Cyclotrons

10 MeV  18 MeV  30 MeV  70 MeV
Step 1: anatomic imaging
Duration: 20 seconds

CHU Saint Cloud (Paris) - Prof. Pecking
Step 2: functional imaging
Duration: 10-20 minutes

CHU Saint Cloud (Paris) - Prof. Pecking
Image Fusion

PET

CT

PET+CT

Functional Imaging + Morphological Imaging
Image Fusion
Breast Cancer

Lymphoma
Nuclear Medicine and Neurology

1. Seeing through the body
2. Radioactivity for diagnostic
   a. Nuclear Medicine applications
   b. Cardiovascular applications
   c. Cancers
3. Brain Imaging
   a. Alzheimer’s Disease
   b. Other neurodegenerative diseases
4. Towards Personalized Medicine
   Nuclear Medicine and Therapy
Alzheimer’s Disease and Amyloid Plaques

Rowe et al., Lancet Neurol 2008;7:129–35

$^{[18F]}$AV-1/BAY94-9172: 69% Increase in Signal PCG of AD vs Control

61 years (MMSE 30)  80 years (MMSE 26)
Neuronal Degenerative Diseases

Healthy Control  Lewy Body Degeneration  Alzheimer’s Disease  Fronto–temporal Degeneration

$^{11}$C PIB

Rowe 2007
Multi-tracers Approach - Evolution of an Alzheimer patient’s brain

- Amyloid Plaques
- Tangles
- Cognition
- Neurons

Prodromal MCI AD

Amyloid marker \[^{11}C\]PIB

Neuroinflammation marker \[^{11}C\]D-deprenyl

rCBF marker \[^{18}F\]FDG

- Amyloid Plaques
- Tangles
- Cognition
- Neurons
1. **Seeing through the body**
2. **Radioactivity for diagnostic**
   a. **Nuclear Medicine applications**
   b. **Cardiovascular applications**
   c. **Cancers**
3. **Brain Imaging**
   a. **Alzheimer’s Disease**
   b. **Other neurodegenerative diseases**
4. **Towards Personalized Medicine**
   **Nuclear Medicine and Therapy**
Principle of Molecular Targeting

Pathology  Receptor  Ligand / Vector  Radio-isotopes

Therapy ex. Labeling with Lutetium (Beta emitter)

Linker + chelator
Pancreatic Neuroendocrine Liver Metastase five years post treatment with Somatostatin peptide analogue labelled with $^{90}$Y (three cycles) and $^{177}$Lu (one single treatment)

Prof. R. Baum - Bad Berka
Thanks for your attention

www.oncidium-life.org

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