

SMART I BIOMARKERLAB -cooperation with TSU

23.08.2018 | BERND NEUMAIER



OVERVIEW INM-5

PATIENT CARE



CYCLOTRON



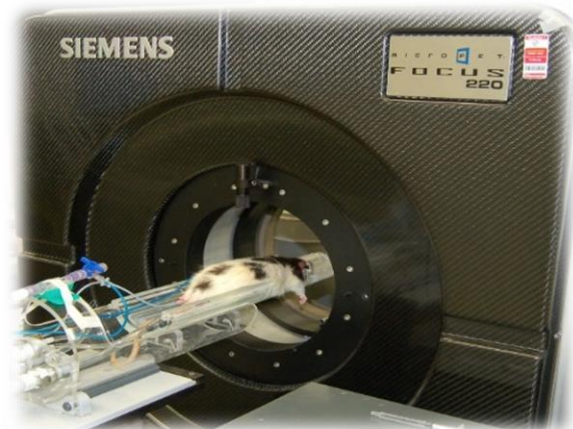
RADIOTRACER DEVELOPMENT



PRODUCTION



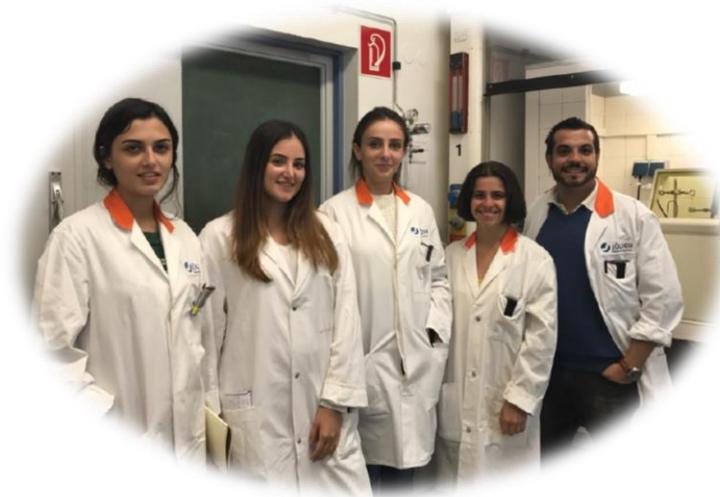
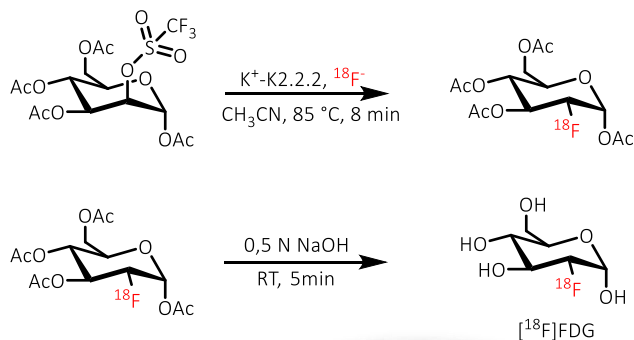
PRECLINICAL-TRIALS



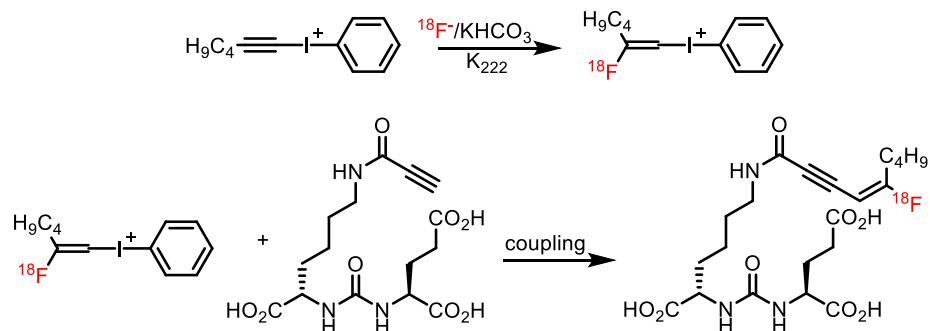
HISTORY:

1st Quali-START-UP SCIENCE LECTURES

Synthesis of [^{18}F]FDG



Synthesis of [^{18}F]PSMA

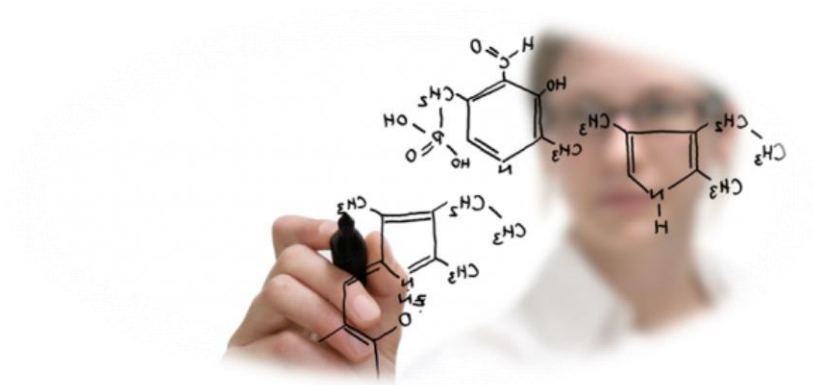


SCIENTIFIC RESEARCH COLLABORATION

Introduction of Non-Standard Radionuclides

„Inorganic (Radio)chemistry“

- Nuclear data measurements
- Analytical chemistry
- Separation techniques



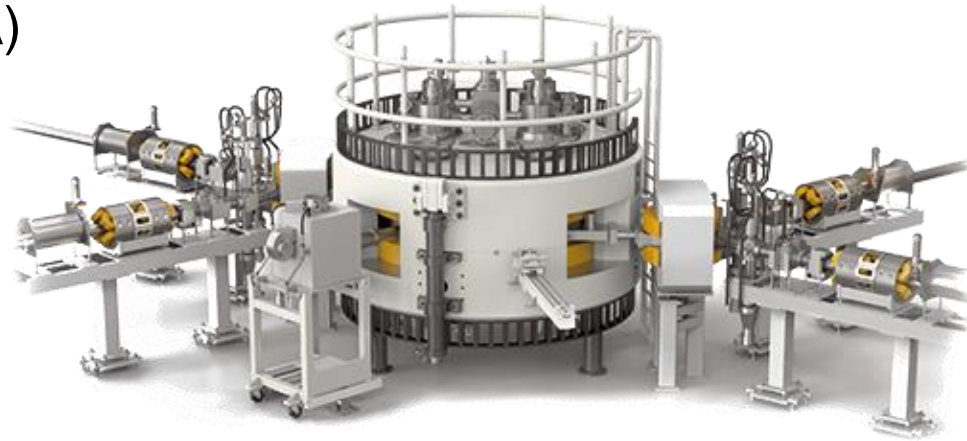
„Organic (Radio)chemistry“

- Organic preparative synthesis
- Development of novel labeling techniques
- Application of labeling methods
- Automated production

RADIONUCLIDE PRODUCTION

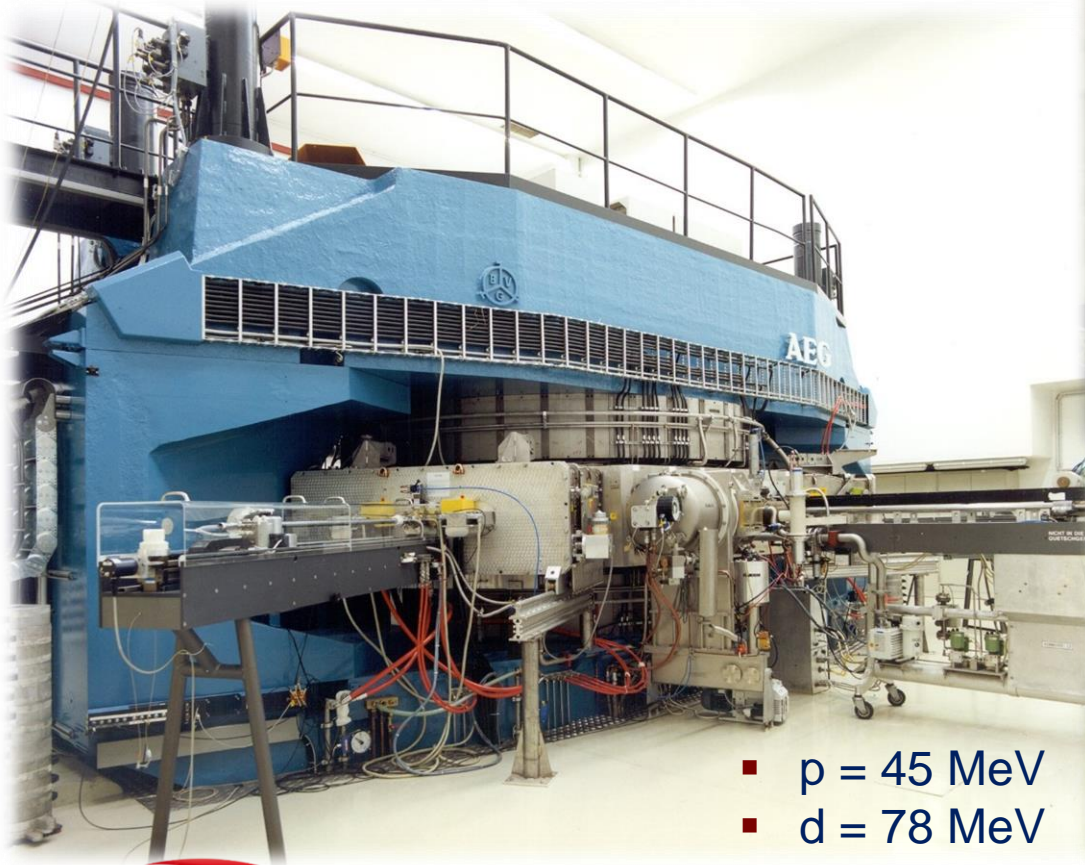
High performance cyclotron IBA Cyclone 30 XP

- High beam intensity (up to 300 mA)
Protons: 15–30 MeV
Deuterons: 7–15 MeV
 α -particles: 30 MeV
- Short irradiation times (F-18: 10 min vs. 60 min)
- Dual beam mode (2 targets simultaneously)
- Production of non-standard radionuclides for diagnosis and therapy (Ru-97, Pt-195m, Cl-34m, Cu-64, Br-77, I-124, At-211, Se-73, C)

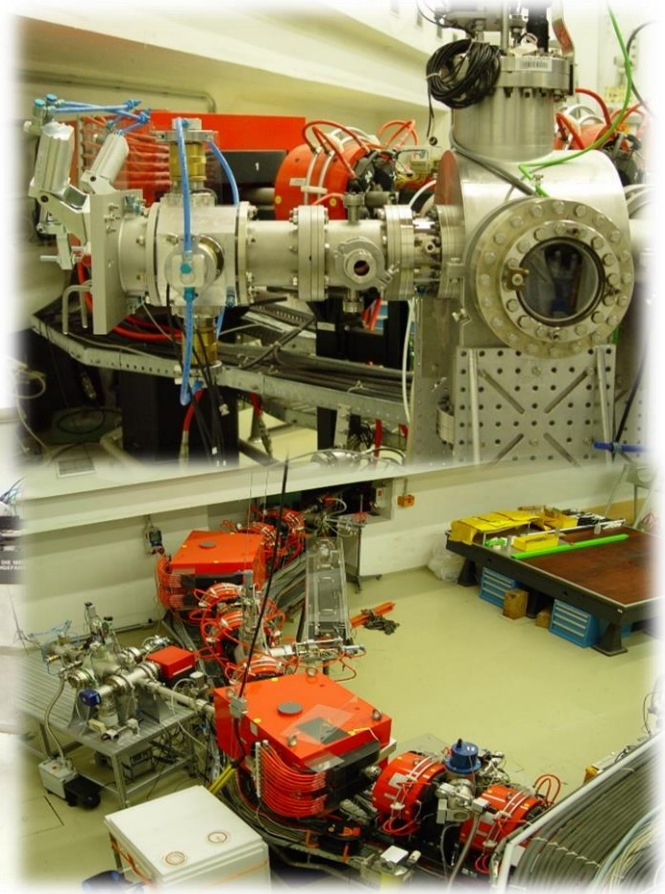


PRODUCTION OF NON-STANDARD RADIO-NUCLIDES

Targetry

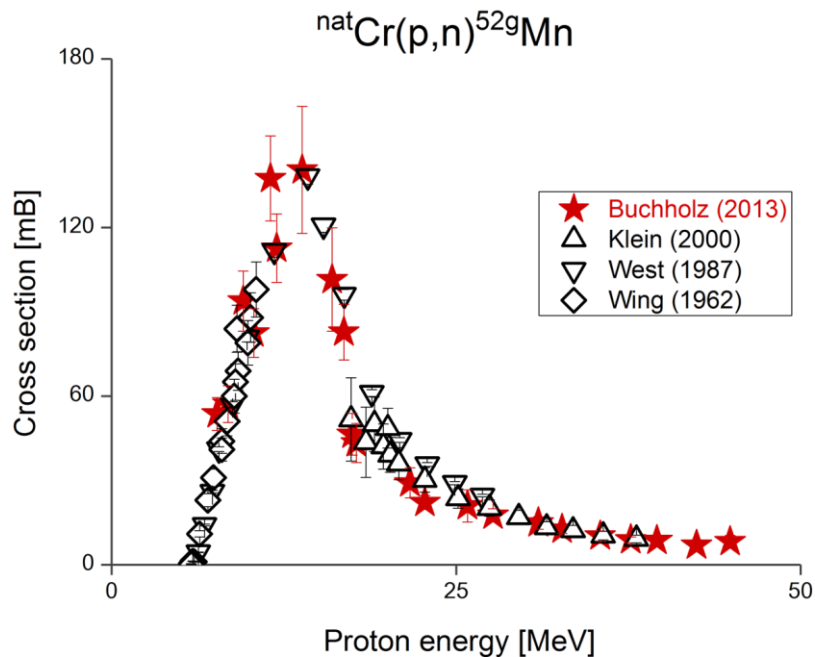


- $p = 45 \text{ MeV}$
- $d = 78 \text{ MeV}$

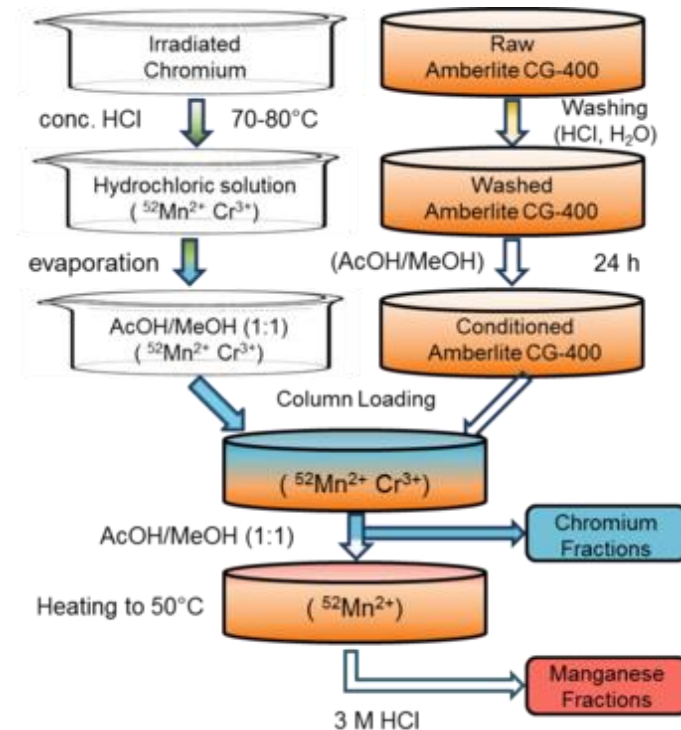


PRODUCTION OF NON-STANDARD RADIO-NUCLIDES

Determination of excitation functions



Separation technique



PRELIMINARY AND FUTURE WORK:

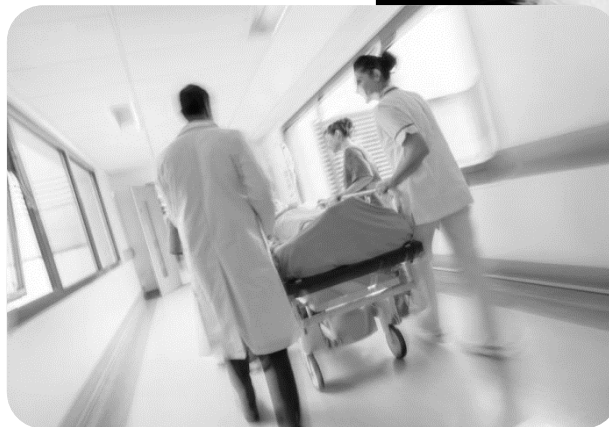
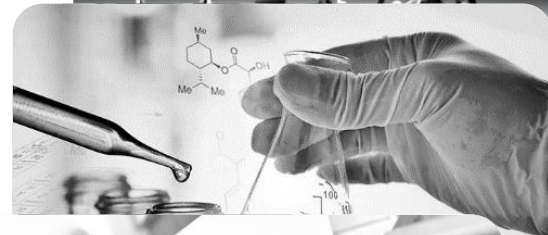
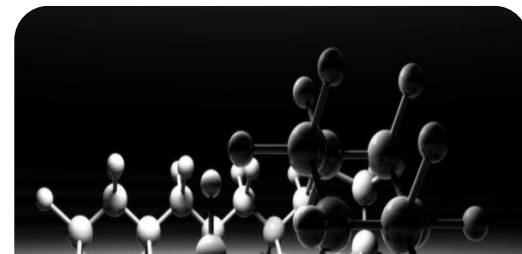
Cooperation INM-5 - TSU/Tbilisi

Cooperation partner:

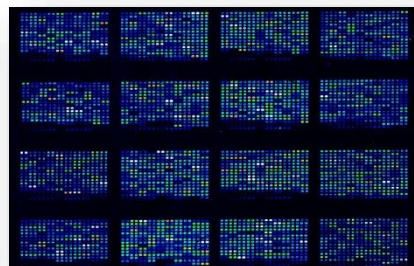
- -Prof. Dr. Bezhan Chankvetadze
- -PhD Rusudan Kakava



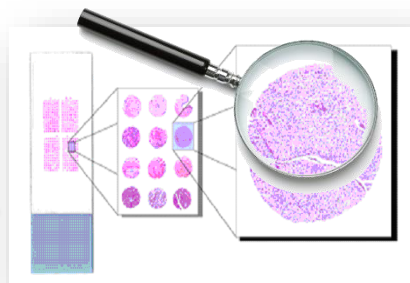
- tracer design
- organic preparative precursor synthesis & chiral resolution
- radiolabeling
- preclinical evaluation
- translation into clinics



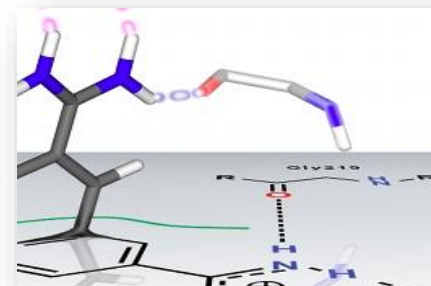
DEVELOPMENT OF MOLECULAR PROBES



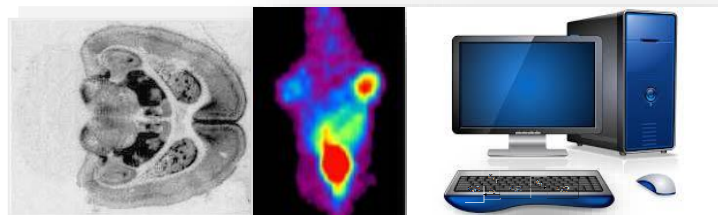
Molecular biological
screening



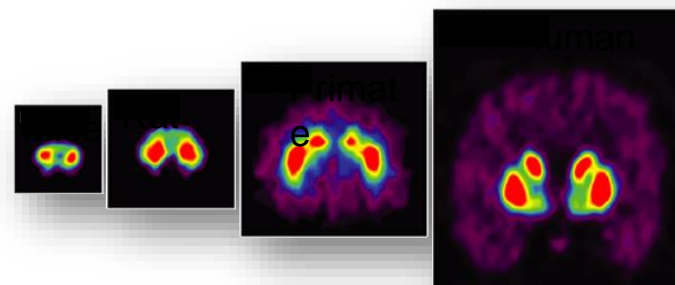
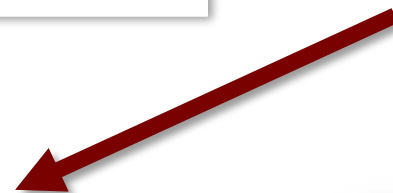
Selection of key
processes and target
lead structure
identification



Tracer design,
development and
production



Preclinical evaluation, toxicity, metabolic
stability, specificity, affinity,
biodistribution



Translation into clinics
biodistribution, pharmacokinetics,
pharmacodynamics, dosimetry,
proof of efficacy in humans

THE FINAL GOAL:

High precision medicine

DIAGNOSTIC:

Sensitive prostate cancer detection using [^{18}F]PSMA

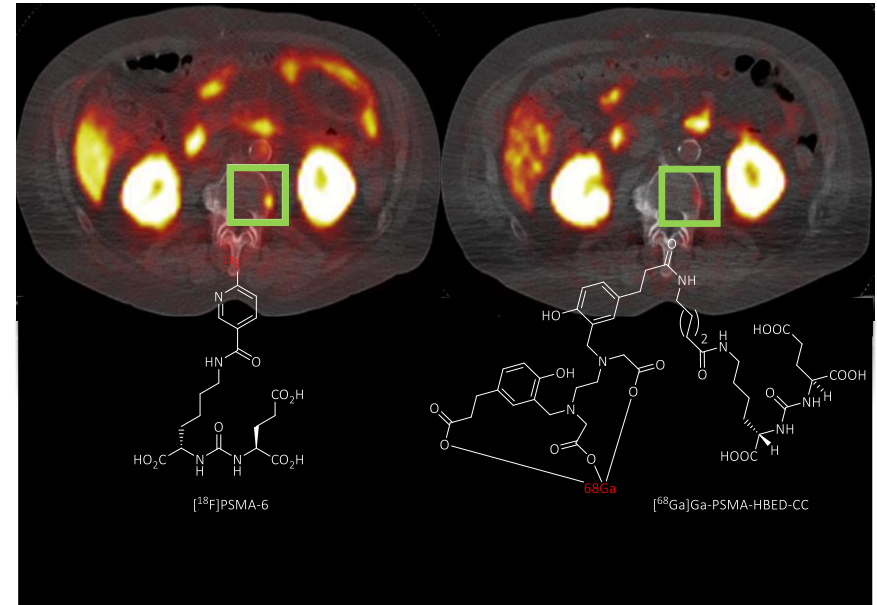
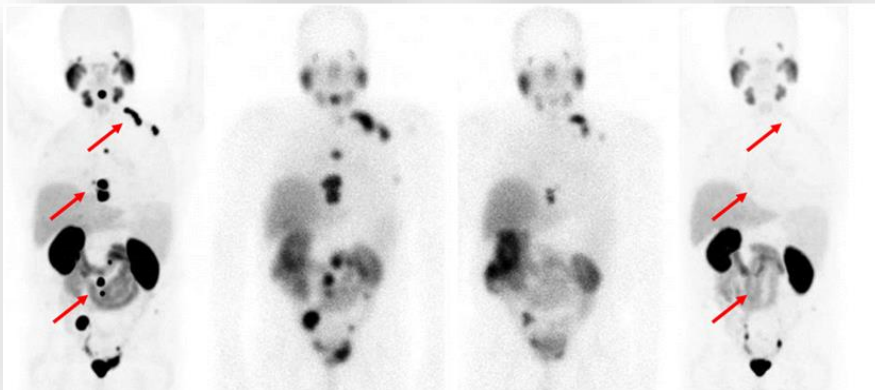


[^{18}F]PSMA
PET/CT (MIP)

^{177}Lu PSMA-617
Planar scan (GM)

^{177}Lu PSMA-617
Planar scan (GM)

[^{18}F]PSMA
PET/CT (MIP)



THERAPY and THERAPY MONITORING:
PET and Endoradiotherapy using
[^{18}F]PSMA & [^{177}Lu]PSMA

დიდი მადლობა