

# **Radiopharmaceutical Sciences Group (RSG) from IST– Contribution to PRISMA MAP**

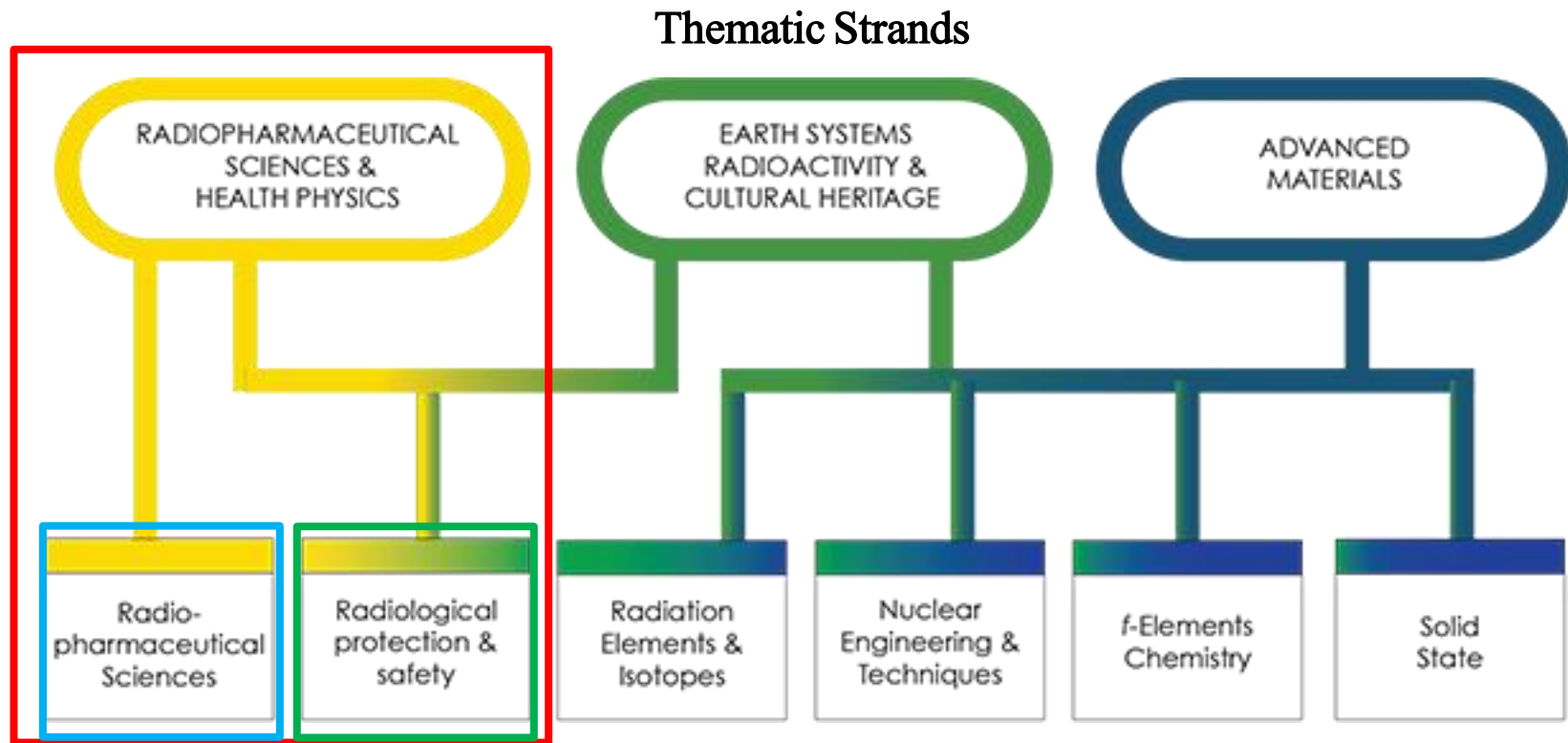
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**Radiopharmaceutical Sciences Group**

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**Worshop “Synergies with Portugal”  
CERN, 19<sup>th</sup> September 2019**



- Studies on Radiopharmaceutical Sciences, Radiation Protection and Dosimetry, Biological Effects of Ionizing Radiation and Metrologys.
- Development of **Radiopharmaceuticals** for molecular imaging by PET or SPECT and targeted radionuclide therapy.
- Expertise on radiobiology, radioanalytical, dosimetry and metrology techniques.

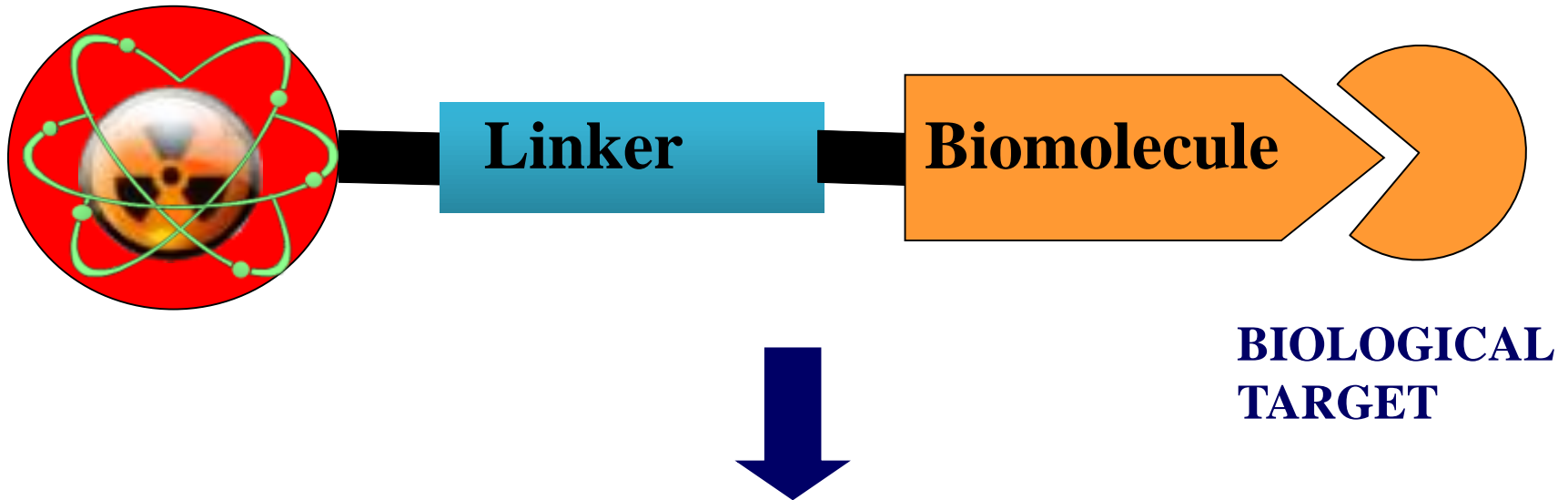


- Multidisciplinary team of scientists with expertise in chemistry, radiochemistry and biological sciences.
- Laboratories for synthesis of cold compounds;
- Laboratory for solid phase peptide synthesis;
- Hot laboratories for handling and characterization of radioactive compounds;
- Laboratories for biochemical, molecular biology and cellular studies;
- Facilities for animal housing and biodistribution studies.



# What Are we Doing ?

## Research On Radioactive Tools



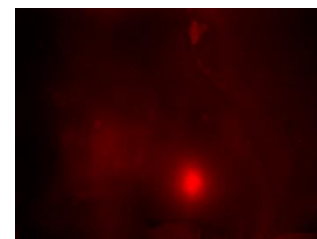
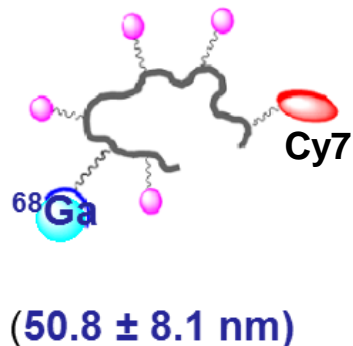
**Molecular Imaging/Targeted Therapy**  
**Drug Development**





# Some RSG achievements/Nanosized Probes

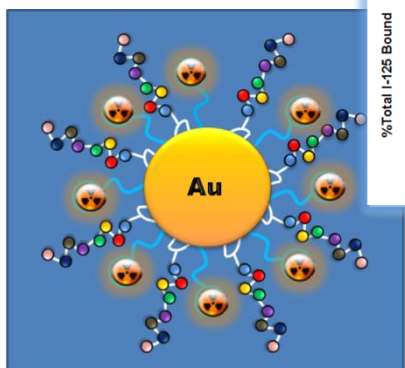
- Intraoperative Probes/SLN detection: Radiolabeled dextran-mannose derivatives



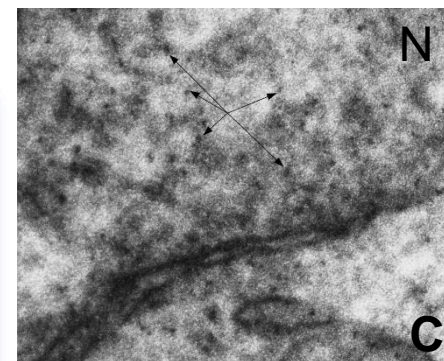
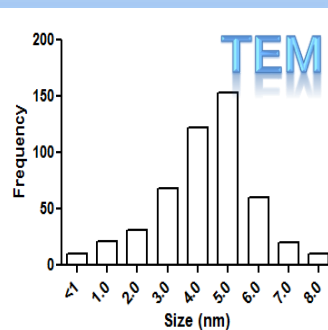
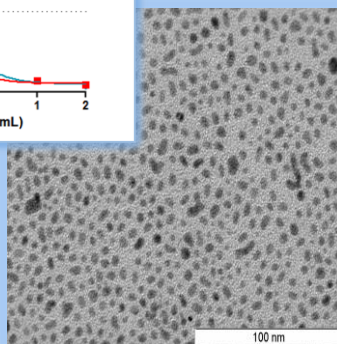
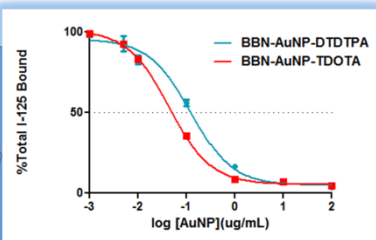
NIR optical imaging of Wistar rat leg injected with  $^{68}\text{Ga}$ -dextran-mannose

I. Santos et al., *Bioconjugate Chem.* **2014**, 25, 1963–1970

- Theranostics of Prostate Cancer: Multimodal AuNPs



BBN-AuNP-TDOTA- $^{67}\text{Ga}$



TEM images of PC3 cells treated with **BBN-AuNP-TDOTA**

A. Paulo et al., *Bioconj. Chem.* **2016**, 50, 27, 1153–1164

## **i) Design of target-specific radioconjugates with innovative and less explored radionuclides (based on experimental and in silico approaches):**

- Development of new labelling strategies, relying on innovative chelators and precursors (e.g. prosthetic groups), suitable to label antibodies or peptides and profiting from the in-house availability of a microwave automated peptide synthesizer.

## **ii) In vitro and in vivo biological evaluation of radiopharmaceuticals:**

- Development and characterization of cellular models: 2D, polarized and 3D (spheroids) models.
- Development and characterization of animal models: normal and tumor-bearing mice (including xenografts)
- Radiobiological evaluation, combining molecular and cytogenetic approaches with radiocytotoxicity assays and complemented by micro- and nanodosimetric simulations.





Thank you for your attention!!