Optical sensors and lab-on-fiber technology may detect Alzheimer's disease at early stages

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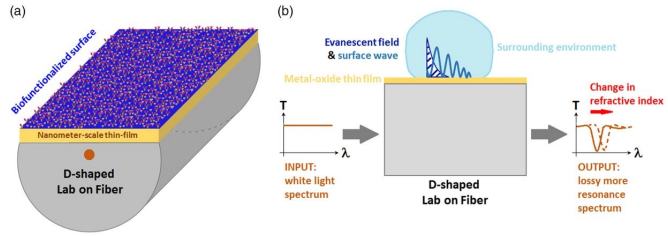

a) 3D view of the nanofunctionalized D-shaped lab-on-fiber sensor. b) Related sensing mechanism based on the evaluation of refractive index changes, through evanescent wave interaction, that occur in the fiber surface and are determined by the spectral shift of the LMR, which is generated by a metal-oxide thin film. Credit: *Advanced Photonics Research* (2022). DOI: 10.1002/adpr.202200044

Currently, the only accurate diagnosis of Alzheimer's disease is through postmortem analyses after a patient dies, but investigators have now developed a highly sensitive method for quantifying levels of tau protein—a hallmark of the condition—in cerebrospinal fluid surrounding the brain and spinal cord.

The method, which relies on optical sensors and what's called "lab-on-fiber" technology, is described in a study published in *Advanced Photonics Research* and it can detect even slightly elevated levels of tau protein that may occur in the very early stages of Alzheimer's disease.

"Lab-on-fiber technology has been advancing in recent years, and its combination with nanometer-scale functional materials can be applied to small-volume samples for highly sensitive detection of molecules at low levels, thereby having potential for early screening and personalized medicine," said lead author Francesco Chiavaioli, Ph.D., MEng, of the National Research Council of Italy.

More information: Francesco Chiavaioli et al, Ultrahigh Sensitive Detection of Tau Protein as Alzheimer's Biomarker via Microfluidics and Nanofunctionalized Optical Fiber Sensors, *Advanced Photonics Research* (2022). DOI: 10.1002/adpr.202200044

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