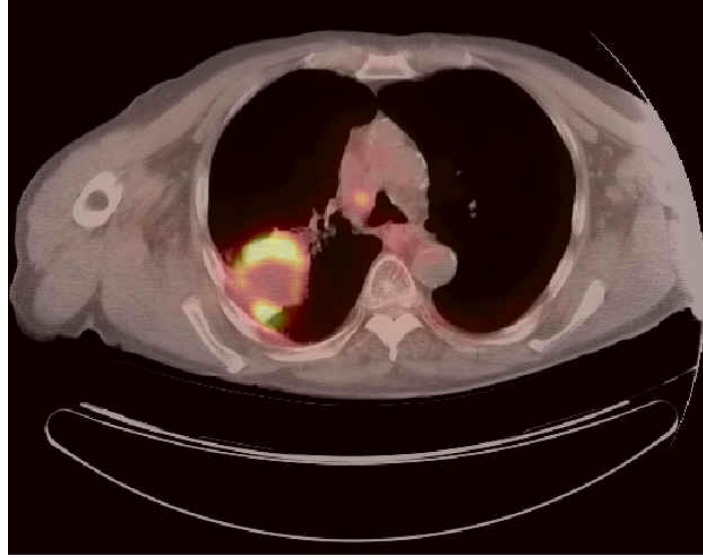
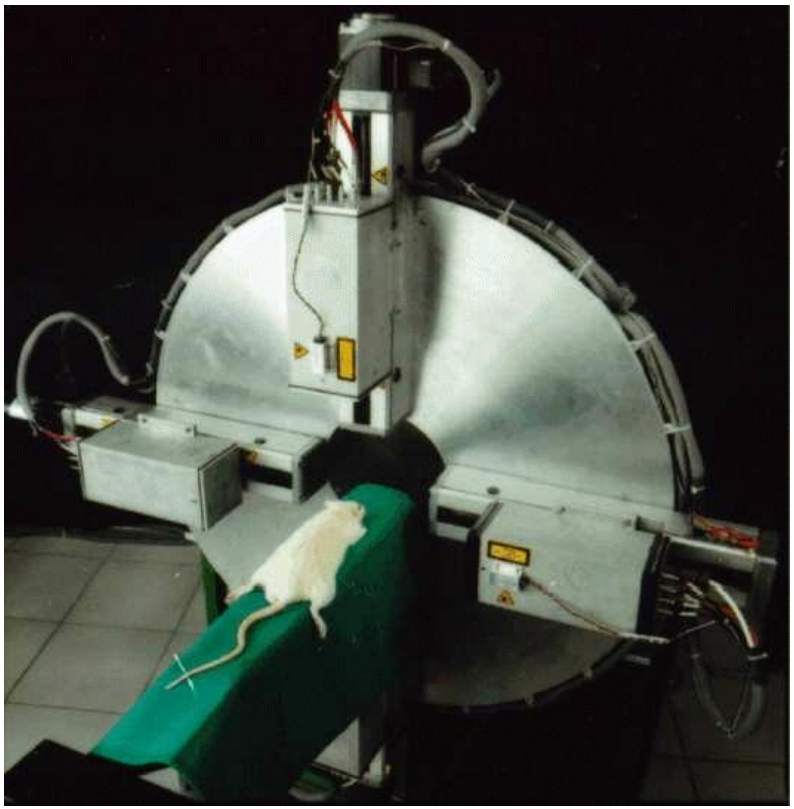
A PET SCANNER

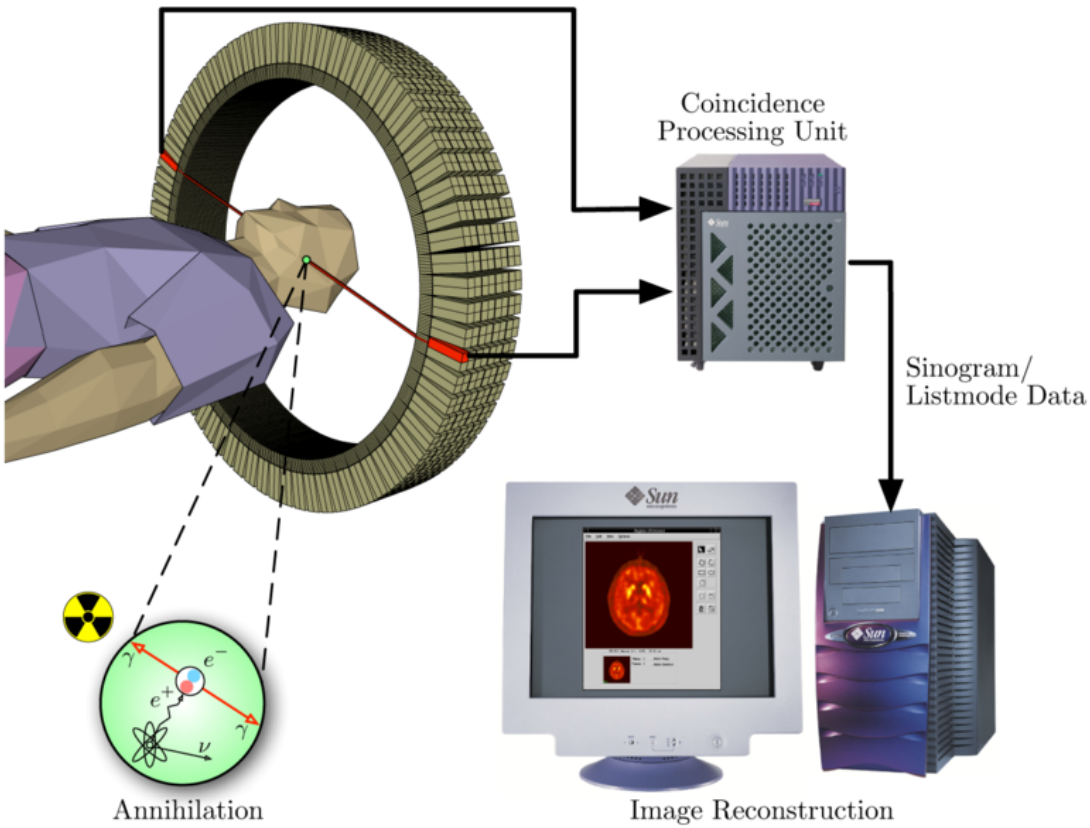




Positron Emission Tomography (PET) is one form of radio-pharmaceutical diagnosis.

It is a combination of great inventions of technology: computer tomography and scintillator technique developed. A positron emission camera comprises a plurality of scintillators, which are based on chrystals, especially LuAP. The PET is a powerful technique whose development owes much to CERN and Geneva Cantonal Hospital. PET allows disease-related changes in tissues and organs to be detected long before serious symptoms set in. The PET is especially useful in functional brain imaging.

Positron Emission Tomography



http://www.radiologyinfo.org/en/info.cfm?pg=pet&bhcp=1

The short-lived isotope decays, emitting a positron.

After travelling up to a few millimeters the positron annihilates with an electron, producing a pair of annihilation photons (similar to gamma rays) moving in opposite directions.

These are detected when they reach a scintillator material in the scanning device, creating a burst of light which is detected by photomultiplier tubes.

The technique depends on simultaneous or coincident detection of the pair of photons: photons which do not arrive in pairs (i.e., within a few nanoseconds) are ignored.

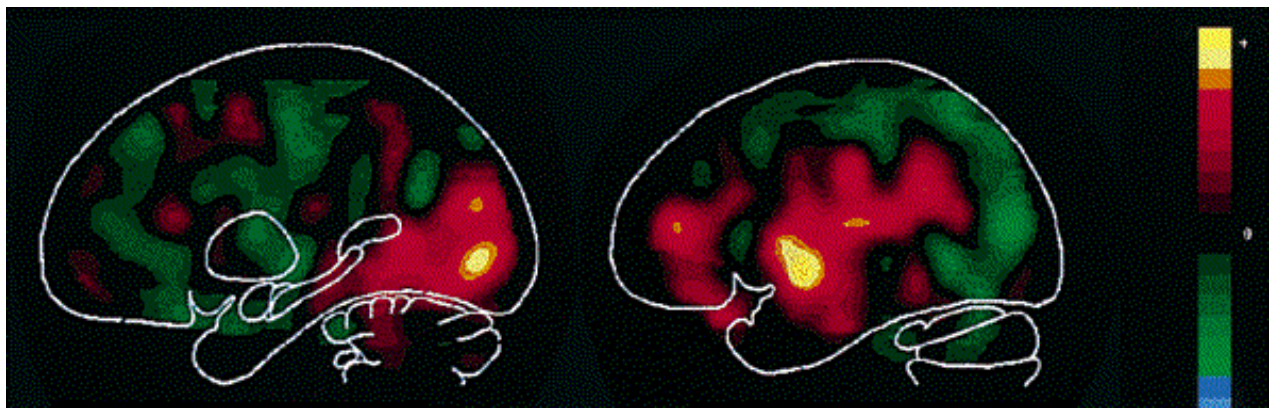
Positron Emission Tomography

Radioactive isotopes with positron decay→ annihilation of a still positron → formation of two photons (quantum gamma radiation) moving in the opposite direction → their position is specified by their detection

Inserting a radioactive isotope into a compound which is settling in the explored organ (exact diagnostics and medical science research):

1. Localize the position and size of carcinoma
2. The efficiency of irradiation using heavy ions (^{10}C, ^{11}C)
3. Determine the congested and not congested parts
4. Determine which part of the brain is working at the moment

PET camera v
GSI
Darmstadt



Brain read

Brain listen