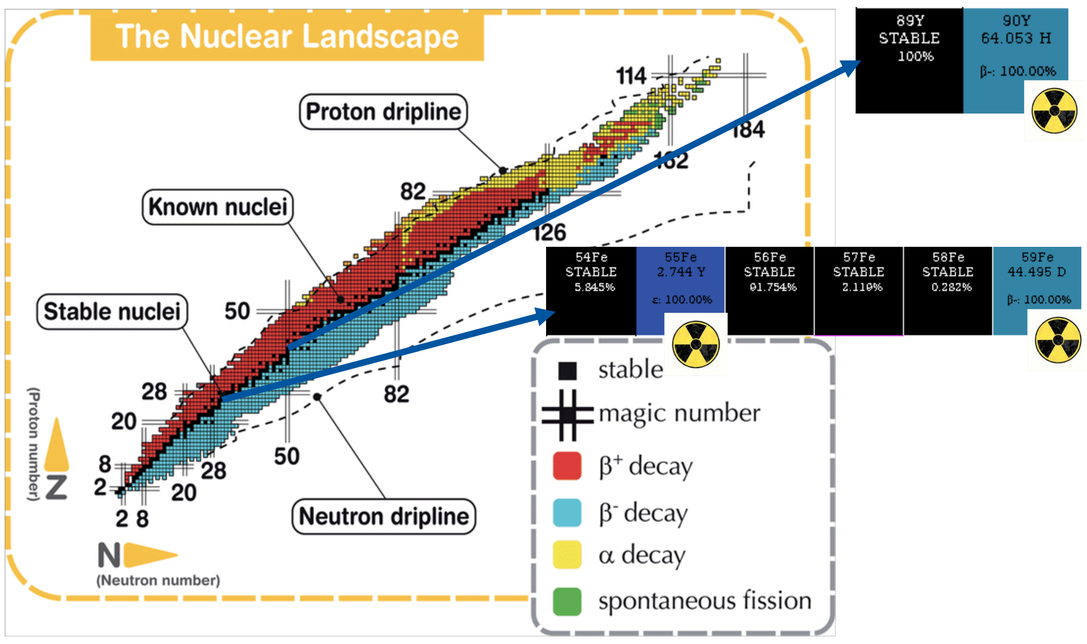
MEDICIS

Making new medical radionuclides available for cancer research

Fournir de nouveaux radionucléides pour la recherche contre le cancer

Which radionuclides do we know?
Quels radionucléides connaissons-nous?



Taken from Galatà, Alessio (2015) *Physics and Technology of the SPES Charge Breeder.* PhD Thesis , Università degli Studi di Ferrara.

CERN-MEDICIS radionuclides catalog
Catalogue de production de radionucléides

Internal Radiotherapy
Radiothérapie interne

149Tb 4.118 H ε: 83.30% α: 16.70%
153Sm 46.284 H β-: 100.00%
161Tb 6.89 D β-: 100.00%
212Bi 60.55 M β-: 64.06% α: 35.94%
166Ho 26.824 H β-: 100.00%
166Yb 56.7 H ε: 100.00%
177Lu 6.647 D β-: 100.00%

Functional imaging
Imagerie fonctionnelle

152Tb 17.5 H ε: 100.00% α < 7.0E-7%
155Tb 5.32 D ε: 100.00%
156Tb 5.35 D ε: 100.00%

Imaging & Therapy
Imagerie & Therapie

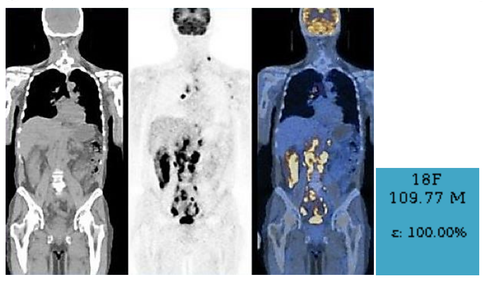
213Bi 45.61 M β-: 97.80% α: 2.20%
140Nd 3.37 D ε: 100.00%

What are their applications in medicine ?
Quelles sont leur applications en médecine ?

Functional imaging
Imagerie fonctionnelle

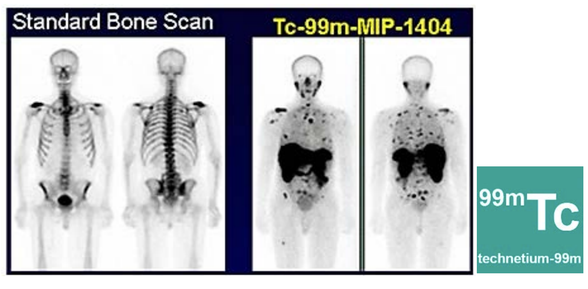
PET-CT Philips – Clinique Genolier (Suisse)

Positron Emission Tomography (PET)
Tomographie par Emission de Positons (TEP)



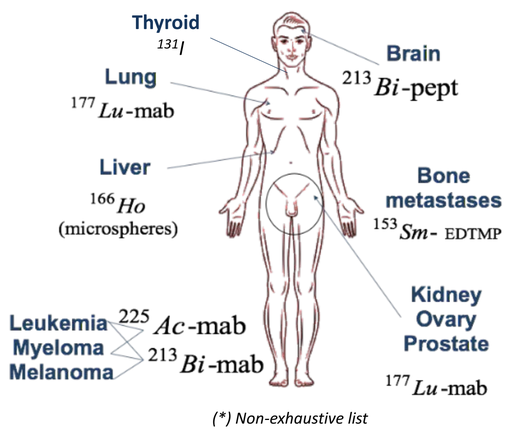
TEP-Scan au fluor-18 - Société Luxembourgeoise de Médecine Nucléaire

Single Photon Emission Computed Tomography (SPECT)
Tomographie par Emission de MonoPhotonique (TEMP)



Press article Medical physics web Jun 14, 2013

Internal Radiation therapy
Radiothérapie interne



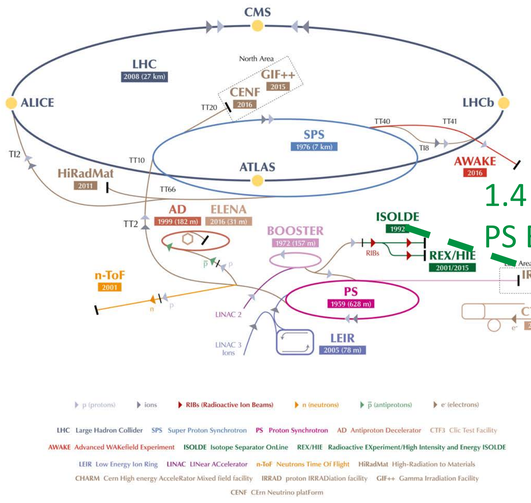
(*) Non-exhaustive list

Theranostics
Théranostique

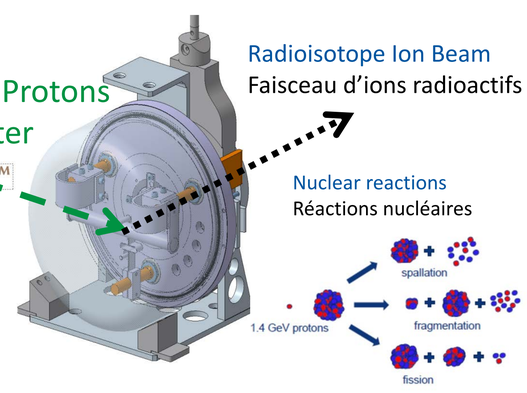
Terbium: A new 'Swiss Army knife' for cancer diagnosis and treatment
C. Müller et al. Journal of Nuclear Medicine, 2012. 53:1951-1959

How does MEDICIS work ? Comment fonctionne MEDICIS ?

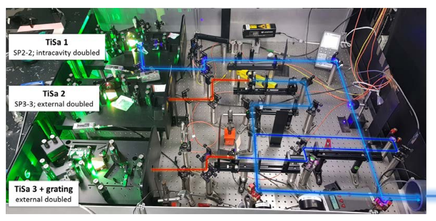
CERN Accelerator complex
La chaine d'accélérateurs du CERN



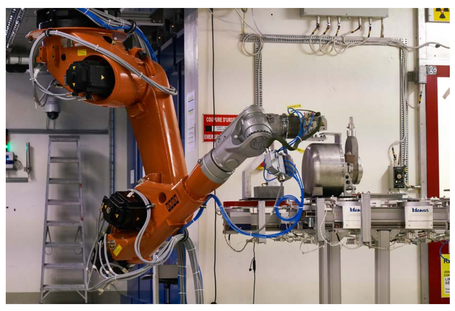
Target Irradiation
Irradiation de la cible

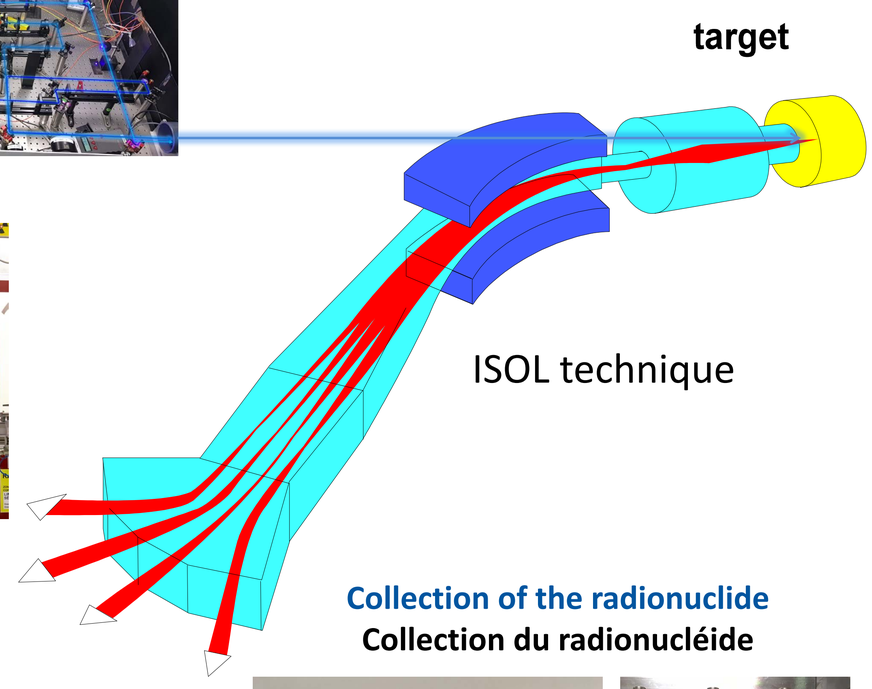


Element Selective Laser Ionisation + **Isotopes Electromagnetic Mass Separation**
Ionisation Laser — Séparation en masse

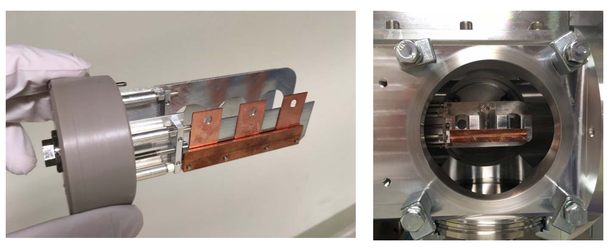


KUKA Robot





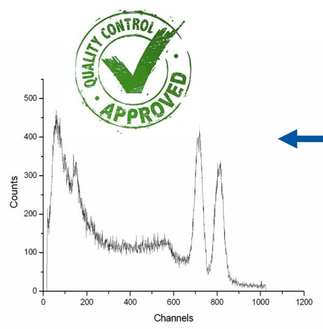
Collection of the radionuclide
Collection du radionucléide



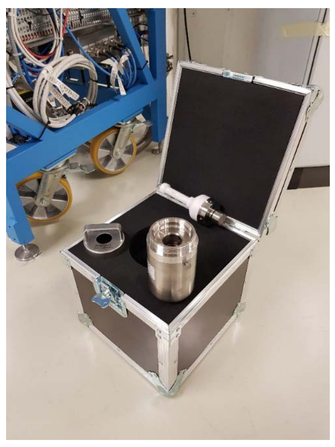
Implantation on a metallic foil

Radiochemical purification
Purification radiochimique

Quality Control
Contrôle qualité

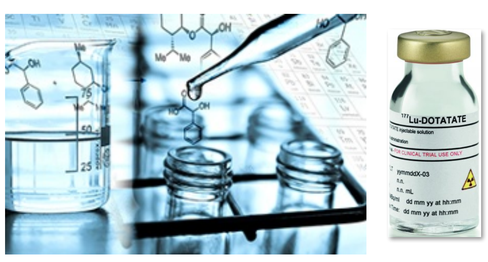


Packaging
Emballage

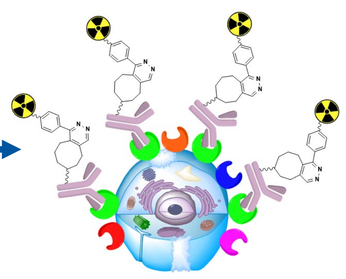


Shipping to hospitals or research centers
Envoi vers les hopitaux ou centres de recherche

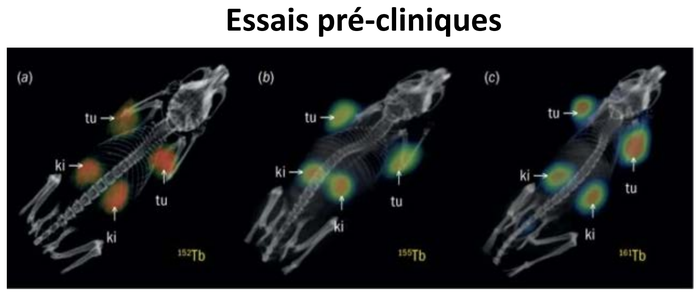
Radiopharmaceutical Synthesis
Synthèse du radiopharmaceutique



Radiolabelling
Radiomarquage



Pre-Clinical Trial
Essais pré-cliniques



PET (a) and SPECT images (b, c) of KB tumour-bearing mice 24 hours after injection of (a) ^{152}Tb-cm09, (b) ^{155}Tb-cm09 and (c) ^{161}Tb-cm09.