System and Method for Using Glass Microspheres Containing a Positron-Emitting Isotope to Image Blood Flow and Distribute a Radiomedical Treatment Species

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Technology description

Novel method for imaging blood flow and the distribution of radiomedical treatments through the use of biologically stable microspheres.

Background

Positron emission tomography (PET) is a specialized radiology procedure used to examine various body tissues to identify certain conditions. PET may be used before, during, and after the treatment of certain conditions. It is commonly used in the fields of oncology, neurology, and cardiology. PET typically works by attaching radioactive tracers to chemical substances or molecules involved in a desired biological process.

One common approach to the treatment of patients with certain kinds of cancer, such as liver cancer, is to introduce radioactive particles into the patient's circulatory system, wherein the radioactive particles are targeted to the site of the cancer. However, whenever a microsphere comprises a core material having an external surface coating which contains the radioactive isotope, there is a risk that the radioactive coating may separate from the underlying microsphere core. Any mechanical breakage of the coating can release unwanted radioactivity to other parts of the human body which is highly undesirable. Further disadvantages are presented by the special handling and precautions that are necessary to coat a radioactive isotope onto a crystalline ceramic core, or to label ion exchange resin. There remains a need for a radiomedical cancer treatment that does not require any technicians to handle radioactive material, and that is useful in the treatment of cancer or tumor bearing tissue, which will not release a radioactive coating or isotope into remote parts of the body of the patient after administration.

Technology Description

A researcher at the University of New Mexico has developed a novel method for imaging blood flow and the distribution of radiomedical treatments through the use of biologically stable microspheres. The microspheres include a non-radioactive isotope can be transmuted via neutron irradiation into an

imaging isotope that emits positrons detectible by positron emission tomography. The microspheres may be formed from any convenient glass composition that is biologically compatible. Once microspheres formed from the glass are introduced into the patient's body and lodge at the target tumor site, no significant amount of a radioactive isotope is leeched from the microspheres into the patient's body or circulated to other parts of the patient's system. In tandem with initial uses of microspheres, therapeutic treatment microspheres may themselves be directly imaged and tracked in such a case to monitor treatment.

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Application area

Optimizes tumor treatment while minimizing collateral tissue damage
Uniform imaging of patient blood flow and treatment delivery
Microspheres are biologically stable and biologically compatible
Radiation may be tailored to deliver a radiation profile that is well suited for a particular imaging technique
Non-radioactive microspheres may be safely stored for an indefinite period and may be neutron irradiated at will to activate
Application in radiomedical treatment and mapping

Institution

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