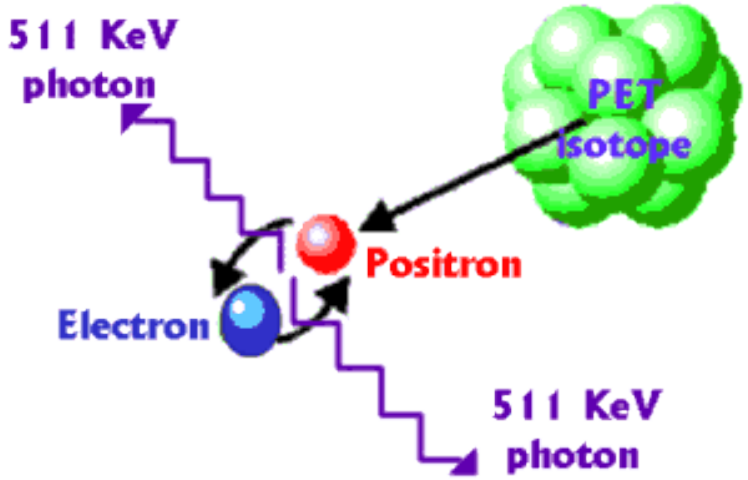
Positron Emission Tomography (PET)
Invented in 1953

https://www.youtube.com/watch?v=yrTy03O0gWw

PET (Positron Emission Tomography)

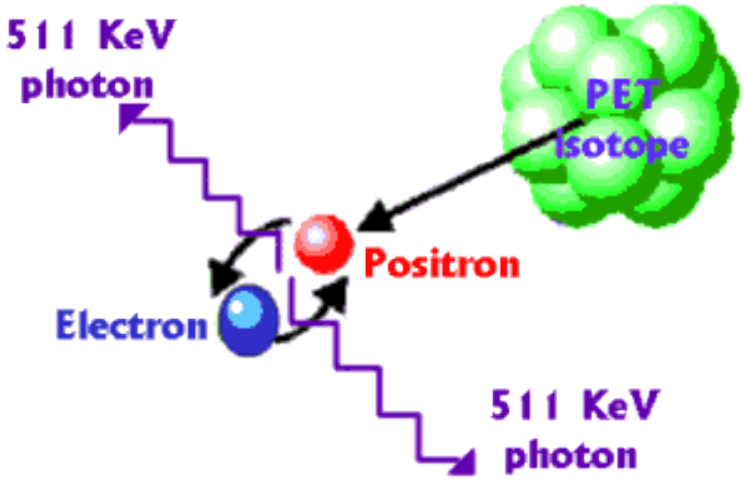
- Radioactive labeling of some compound that is familiar to the body (such as glucose or water).
- The radioactive material is administered to the subject.
- PET images the electromagnetic radiation induced by the decay of the PET radioisotopes.
  - The chosen radioactive material must have a short half-life (must decay quickly).



- PET radioisotopes emit a positron (a positively charged electron) in the process of decay. When this positron collides with an electron, the 2 particles annihilate each other, and produce 2 photons traveling in opposite directions. This induces electromagnetic radiation which is what can be detected externally and is used to measure both the quantity and the location of the positron emitter.

PET (Positron Emission Tomography)

- Dependent measure: regional Cerebral Blood Flow (rCBF).
- Spatial resolution about 4mm throughout the brain.
- Temporal resolution very bad (~30-40 sec).
  - **Randomization is impossible (trials cannot be distinguished from each other).**
  - **Blocked design is necessary.**



PET pros and cons

PRO

- Very good spatial resolution
- Better signal in anterior regions than in fMRI

CONs

- Basically no temporal resolution
- To some extent invasive.
  - **These days it's hard to get human subjects approval for PET studies, given that noninvasive alternatives exist: fMRI (based on MRI).**