An 18F PET/NIRF Smart Probe for Identifying, Grading, and Visualizing Astrocytic Gliomas

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Technology description

The purpose of the designed 18F PET/NIRF smart probe is to allow for multimodal imaging of intracranial astrocytic gliomas. In particular, the molecular imaging tool would afford i) noninvasive identification and grading of intracranial astrocytic gliomas as well as diagnostic monitoring for potential tumor growth and grade transformation, and ii) direct visualization of both diffuse and deeply-embedded tumor tissue (in addition to focal tissue) upon its application to fluorescence-guided surgery (FGS).
Researchers at Stanford have developed a dual modality, 18F positron emission tomography (PET)/ near-infrared fluorescence (NIRF) imaging probe to identify, grade and visualize astrocytic gliomas. Treatment for astrocytic gliomas, a common type of primary brain tumor, often includes surgery to remove the tumor. The more invasive the tumor, the more difficult it is to completely remove it as current imaging techniques have limitations that prevent accurate identification and visualization of diffuse and deeply embedded tumor tissue. To help overcome these limitations the inventors have developed a dual mode, 18F PET/NIRF probe to selectively identify, grade and visualize astrocytic gliomas. The probe uses a molecular logic gate design strategy and targets an established biomarker. The PET portion of the probe allows non-invasive identification, grading and monitoring of both diffuse and focal tumor growth, whereas the NIRF portion may be used in fluorescence guided surgery to allow direct visualization of the diffuse and deeply embedded tumor tissue. This probe may help facilitate complete surgical resection of astrocytic gliomas and thus improve patient outcomes.

Application area

Imaging astrocytic gliomas:
Non-invasive identification and grading Diagnostic monitoring of tumor growth, grade transformation and recurrence Direct visualization of diffuse and deeply embedded tumor tissue during fluorescence guided surgery

Advantages

May help facilitate compete surgical resection of astrocytic gliomas Multimode imaging provides enhanced structural and functional information for improved diagnosis and treatment efficacy evaluation Potential to improve patient outcomes

Institution

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