

measurements. Due to the small target size, we believe the sensor may be appropriately suited for monitoring regional physiological parameters, such as hemodynamic changes, in which sensor positioning is not as critical. The sensor could also be affixed to hard structures, such as the skull for neurological studies. Relevant applications of this approach include monitoring of the progression and treatment of chronic diseases such as Alzheimer's, Parkinson's, or neurovascular diseases (stroke) for which molecular probes exist. Furthermore, the sensor components are scalable to allow optical sensing of different fluorophores (multiplexing) or multimodality sensing (measuring endogenous components, for example).

In conclusion, we have developed a fully-implantable, laser-based fluorescence sensor complete with optical and electrical read-out elements. This constitutes the first known laser-based implanted fluorescence detector. We have verified that the device operates while implanted in a live animal, and is sensitive enough to detect fluorophore at pre-clinically-relevant concentrations. Although this is an initial demonstration, we believe this technology platform has potential for the long term monitoring of disease progression and treatment.

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