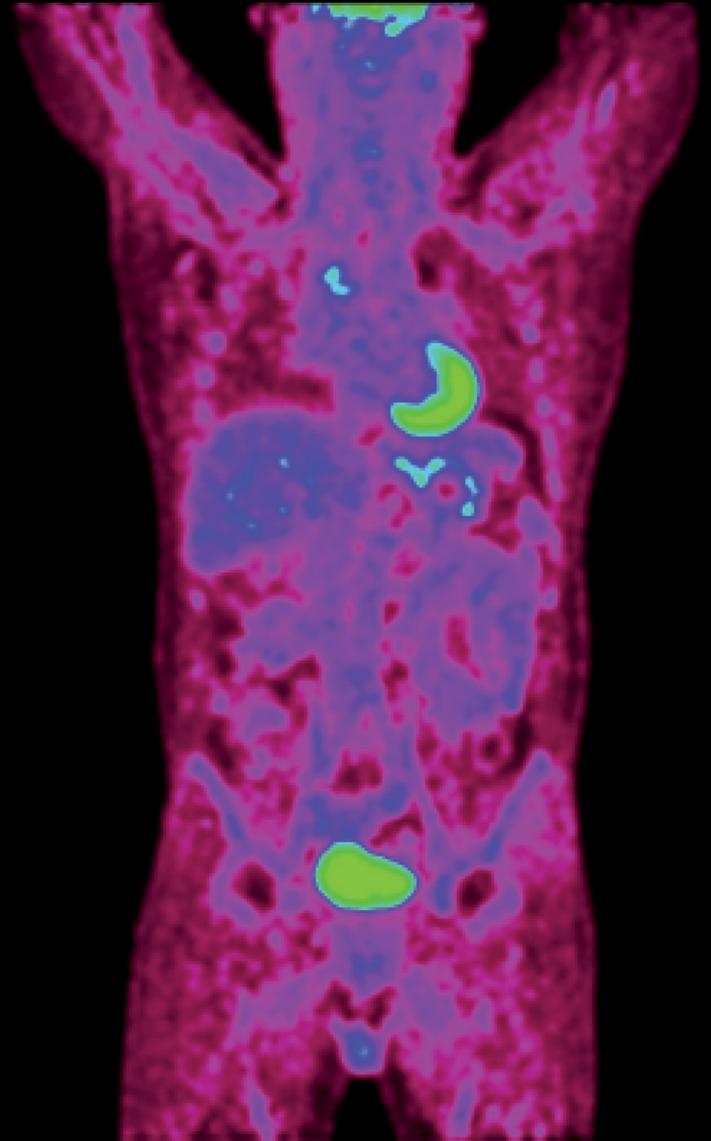


Disegnare con l'antimateria

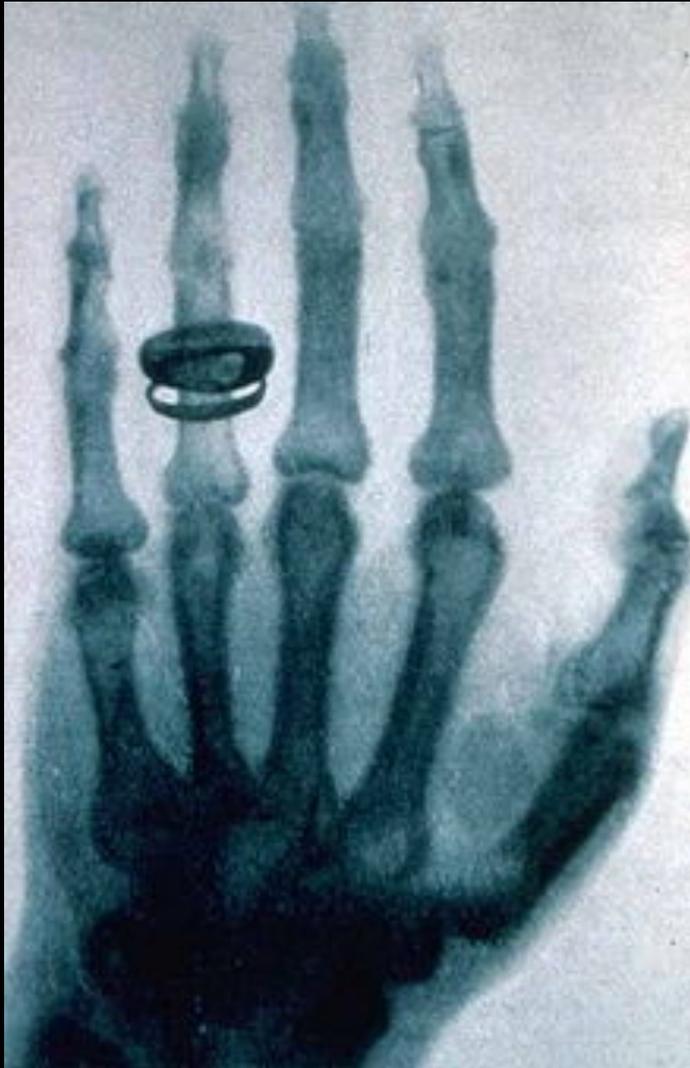
Piergiorgio Cerello





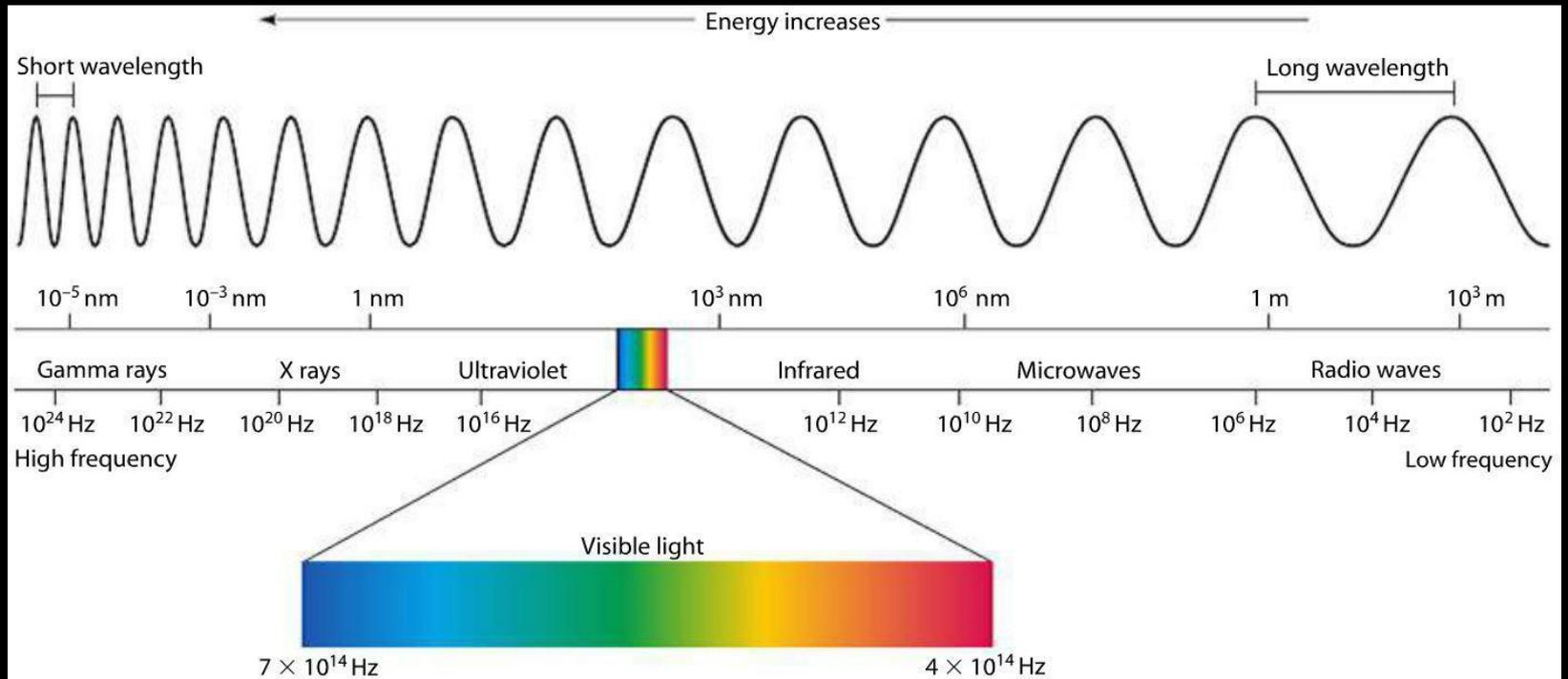
Antimateria

Roentgen



- 1895
- Raggi X
- Radiografia
- Guardare attraverso la materia

Radiazione Elettromagnetica

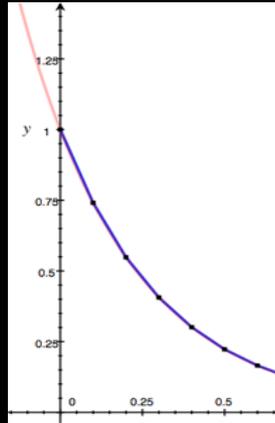


Raggi X

Sorgente



Rivelatore



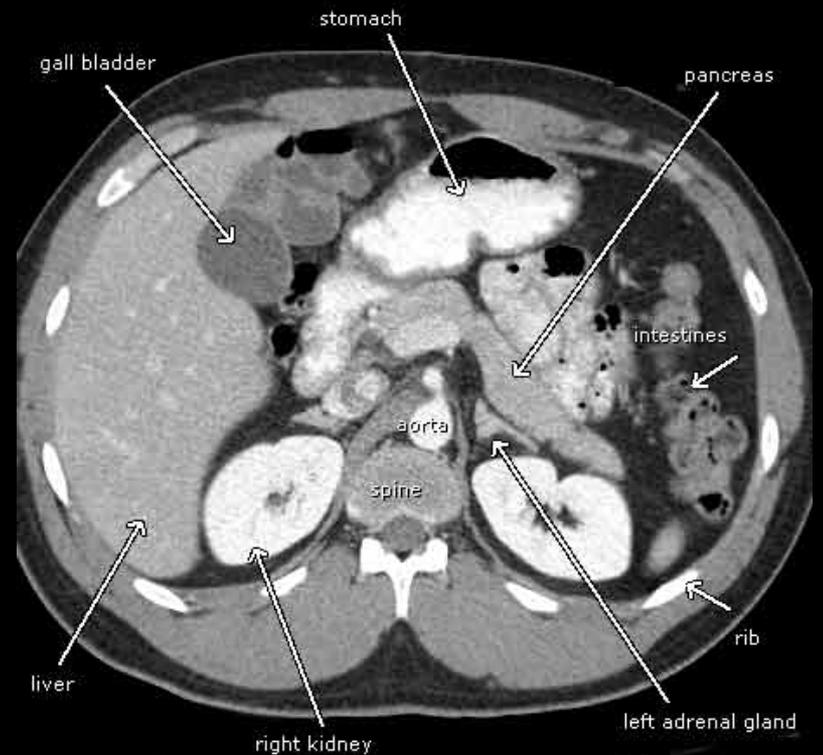
Radiografia



Tomografia Computerizzata

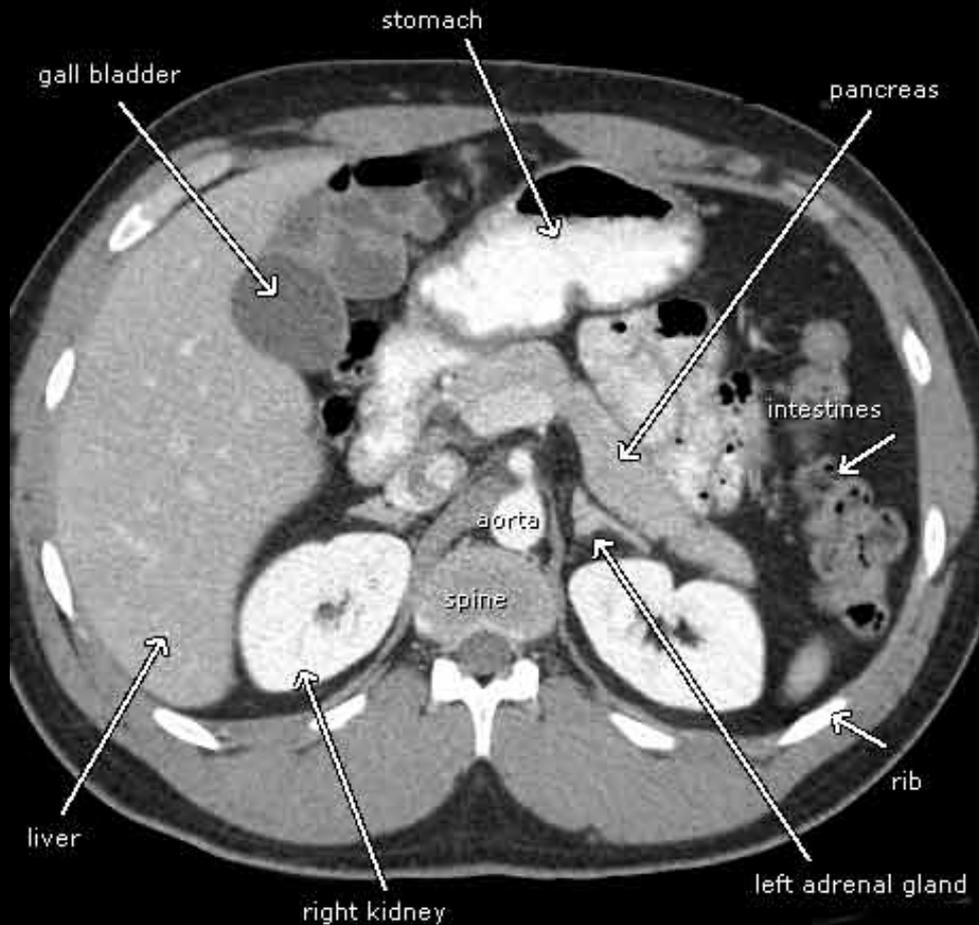


- Godfrey Hounsfield, 1971
- Premio Nobel per la Medicina, 1979



(grazie, Beatles!)

Tomografia Computerizzata



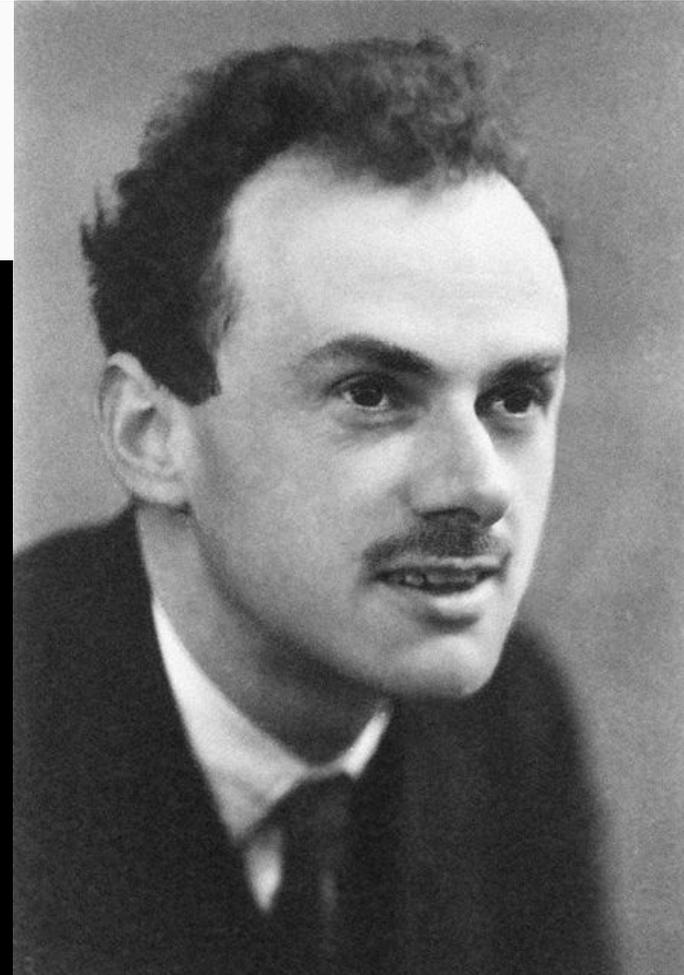
Immagini
Morfologiche



Antimateria

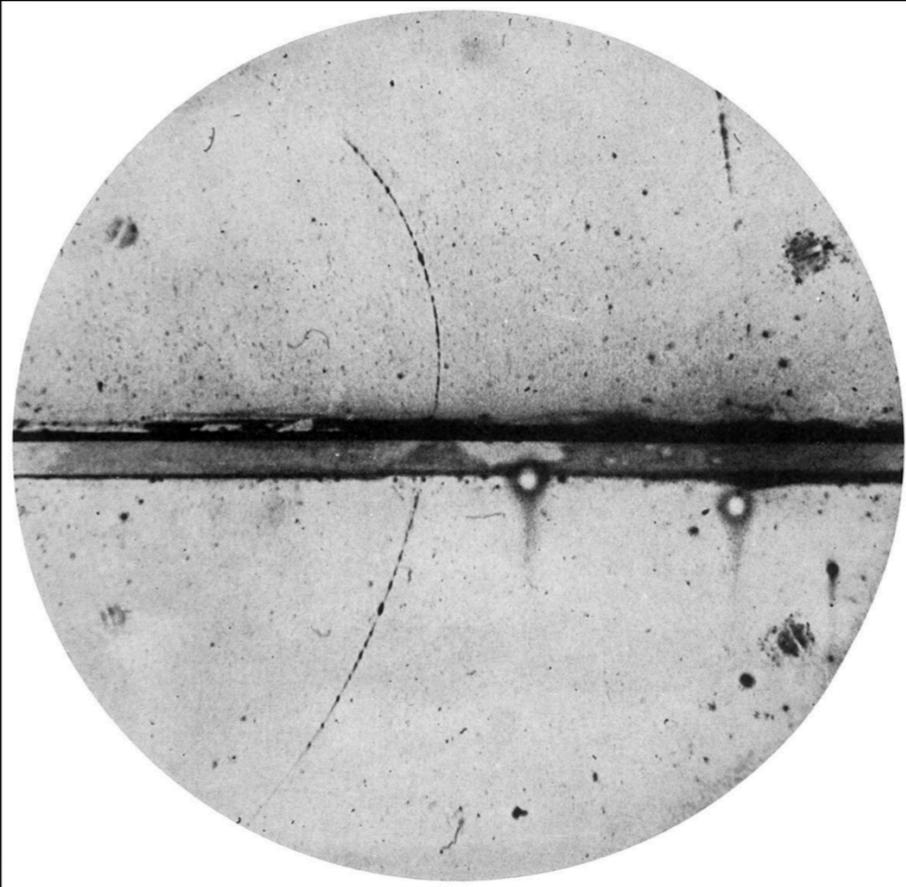
Antimateria

$$(i\partial\!\!\!/ - m)\psi = 0$$



- Dirac, 1928
- Soluzioni con energia negativa???

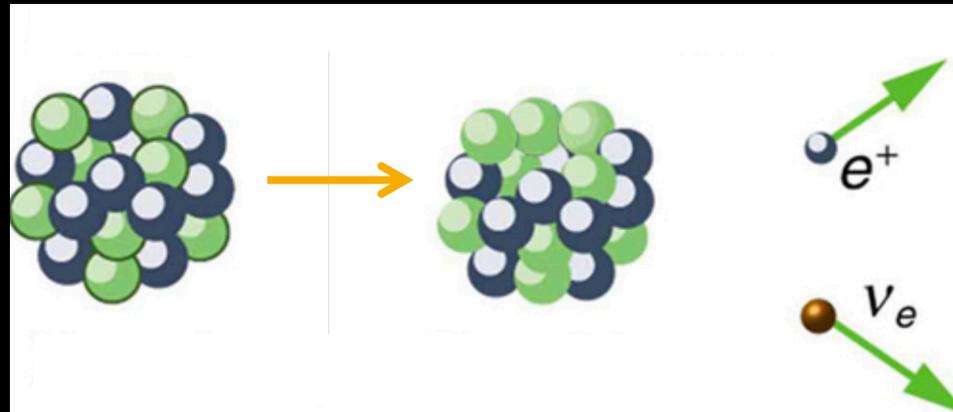
Antimateria



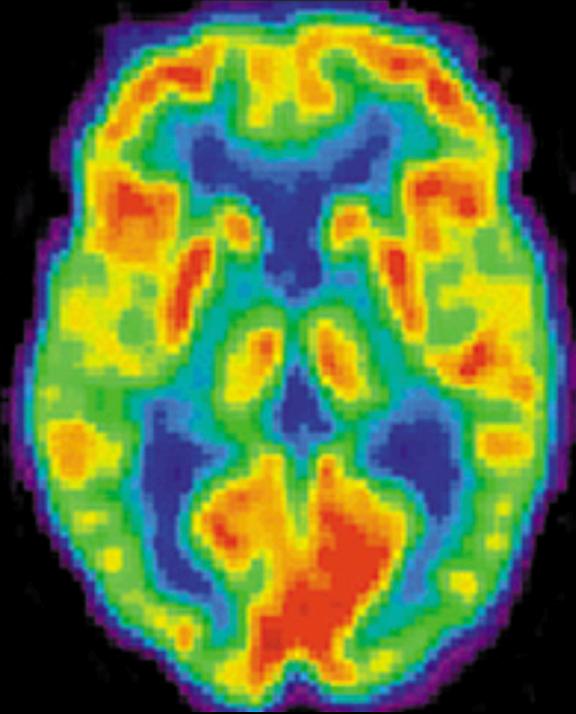
- Anderson, 1932
- il positrone (e^+)
- annichilazione



Il decadimento β^+

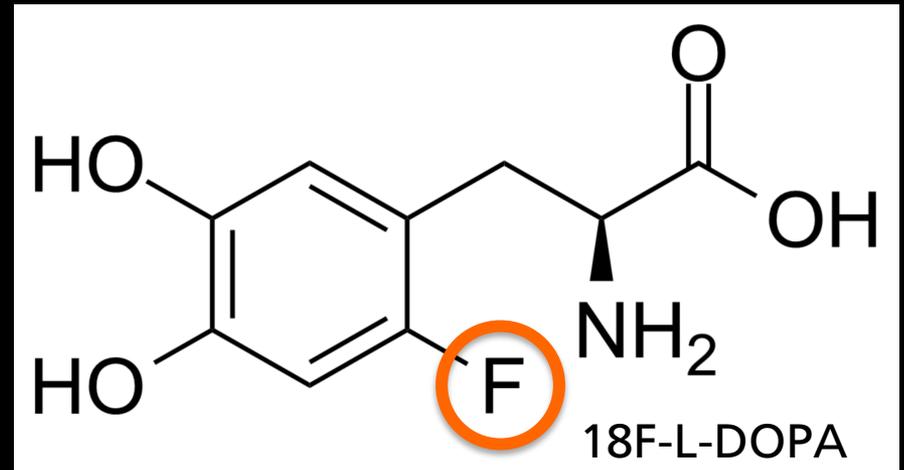
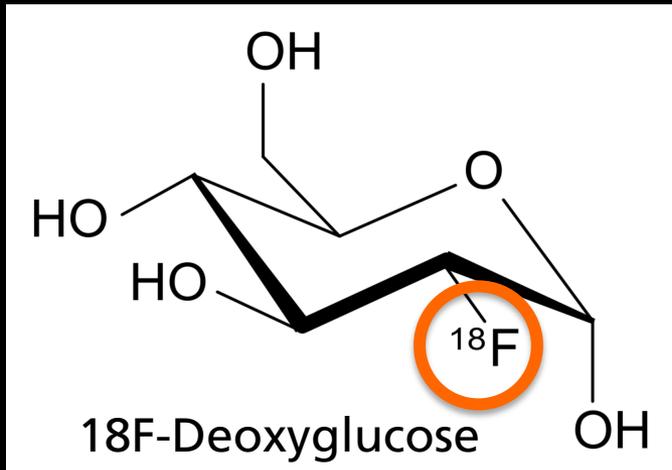
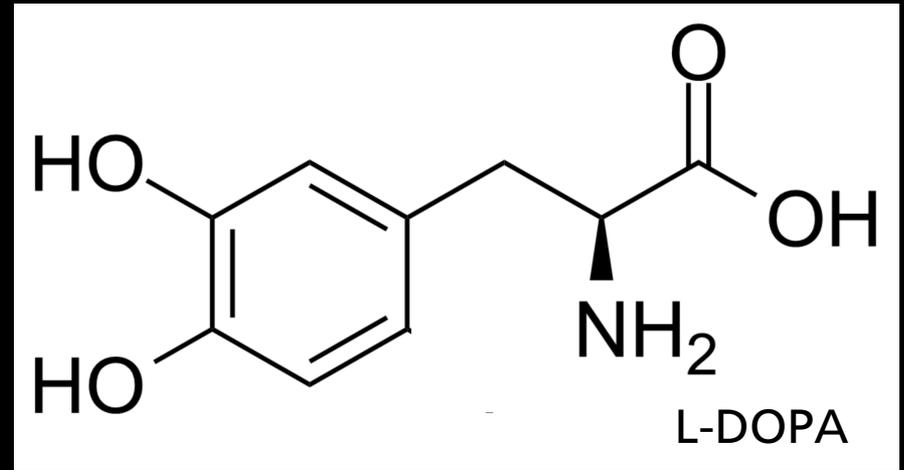
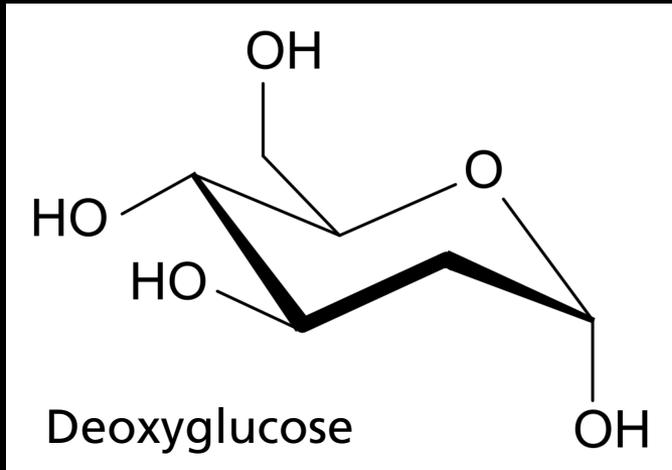


Immagini funzionali!

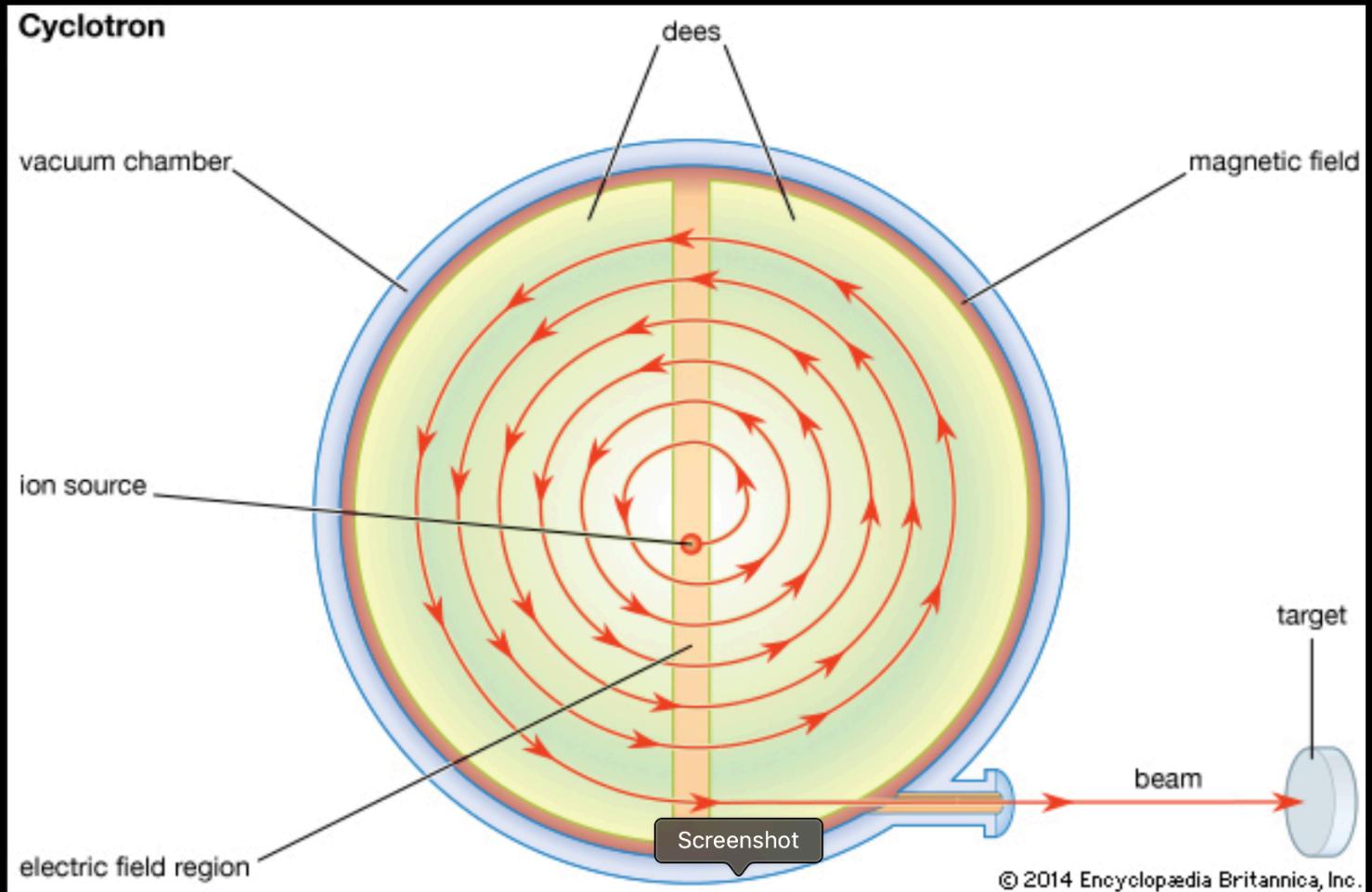


La Medicina Nucleare

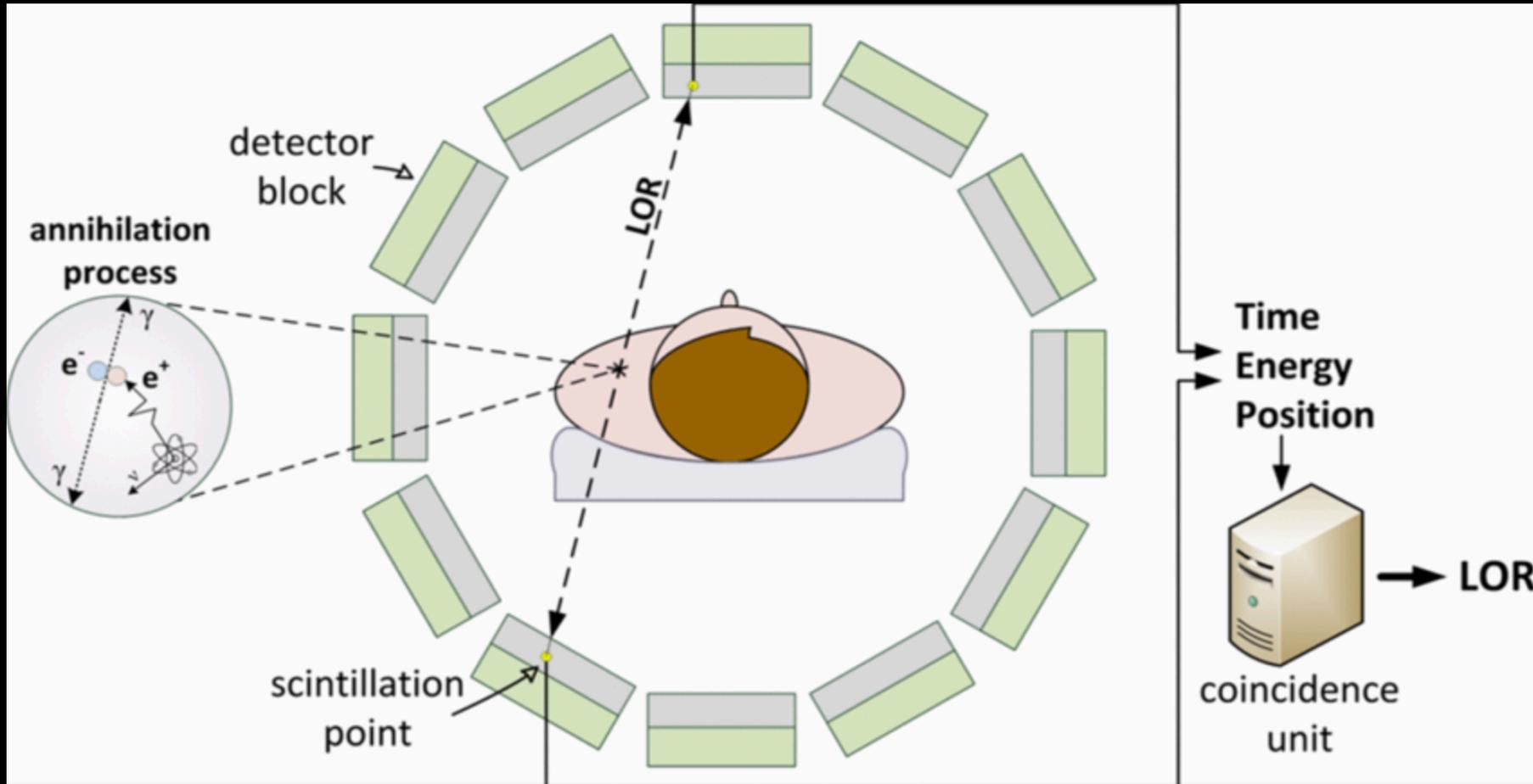
Radiotracciante



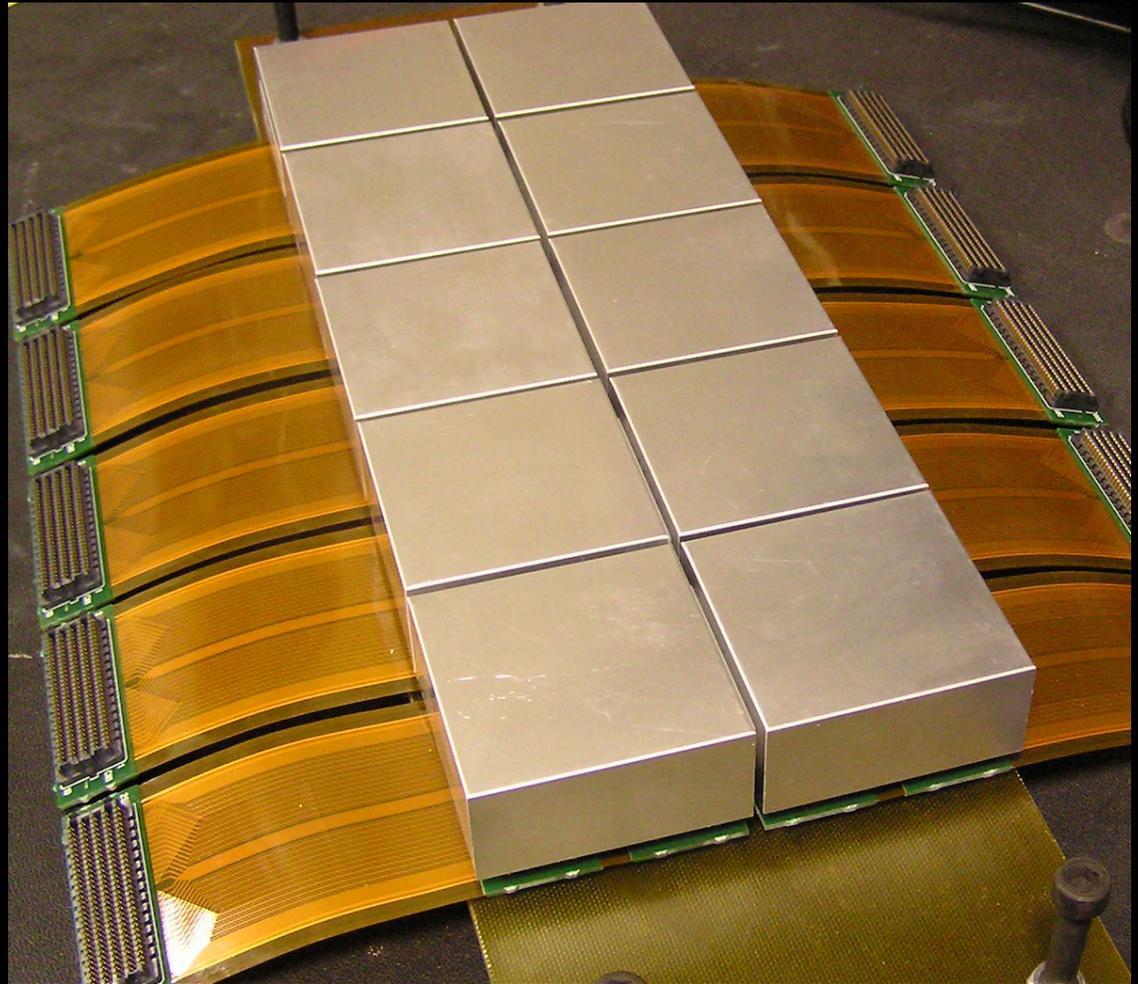
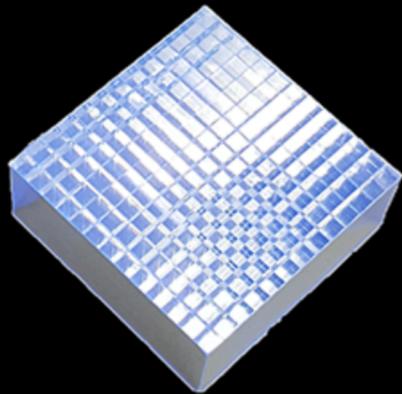
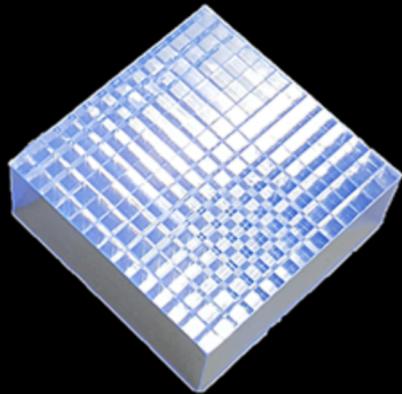
Ciclotrone



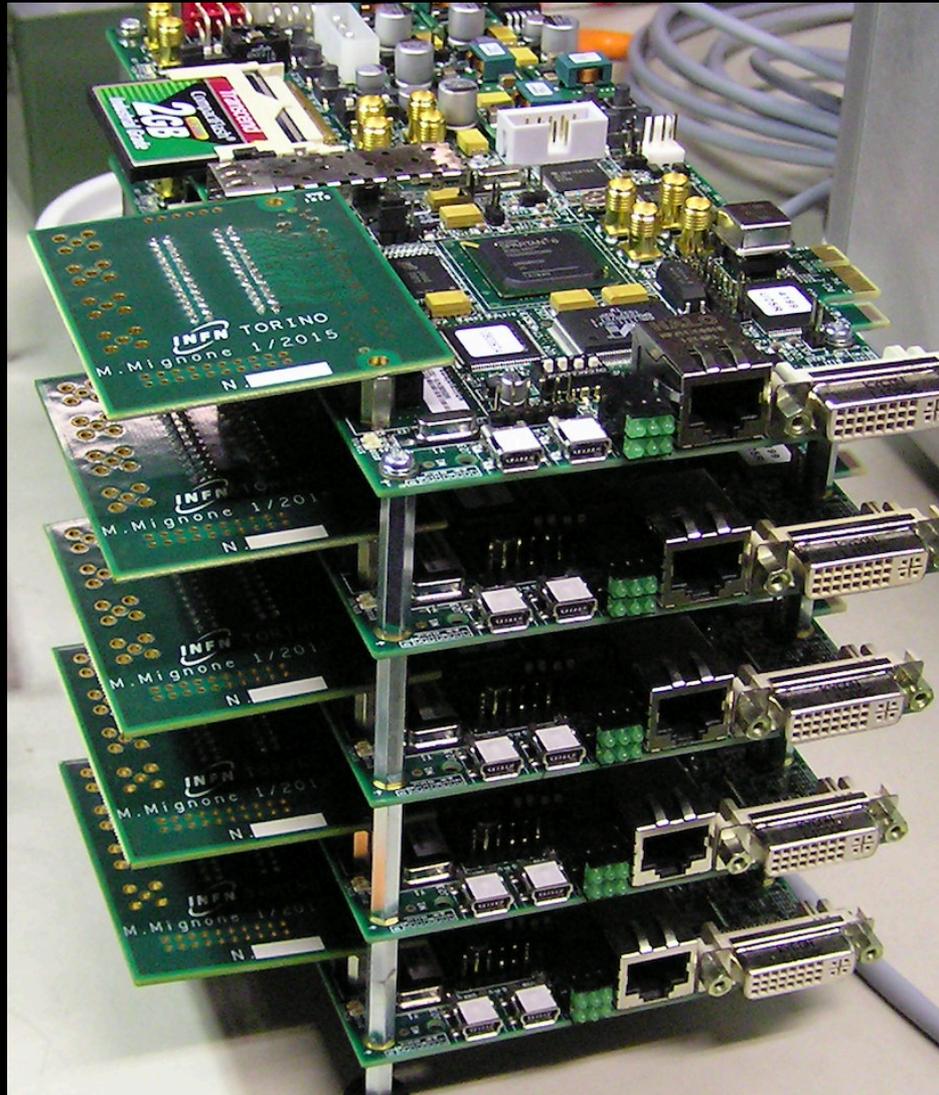
Positron Emission Tomography



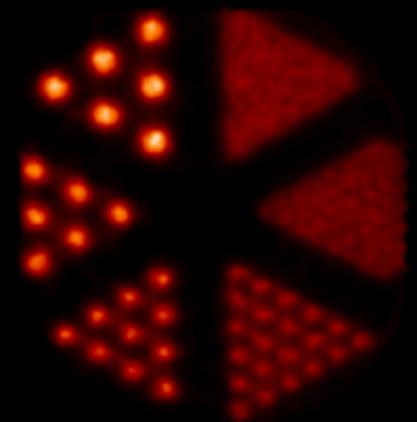
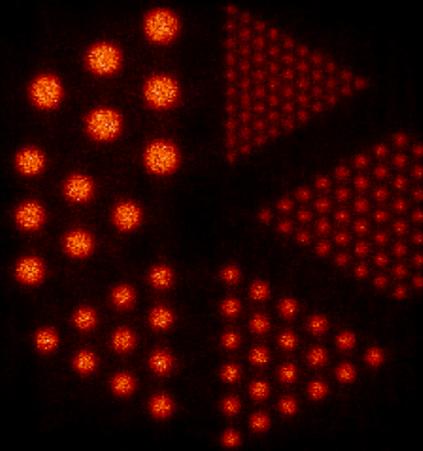
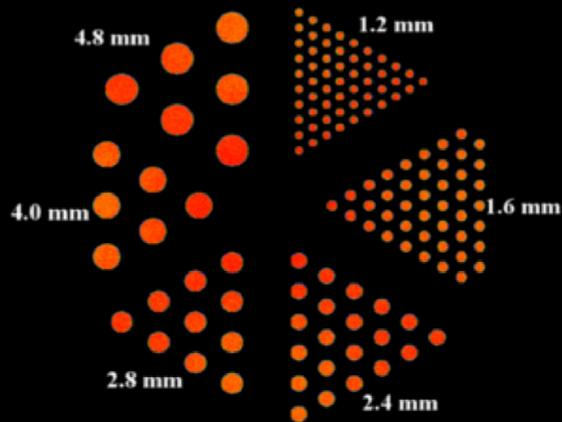
PET detectors



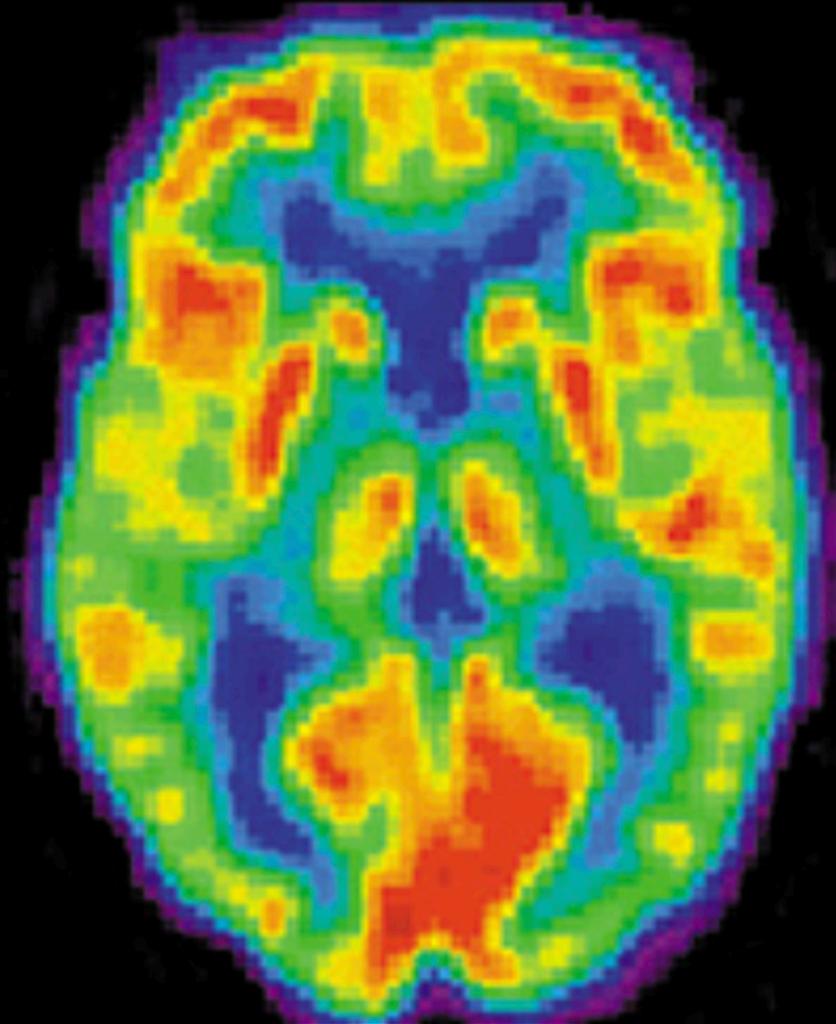
PET detectors

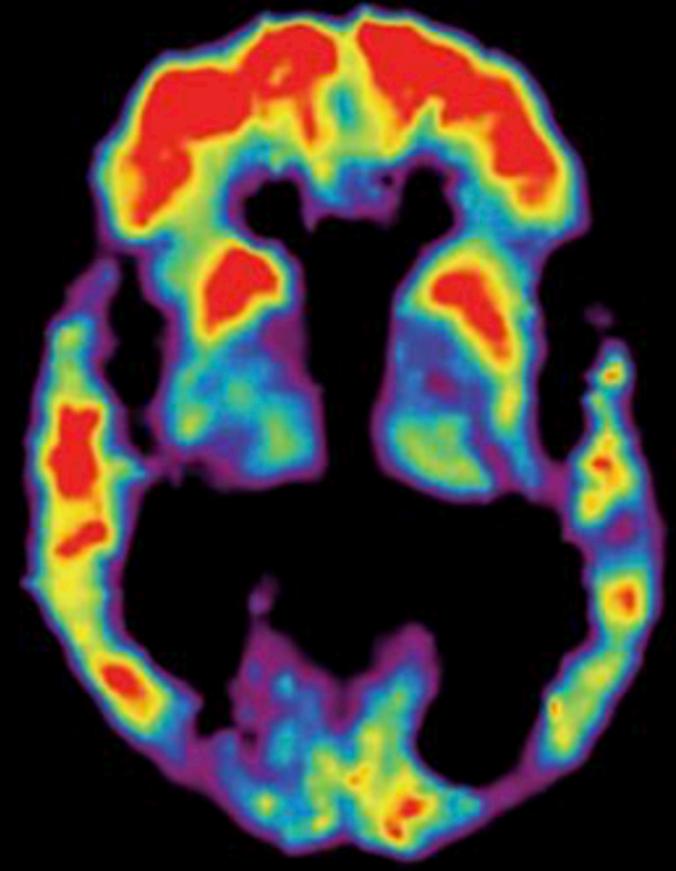
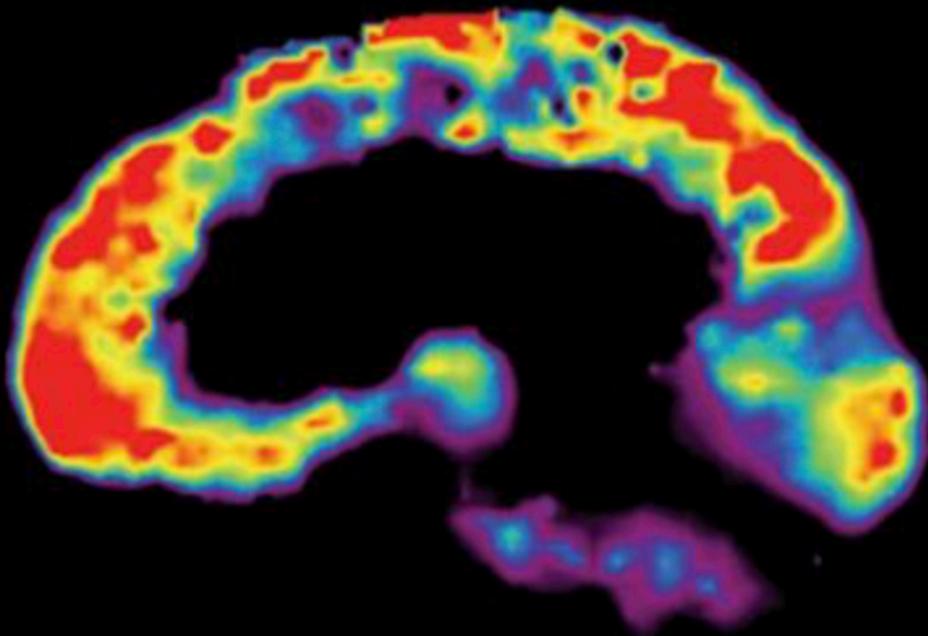


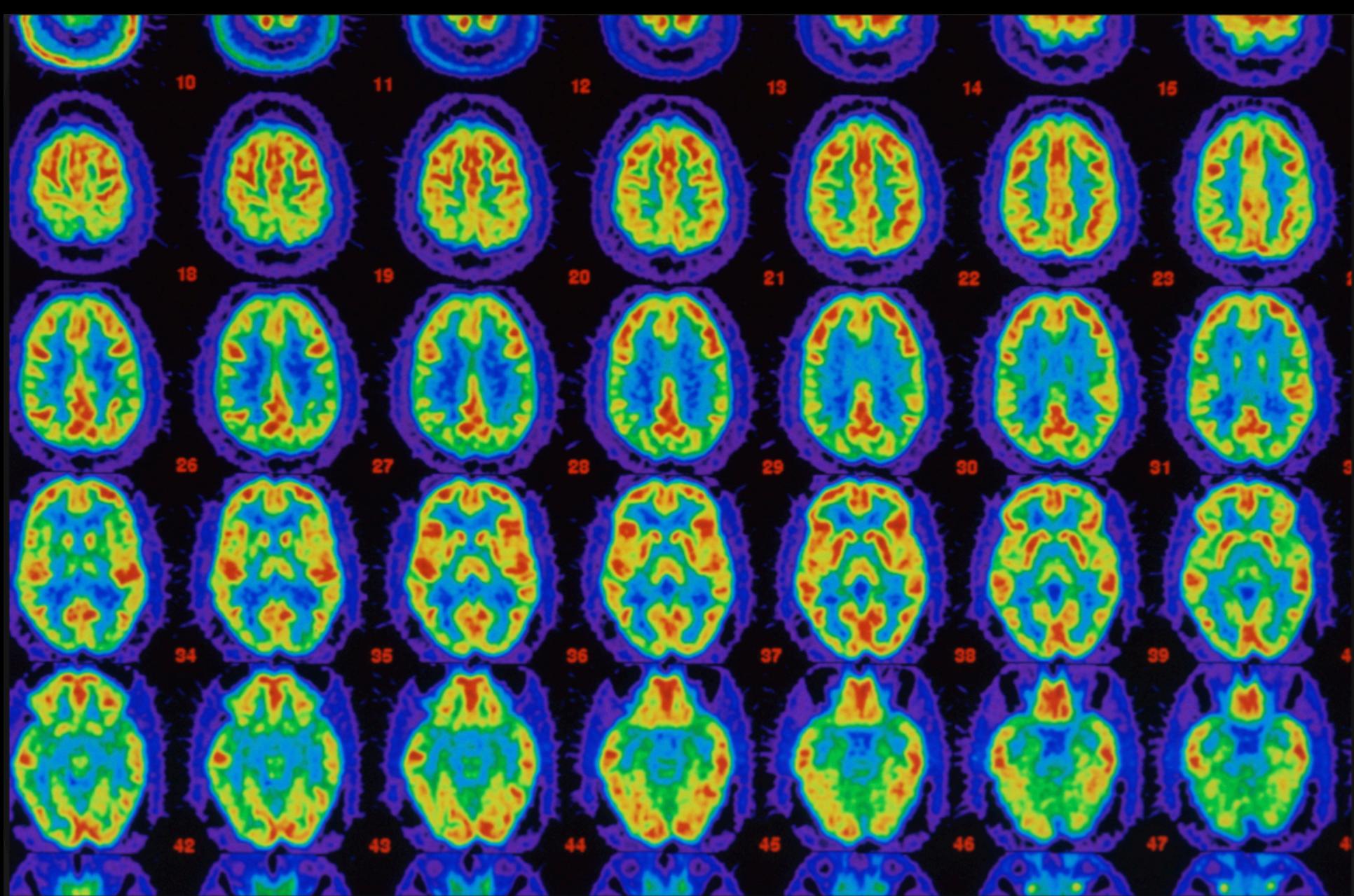
Fantoccio PET

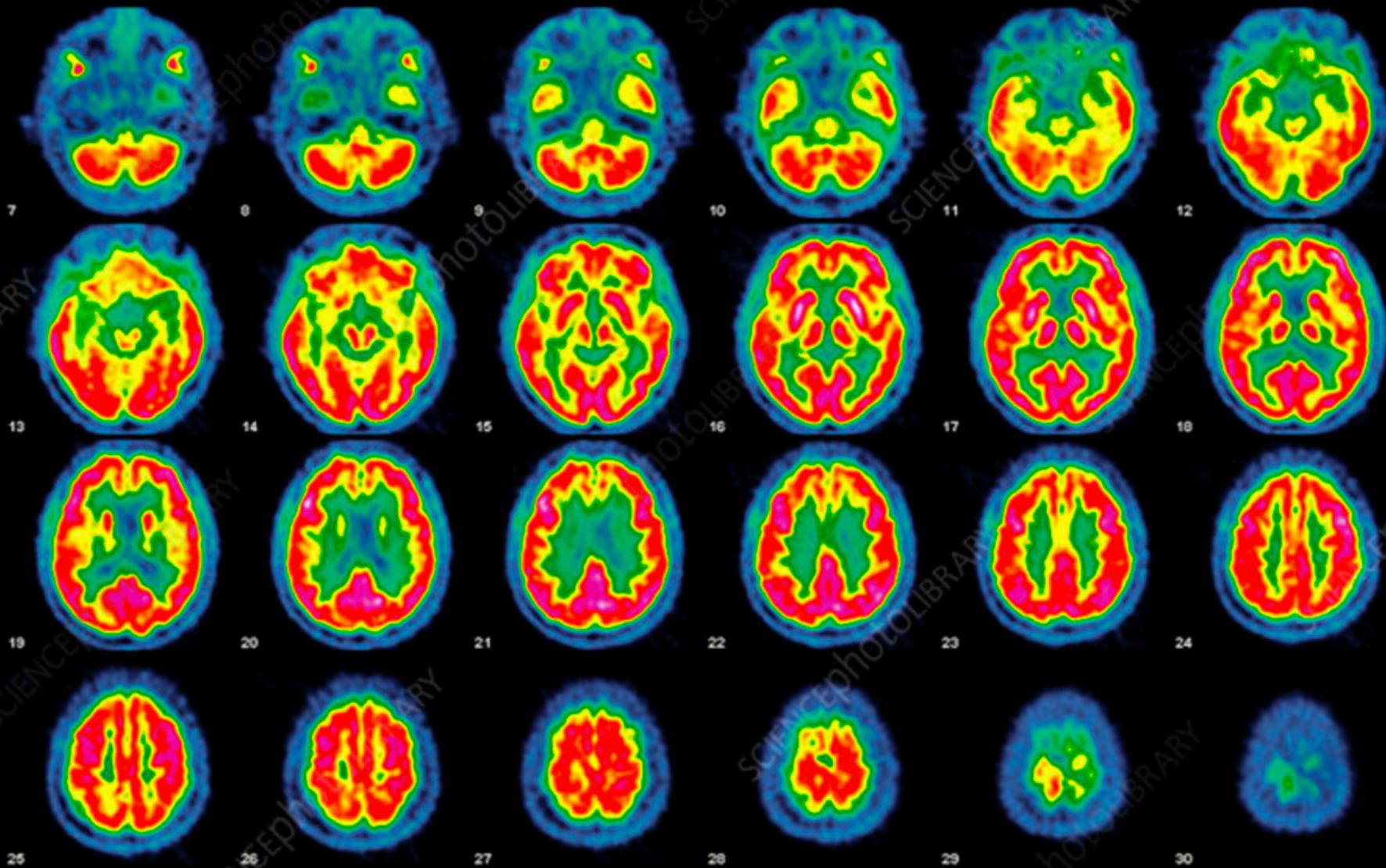


Il cervello, con le prime PET

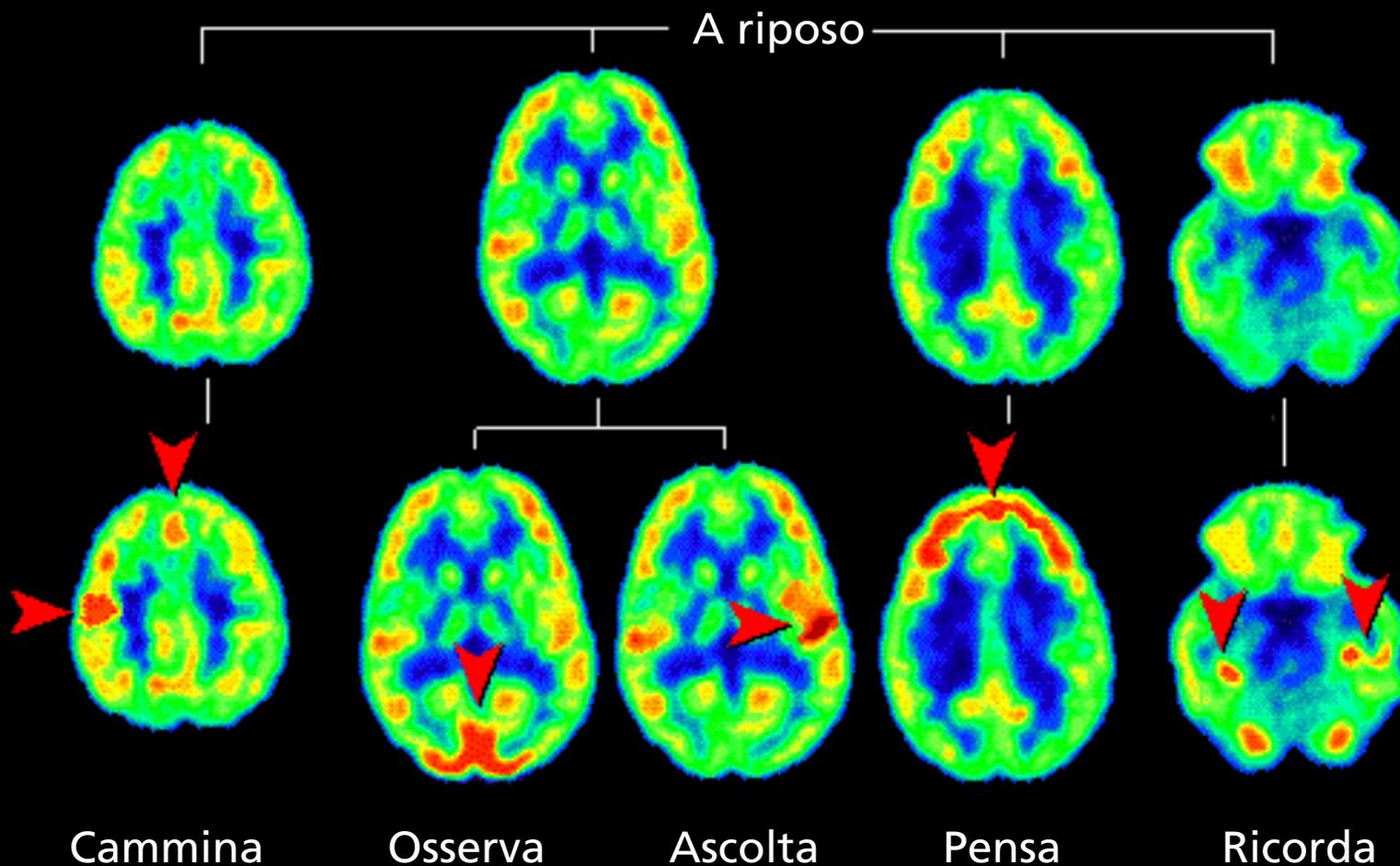






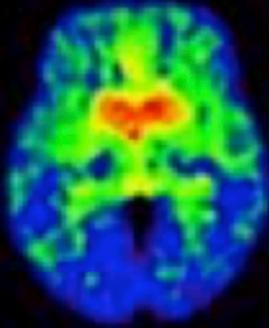


Cervelli al lavoro

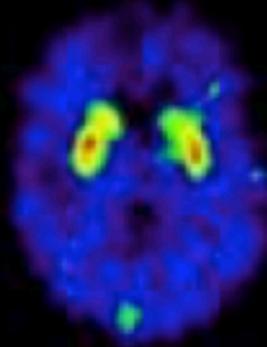


Phelps & Mazziotta, UCLA

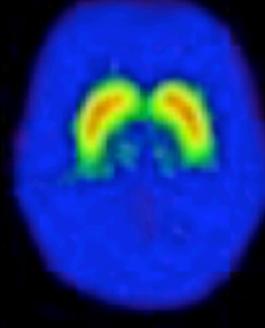
Problemi vari...



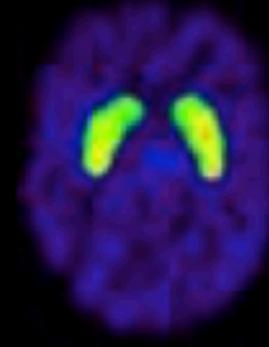
Fumatore



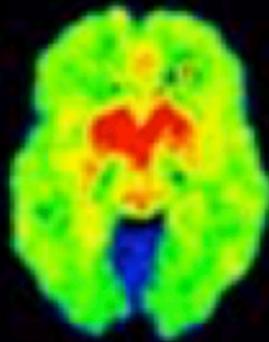
Alcolista



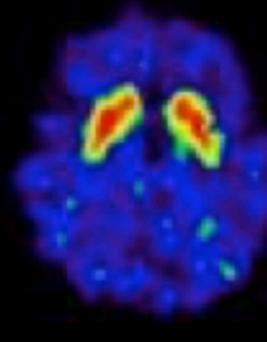
Obeso



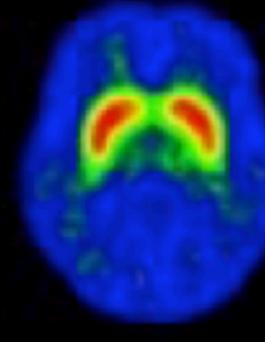
Cocainomane



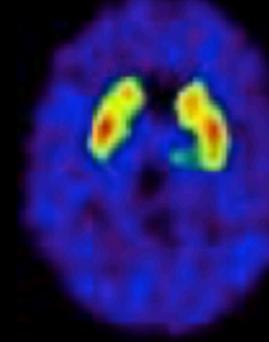
Non- Fumatore



Normale



Normale



Normale

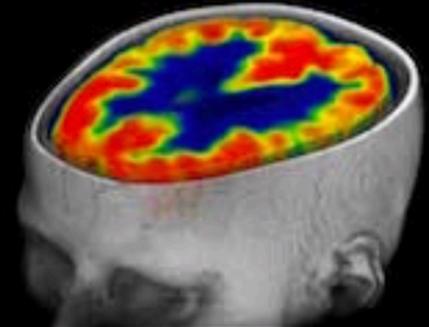
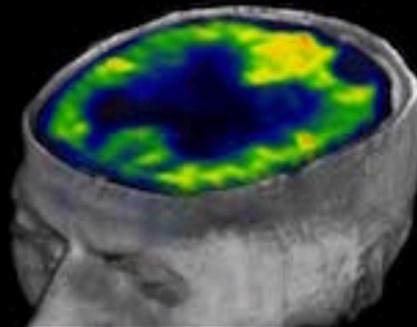
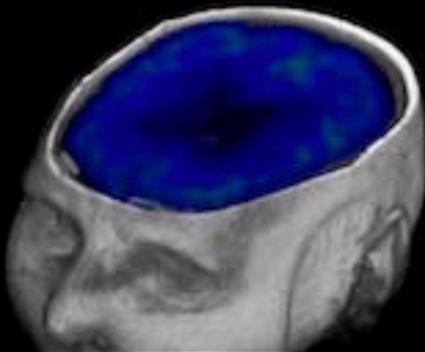
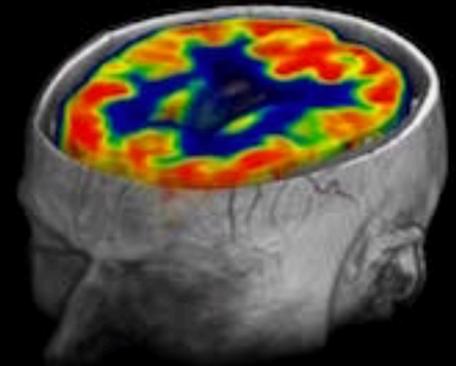
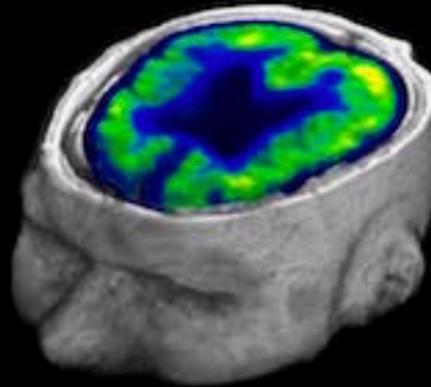
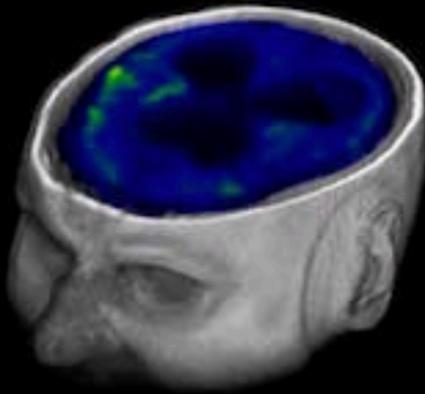
Volkow N, Fowler J, Wang G (May 2003). ["The addicted human brain: insights from imaging studies".](#) *J Clin Invest.* **111** (10): 1444–1451

Stato di coscienza

Vegetativo

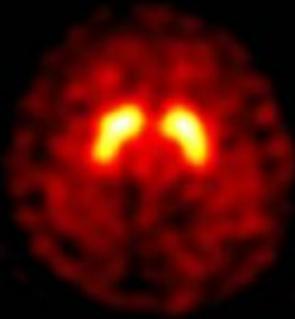
Parzialmente Cosciente

Cosciente

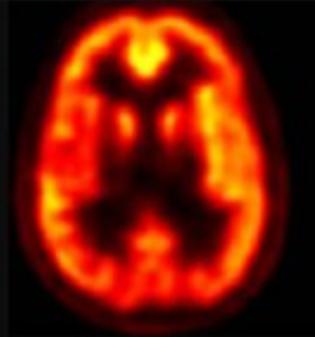


[The Minimal Energetic Requirement of Sustained Awareness after Brain Injury](#)
Johan Stender, Kristian Nygaard Mortensen, Aurore Thibaut, Sune Darkner,
Steven Laureys, Albert Gjedde, Ron Kupers
Current Biology, Vol. 26, Issue 11, p1494–1499

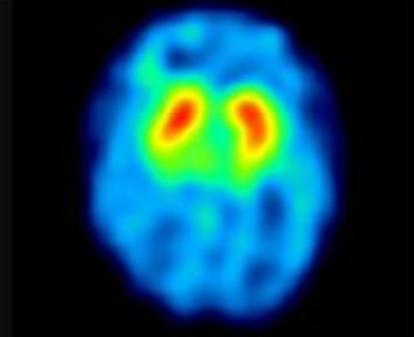
Cervelli colorati



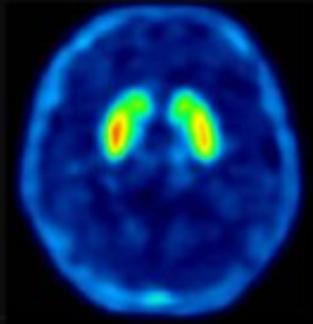
Dopamine Transporter
(123I FP-CIT)



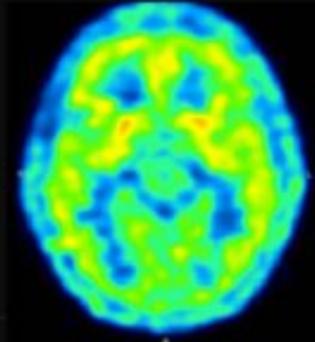
mGluR5 (18F-FPEB)



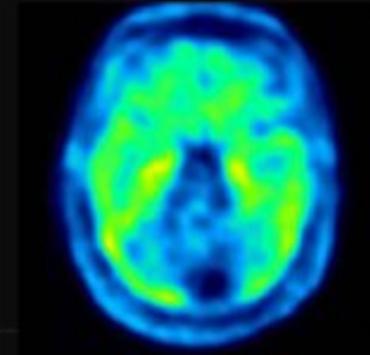
Adenosine 2a (123I-MNI
420)



PDE10 (18F-MNI 659)

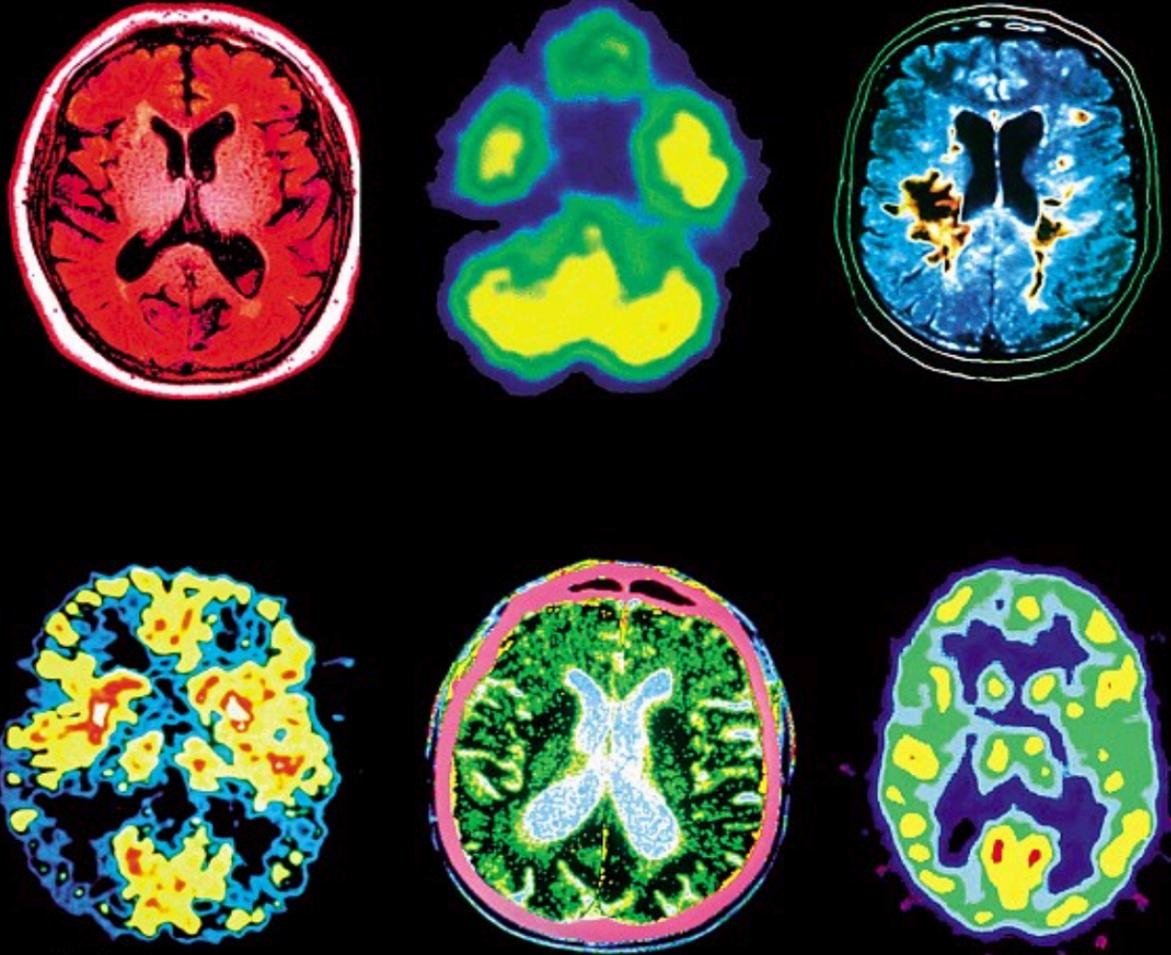


CB1 (18F-MK 9470)



5HT1a (18F-MPPF)

Cervelli colorati

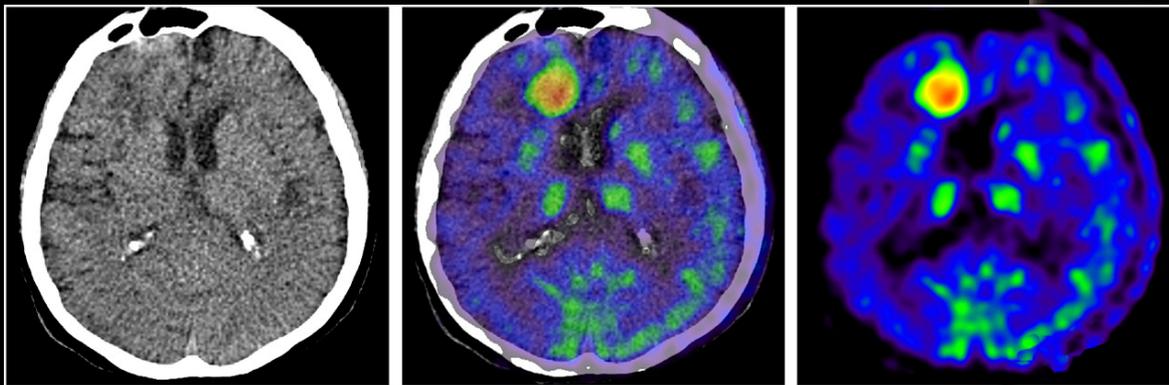
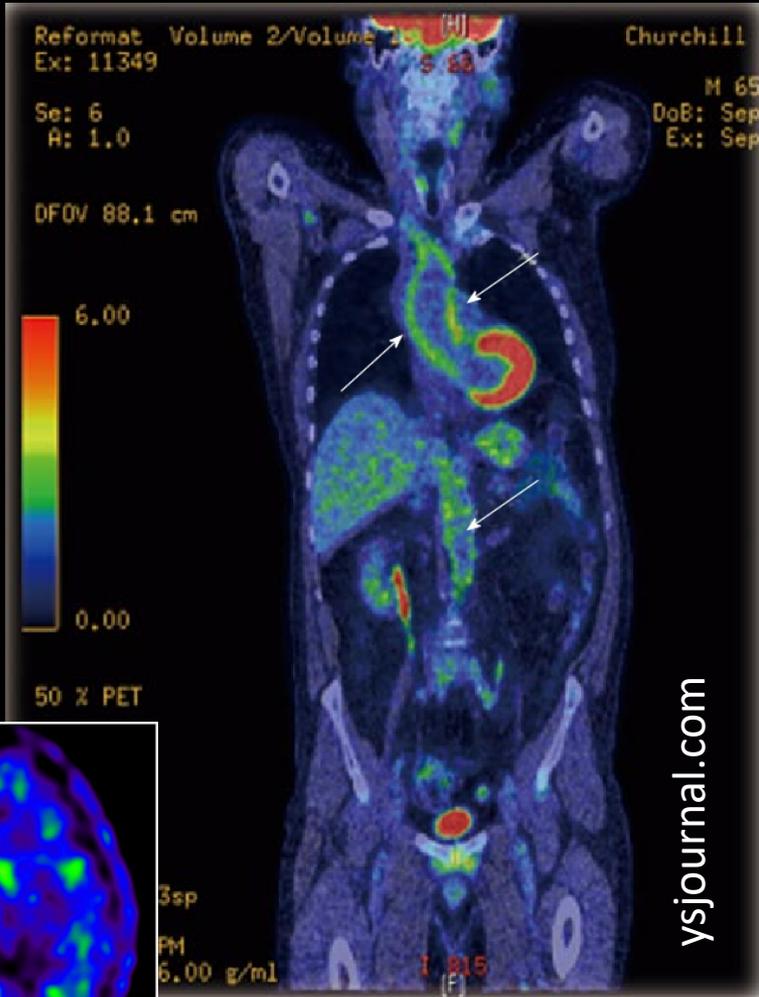


© Science Photo Library

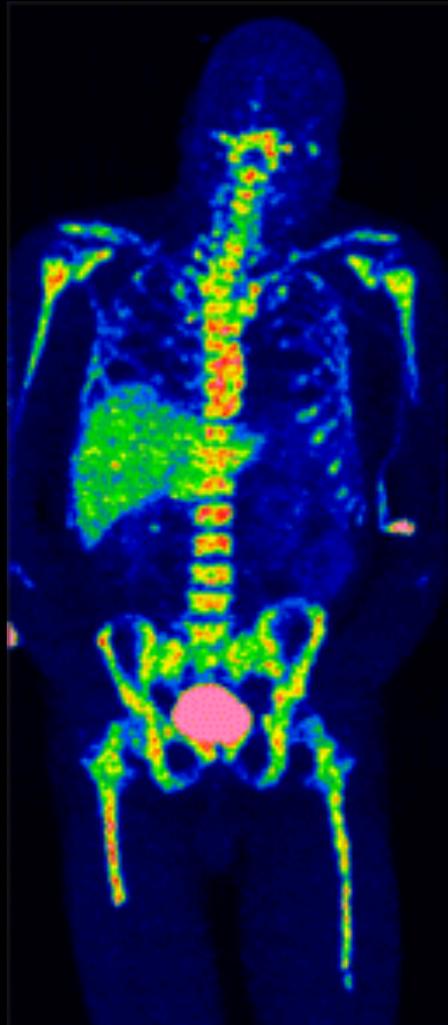
PET/CT – Hybrid Imaging



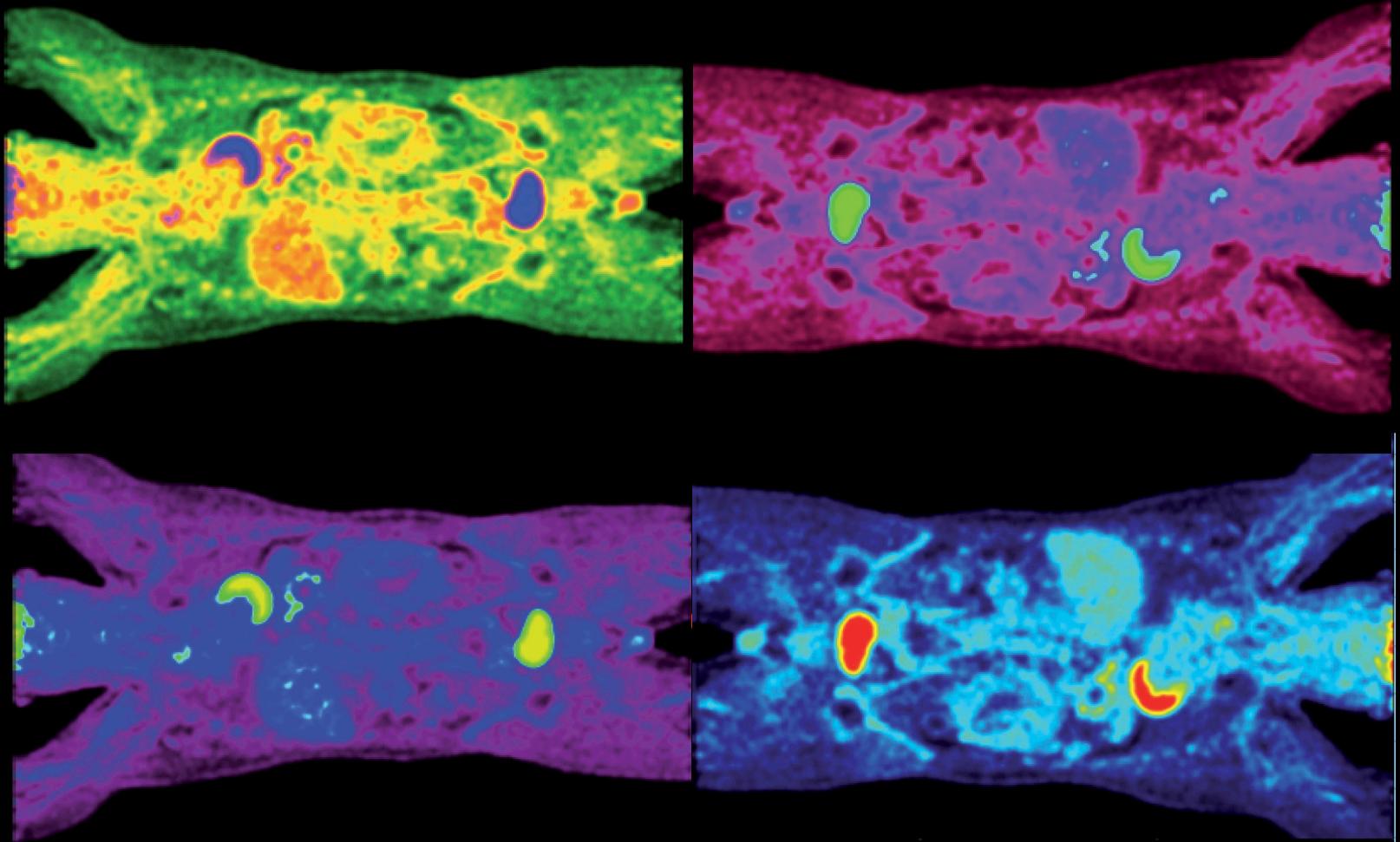
David
Townsend



Full-body PET

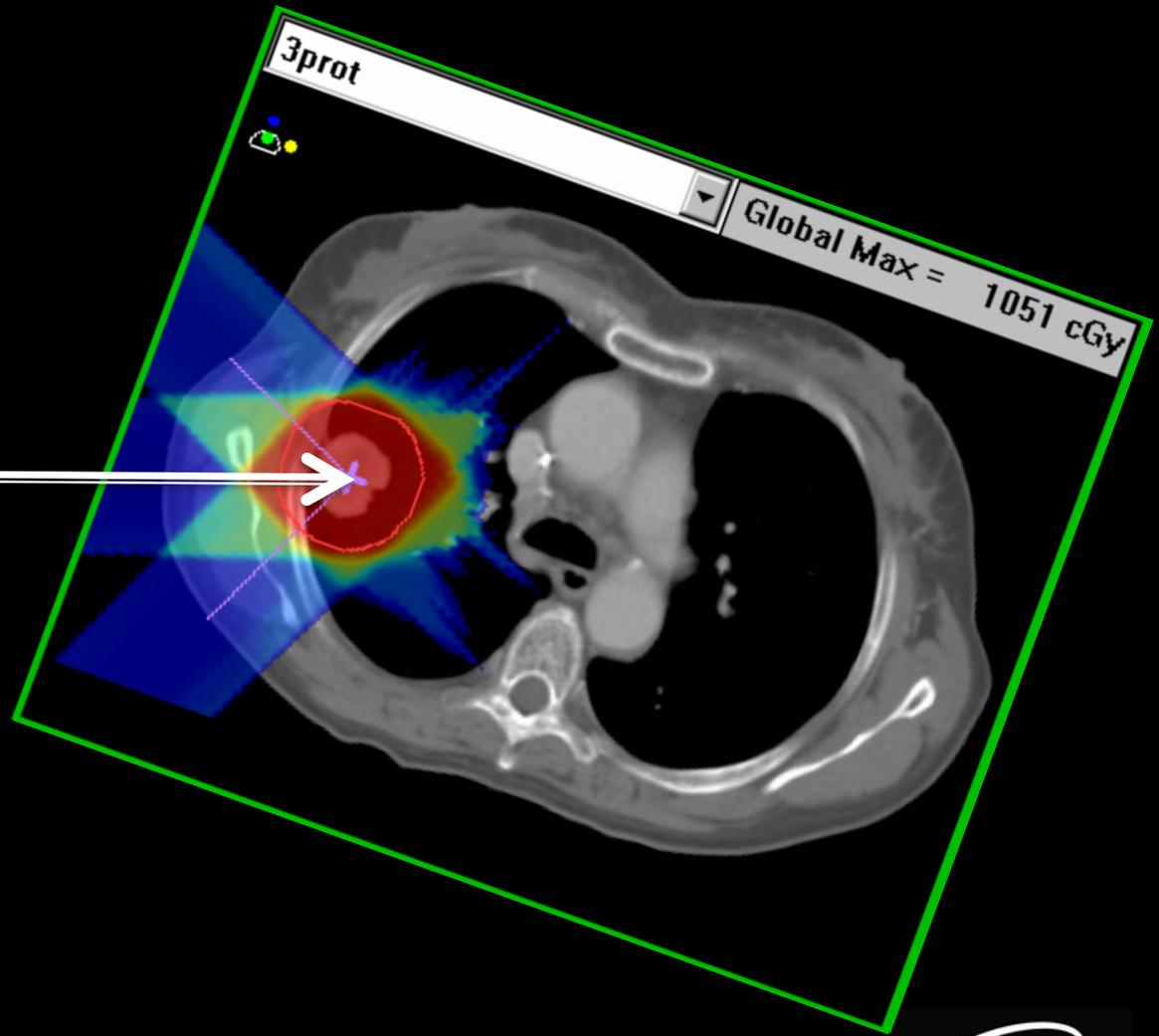


Full-body PET

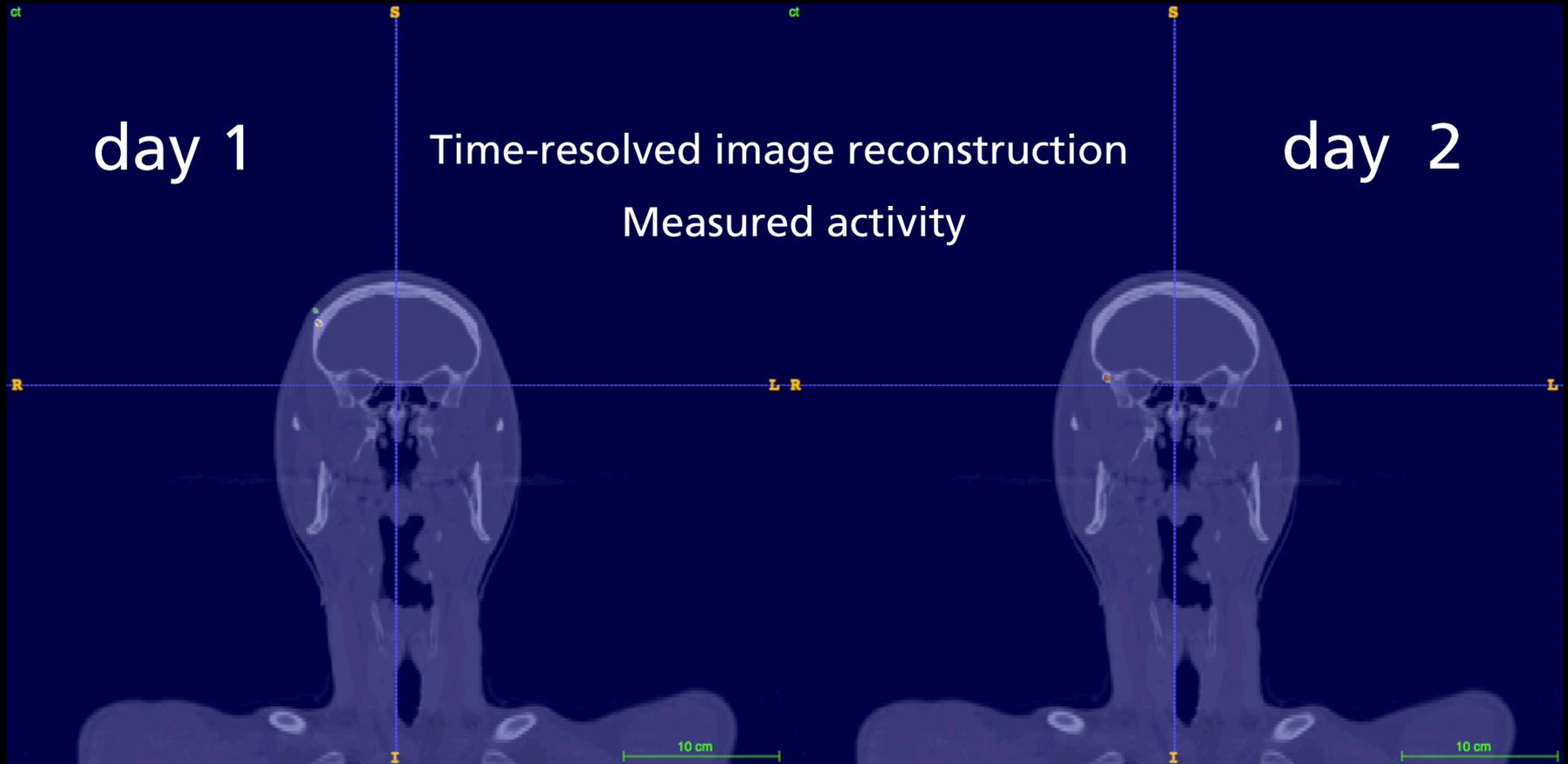


PET per l'adroterapia

fascio



Range Monitoring / INSIDE



InSide

V. Ferrero et al., "Online proton therapy monitoring: clinical test of a Silicon-photodetector-based in-beam PET"
Scientific Reports, (2018) 8:4100

INFN
TORINO

Art
& Science
ACROSS ITALY

Cosa abbiamo imparato?

