Docket #: S21-088

Fluorescent probe for high-contrast detection of diseased tissues

Researchers at Stanford have developed a probe, NIRDye812, which improves contrast between healthy and diseased tissues for fluorescence-guided cancer surgery applications. The surgeons' ability to distinguish and remove any residual diseased tissue significantly improves postoperative cancer prognosis in patients. NIRDye812 is topologically equivalent to IRDye800 that was recently approved for clinical trials, which may allow fast track or breakthrough designation by the FDA. NIRDye812 offers a 2-fold enhancement in tumor-to-background fluorescence ratios over IRDye800 because its spectral properties are more optimally aligned with the fixed settings of standard clinical surgical devices. Furthermore, NIRDye812 results in 60% increased signal over IRDye800 for deep-seated tumor removal applications. The inventors additionally show comparable biodistribution between NIRDye 812 and IRDye 800 in liver, kidney, spleen, skin, tumor, and muscle tissues in ex vivo studies, but note a 10-fold increase in relative intensity in the spleen.

Stage of Development
The inventors demonstrate a proof-of-concept in pre-clinical in vivo mouse tumor models, where NIRDye 812 resulted in a 2-fold increase fluorescence intensity of tumor to background ratios compared to IRDye 800.

Applications

- Cancer surgery
- Immunoimaging
- Fluorescence imaging
- Fluorescence guided surgery
- Laboratory reagent

Advantages

- Fluorescent-guided detection of diseased tissues improve visual contrast between diseased and background healthy tissues than compared to non-optical imaging methods such as CT, MRI, and PET
    - Complete removal of diseased tissue bordering excision site improves postoperative cancer prognosis
- NIRDye 812 is a topological equivalent to an FDA-approved IRDye 800, which may allow for fast track or breakthrough designation of the proposed invention
- 2-fold enhancement in fluorescent tumor-to-background ratios compared to current FDA-approved technologies
- Up to 60% higher photoacoustic signal than IRDye 800, which is useful for surgical removal of deep-seated diseased tissues

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