

"Radionuclides for medical use"

Description

This invention relates to production methods and usage of a radionuclide pair suitable for use in medicine.

Nowadays, the most widespread treatment of cellular disorders including cancer and infectious diseases is the TAT (Targeted Alpha Therapy). This therapy uses alpha radiation, emitted from radionuclides injected in the body, to deliver a high cytotoxic radiation dose to targeted cells while limiting the damage to surrounding healthy tissue. Existing radionuclide pairs used for TAT proved complicated to produce, especially in large quantities, since there is a high risk of instrumentation contamination and mother radionuclides are difficult to find or handle.

The most appropriate pair would be pure alpha-emitters with high cumulative energy providing a high cytotoxic dose to targeted cells as well as allowing imaging of the biodistribution of the nuclides in the body and a stable binding to biological carrier molecules. The proposed pair of U-230/Th-226 satisfies all of the above requirements. It is well suited for medical use, in particular for therapy and diagnosis as well as for prophylaxis and pain palliation. The pair can be furthermore used for bone and soft tissue treatment.

The invention furthermore proposes a number of processes for the production of U-230, which are advantageous in terms of productivity and allow the production of sufficient quantities at acceptable costs, thereby permitting large scale treatments. These methods of production are based on existing principles and use mother nuclides that have relatively long half-lives and are not very radioactive therefore facilitating their transport and handling.

Areas of application

- Medical Treatment of cancerous or calcified tumours, bones and soft tissues
- Medical Diagnosis of undetected cancer metastasis
- Radiopharmaceutical production

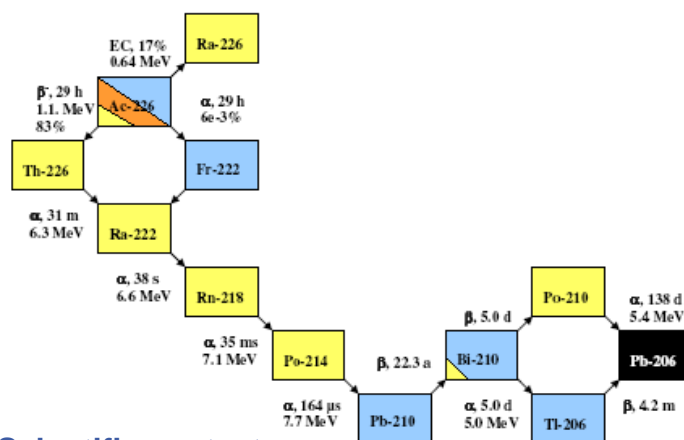
Stages of development

Patent Priority date: 25/06/2004

Patent pending: PCT/EP2005/052966

Innovative aspects and main advantages

- U-230/Th-226 pair is pure alpha-emitter and has high cumulative energy (higher toxic dose to targeted cells).
- Stable binding to biological carrier molecules.
- Low energy gamma rays emitted by Th-226 (no extensive shielding needed but imaging of the biodistribution of the nuclides in the body possible).
- U-230 is safely and economically produced and easier to handle in terms of packaging and shipping.
- Other useful nuclides induced from producing U-230.
- Th-226 derived from more than one radionuclide.



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Reference: file n°2717