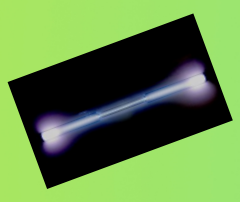
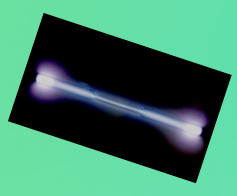


XENON-133



The "radioisotope" that saves lives...

WHAT IS IT?

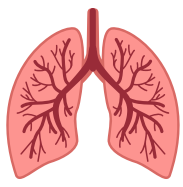
It's a **radioactive isotope** - of the noble and inert gas Xenon. It's known as a radio pharmaceutical in the medical world. It's used to treat diseases and complications in the body.

CUE THE Facts

Discovered: 1940
>- **Appearance**: Colourless
>- **Odor**: No distinctive odor
>- **Isotope Mass**: 132.9059107 u (unified atomic mass unit)
>- **No. of Neutrons**: 78.9059107 -> 79n
>- **No. of protons / Atomic Number:** 54p
>- **No. of electrons / Not ion therefore equal #. of electrons:** 54e
>- **Covalent Atomic Radius:** 140(9) (Covalent)
>- **Electronegativity**: 2.6 (Pauling Scale) | 2.582 (Allen Scale)
>- **Half-life**: 5.243 days
>- **Abundance %** = None -> reactor-produced
>
>- **Branching/Probability %**: 100%
>- **Yield:** 100%

What is Xenon-133 used for?

- Lung **perfusion TESTS**

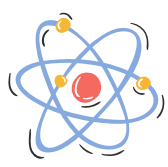


- SPECT Imaging

- **MEASURING** cerebral blood flow

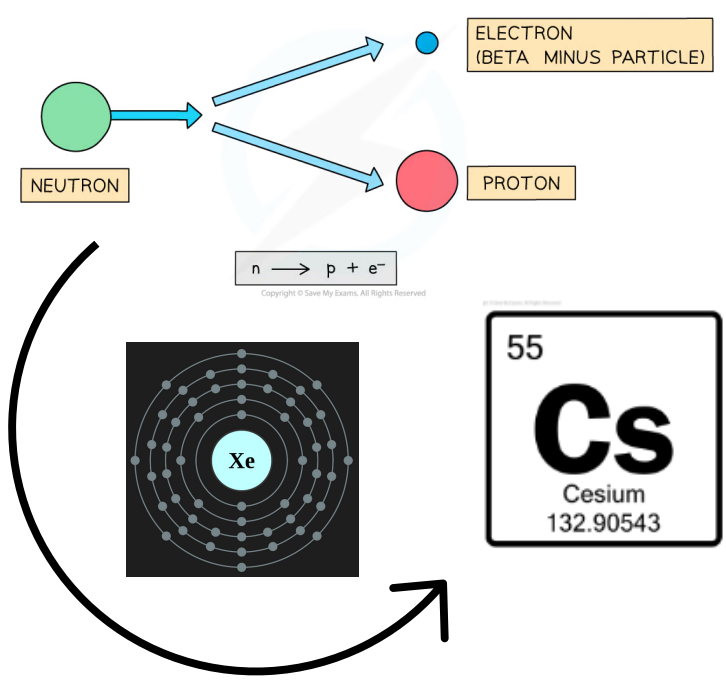
0%

- No **natural abundance**
- **REACTOR PRODUCED**
- **By-product of U-235 or Pu-239 fission reactions.**



SLIGHTLY RADIOACTIVE

- UNSTABLE AND SLIGHTLY RADIOACTIVE.
- DECAYS VIA BETA AND GAMMA EMISSIONS.
- HALF-LIFE OF 5.245 DAYS.
- DECAY ENERGY OF 0.427 MEV.
- RELEASES IONIZING PARTICLES FOR STABILITY.
- EMITS ENERGETIC GAMMA (Γ) RAYS.

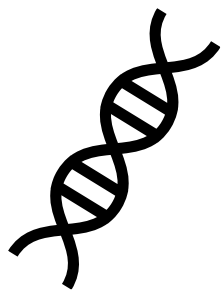


$$^{133}_{54}Xe \rightarrow {}^{0}_{-1}\beta + {}^{133}_{55}Cs$$

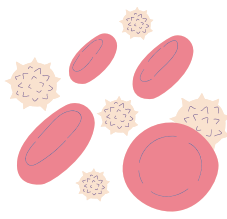
DECAY EQUATION

HOW DOES IT WORK?

FREELY MOVES THROUGH CELLS AND MEMBRANES. USED IN MEDICAL IMAGING TO INVESTIGATE ANOMALIES



AIDS IN CANCER DETECTION AND TREATMENT BY SPOTTING MASSES.



PROS

1. **NOT TOXIC**
2. **SHORT HALF LIFE**
3. **QUICK DISPERTION**

CONS

1. **GAMMA RADIATION (HIGH DOSES)**
2. **LOTS OF ENERGY TO PRODUCE**
3. **WASTE MANAGEMENT**

Caution!

- Not for Pregnant WOMEN!

LEWIS DIAGRAM

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