

CLAIMS

1. A device for synthesizing a radioactive tracer from a radioisotope, the device comprising:

- a universal confined chamber comprising an internal connector plate and in which is provided an access door configured for insertion therein of a cassette for specific synthesis of the radioactive tracer and for its removal therefrom,
- the cassette for synthesis of the radioactive tracer, which comprises reagents and a synthesis module, the synthesis module comprising a reaction cell and being configured to receive the reagents and a radioisotope for synthesizing the radioactive tracer, the synthesis module being fluidically connected to an entry of the cassette that is configured for conveying the radioisotope into the reaction cell and an exit from the cassette configured for delivering the radioactive tracer out of the cassette,
- the internal connector plate, comprising at least one entry, configured to connect the entry of the cassette to an ingress of the radioisotope, and an exit, configured to be connected to the exit of the cassette and to extract the radioactive tracer from the chamber.

2. A device according to claim 1, further comprising a gas suction pipe, configured to pump out a gas contained in the chamber in an upper part of the device.

3. A device according to claim 2, wherein the gas suction pipe is fluidically connected to the internal connector plate of the device.

4. A device according to any one of claims 1 to 3, further comprising a clean gas injection pipe, configured to bring clean gas into the chamber in a lower part of the device, wherein the clean gas injection pipe is fluidically connected to the internal connector plate of the device.

5. A device according to any one of claims 1 to 4, wherein the cassette comprises a module for pre-treatment of the radioisotope.

6. A device according to any one of claims 1 to 5, further comprising a radioactive tracer purification module.

5 7. A device according to claim 6, wherein the radioactive tracer purification module comprises an HPLC column.

8. A device according to any one of claims 1 to 7, further comprising an external system for managing the quality of gas in the chamber.

10 9. A device according to claim 8, wherein the system for managing the quality of the gas in the chamber comprises a pump configured to create a pressure reduction in the chamber and a pressure sensor configured to measure the pressure reduction.

15 10. A device according to any one of claims 8 or 9, wherein the system for managing the quality of the gas in the chamber comprises a flow rate measuring device upstream of the chamber and a flow rate measuring device downstream of the chamber which are configured to measure both a flow rate of gas which passes through the chamber and a pressure in the chamber.

20 11. A device according to any one of claims 8 to 10, wherein the system for managing the quality of the gas in the chamber comprises a filter, for example of H14 type, upstream and possibly downstream of the chamber, configured to ensure Class A air purity.

25 12. A device according to any one of claims 8 to 11, wherein the system for managing the quality of the gas in the chamber comprises an independent measurement loop configured to perform a particular, possibly radiological, measurement of the air in the chamber and wherein the measurement loop comprises a particular counter configured to perform pumping out of the loop.

13. An installation for synthesis of at least one radioactive tracer comprising a synthesis device according to any one of claims 1 to 12 and a confined room comprising:

- an area for storage of at least two chambers of synthesis devices, which are empty and identical,
- at least one window for communication between an inside and an outside of the room configured for a practitioner to supply at least one cassette for synthesis of the radioactive tracer of the synthesis device,
- a manipulation robot configured at least to sample one of the chambers and the synthesis cassette, bring them onto a synthesis station and associate them to form the synthesis device according to any one of claims 1 to 12,
- the synthesis station, fixed in the room and configured to receive the synthesis device, comprising an external connector plate, that is configured to receive the internal plate of the chamber of the synthesis device, comprising at least one entry configured to convey a radioisotope into the synthesis cassette and an exit configured to connect thereto a syringe to fill with the radioactive tracer, and
- an ingress of radioisotope coming from a source situated outside the room and connected to the entry of the external connector plate.

14. An installation according to claim 13, wherein the room comprises an external module for quality control of the synthesized radioactive tracer.

15. An installation according to claim 14, wherein the quality control module is fluidically connected to the exit of the external connector plate of the synthesis station.

16. An installation according to any one of claims 13 to 15, further comprising a system for managing ambient air of the room.

17. A method for obtaining a radioactive tracer in an installation according to any one of claims 13 to 16 comprising the following steps:

- positioning a chamber of a synthesis device on a synthesis station of the installation by a manipulation robot;
- connecting an internal connector plate of the chamber of the synthesis device with an external connector plate of the synthesis station;
- inserting a cassette for specific synthesis of the radioactive tracer into the chamber of the synthesis device by the robot, the cassette being supplied in advance by a practitioner via a window of the installation, thus forming the synthesis device of the installation, the synthesis device being according to any one of claims 1 to 12;
- providing a radioisotope conveyed from a source positioned outside a room of the installation into a synthesis module of the cassette;
- synthesizing a radioactive tracer in the synthesis module of the cassette from the radioisotope and from reagents contained in the cassette ; and
- extracting the radioactive tracer from the synthesis device.

18. A method according to claim 17, further comprising sterilizing filtration and/or dilution/formulation of the radioactive tracer into a product injectable into humans.

19. A method according to any one of claims 17 or 18, further comprising:

- connecting a syringe to the exit of the external connector plate of the synthesis station, and
- placing the radioactive tracer from the device into a syringe.

20. A method according to any one of claims 17 to 19, further comprising quality control of the radioactive tracer at the exit from the external connector plate of the synthesis station by a quality control module situated outside the room.