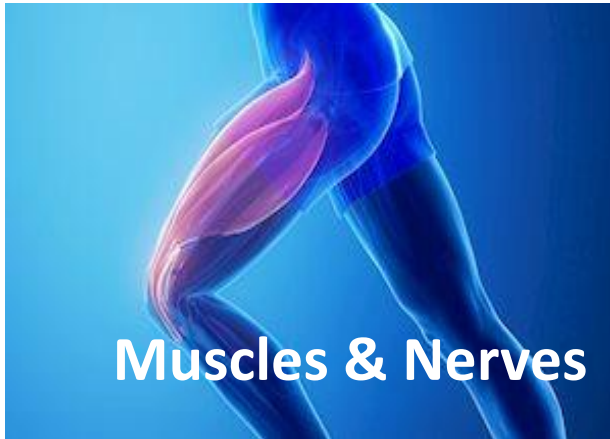
Publications

Manders et al. The Radboud Biobank: a centralized facility for disease-based biobanks to optimise the use and distribution of biomaterial for scientific research in the Radboud university medical center, Nijmegen. OJB 2017.



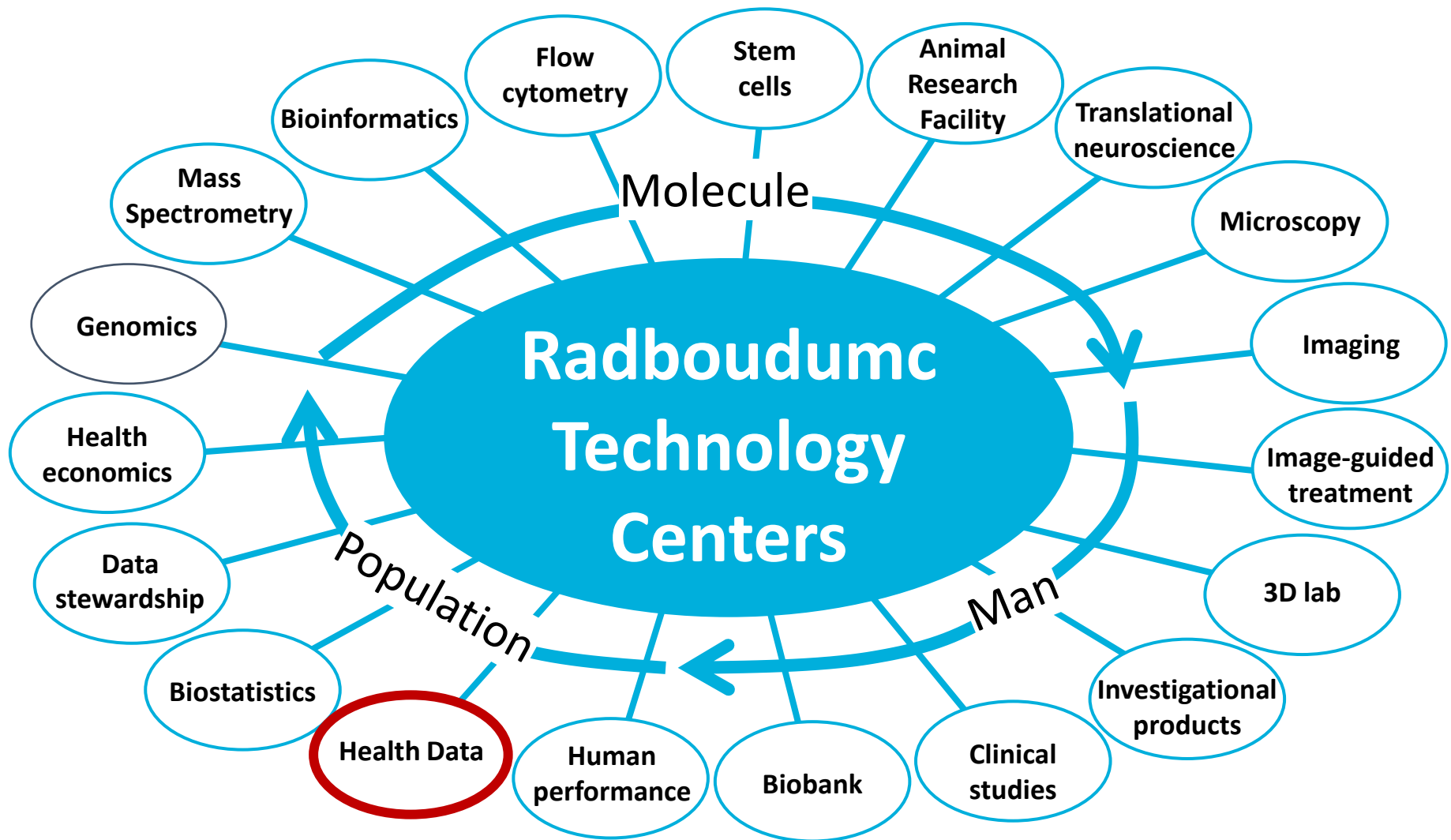
HUMAN PERFORMANCE LAB

Radboudumc



Technology Centers

Radboudumc



RTC Health Data

We have extensive experience with GP-data
We help you to connect GP-data with hospital data
We help you to access, extract, code, interpret
and store GP-data

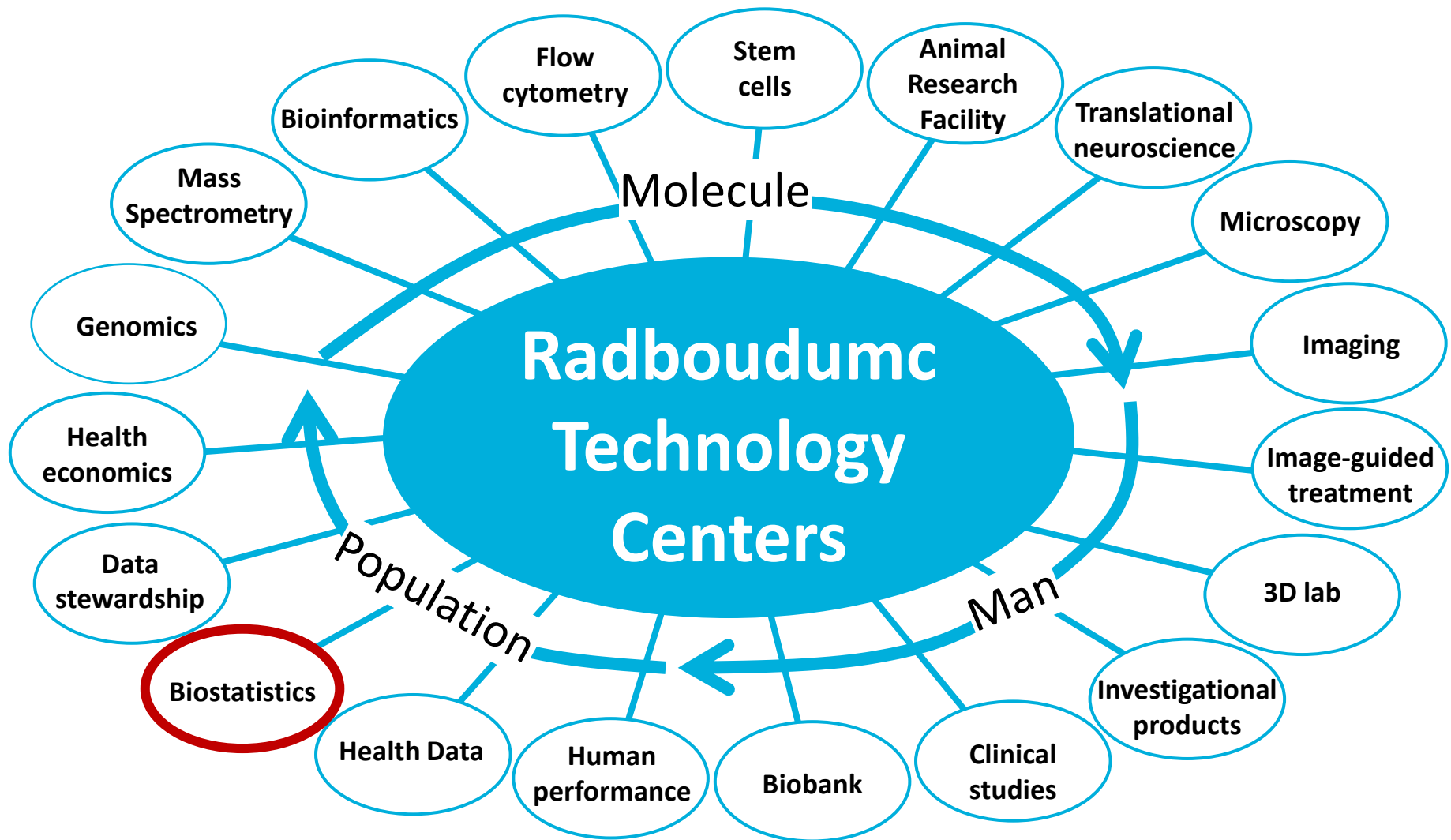


Service

The RTC Health Data provides an accessible knowledge and logistical infrastructure that supports innovation and research bridging the hospital with healthcare outside its walls

Radboudumc Transmural Knowledge and Innovation Center

The RTC is related to the Radboudumc Transmural Knowledge and Innovation Center: supporting innovation and research, bridging hospital and healthcare outside hospital walls





Joanna.IntHout
@radboudumc.nl

Who

- 7-10 experienced statisticians & 2 PhD students

Why

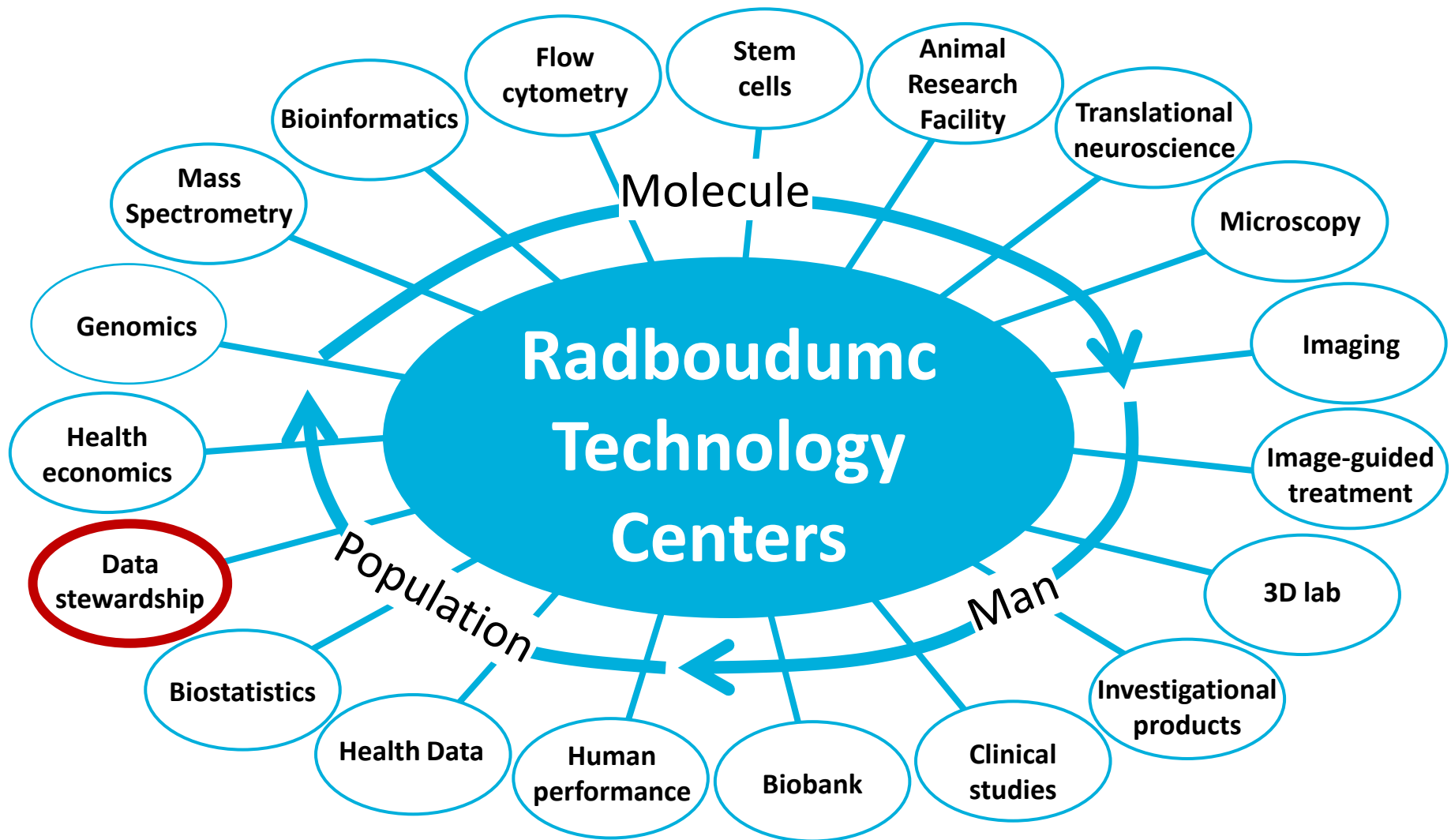
- Complexity in statistics is steadily increasing:
 - Complex data / sophisticated research questions / stringent demands

Expertise

- **Clinical trials:** Innovative design, analysis, METC, DSMB, multiple testing
- **Personalized healthcare:** genetics/genomics, (dynamic) prediction models, subgroup analysis
- **General:** regression, missing data imputation, meta-analysis, animal studies, etc.

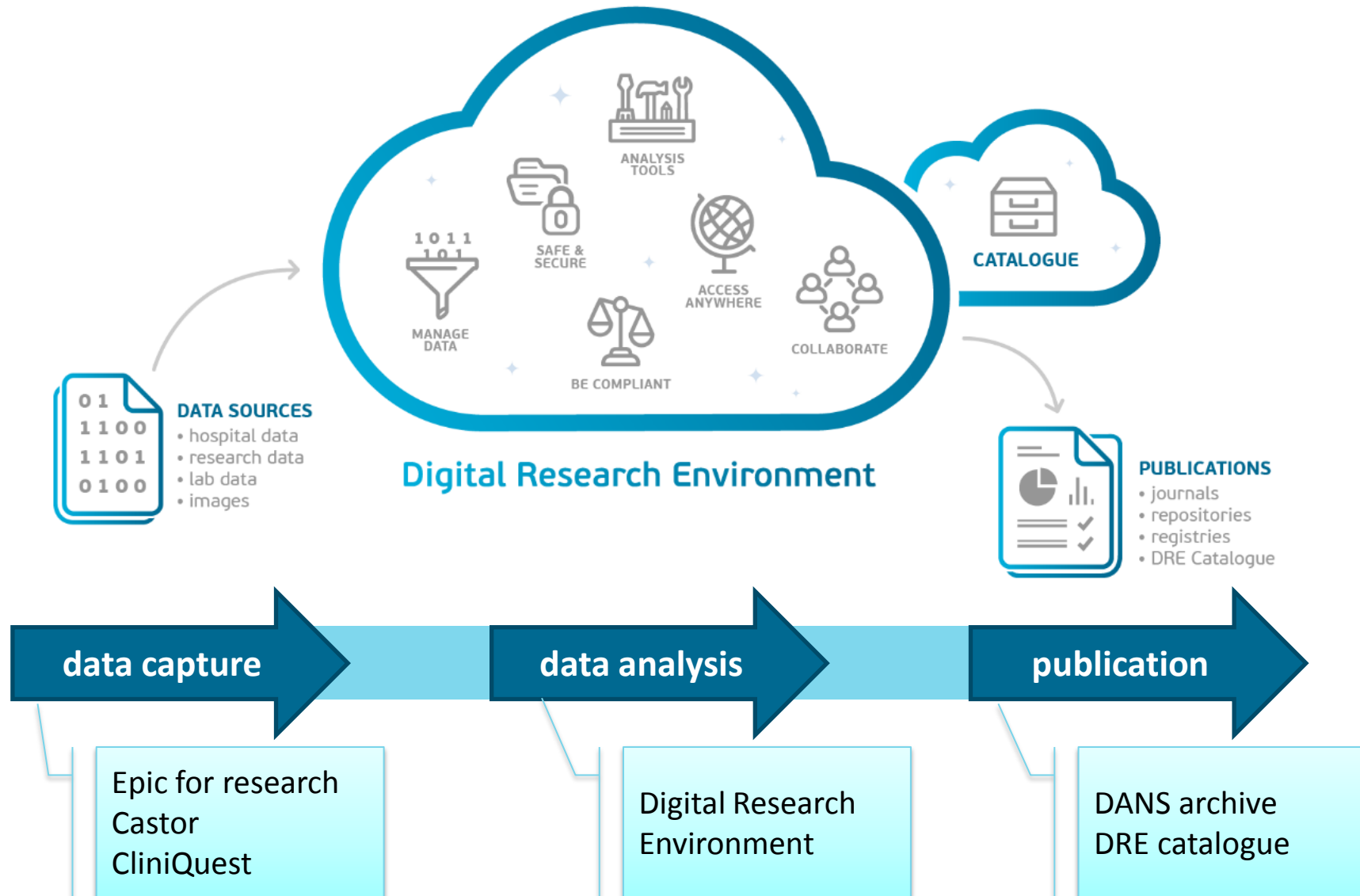
What do we offer

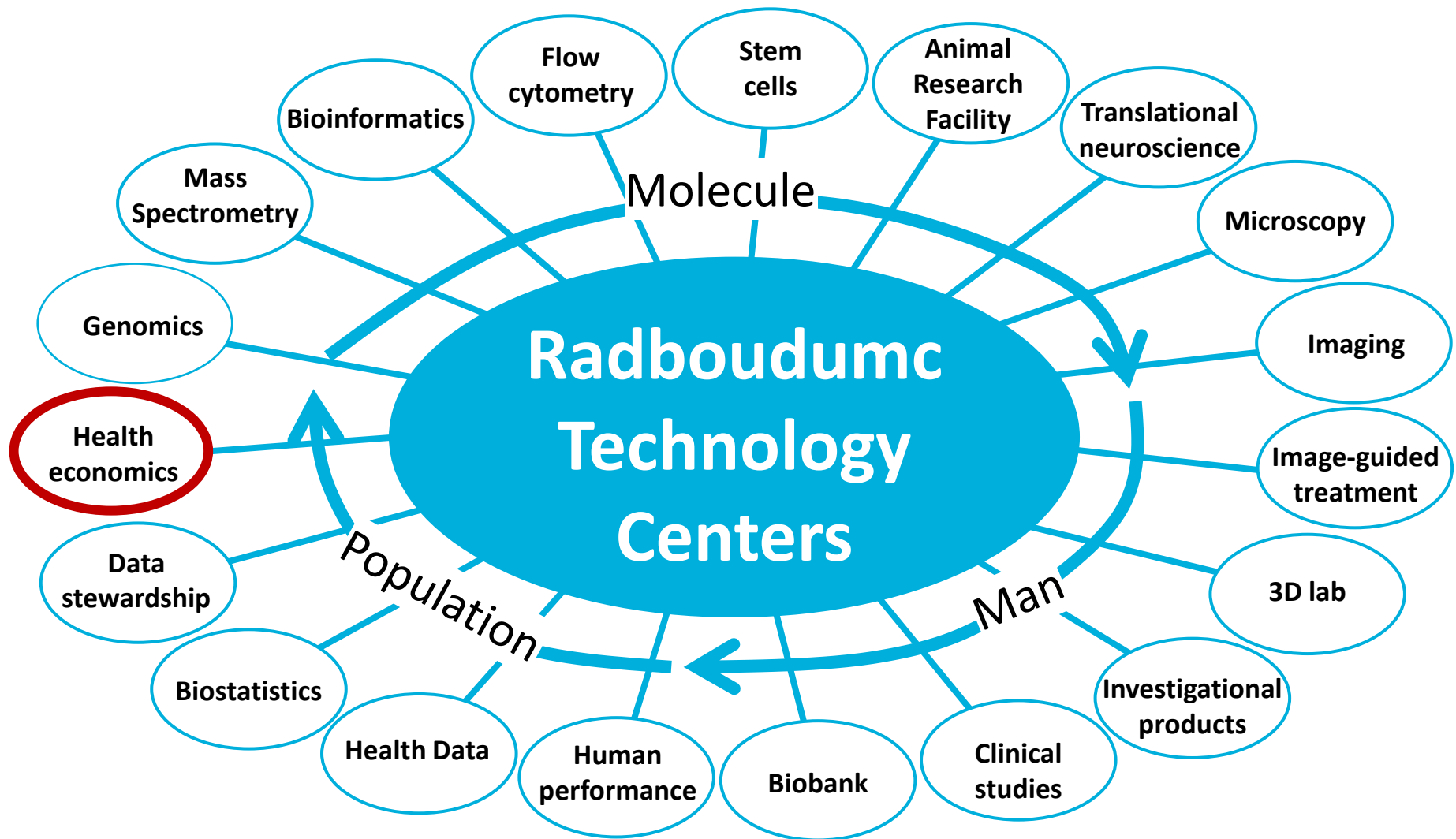
- **Statistical support:** from statistical advice to full analysis
- **Teaching**



Data Stewardship

ICT tools & support for Research Data Management





Radboud Centre for Health Economics

- Decision analytic modelling
 - Budget impact analysis
 - Headroom analysis
 - Value of information analysis
 - Program budgeting and marginal analysis
-
- Collaboration between Departments of Health Evidence, IQ Healthcare, and Primary Care
 - Projects commissioned by clinical departments, National Healthcare Institute (ZIN), ZonMw, VWS, industry
 - Example: point-of-care testing (PCR) in patients with suspected influenza
 - Executive committee: prof. dr. Gert Jan van der Wilt, prof. dr. Patrick Jeurissen, dr. Eddy Adang

Radboudumc Technology Center Matchmaking Day

15 jan 2018

- Welcome (13:30)
 - 5 minute pitches by external infrastructures
 - 1-slide pitches by 19 RTC's
 - Meet & greet + drinks (15:30-17:00)
- (17:00 Grand Round lecture Robert Sauerwein)

- Radboud Research Facilities
- Health Valley
- DTL
- EATRIS
- BBMRI-NL
- NL-Bioimaging
- ECRIN
- Data4LifeSciences
- Health-RI
- ELIXIR after RTC's

