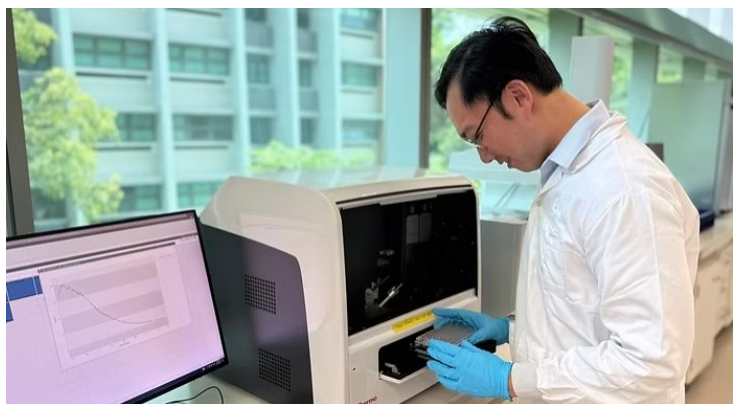


Singapore develops new fluorescent nanosensor for gut health biomarker detection

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Focus would be to translate the sensor into a point-of-care clinical diagnostic tool



Researchers from the National Institute of Education, Nanyang Technological University, Singapore (NIE NTU, Singapore) and Singapore-MIT Alliance for Research and Technology (SMART) - Massachusetts Institute of Technology's (MIT) research enterprise in Singapore - in collaboration with clinicians from the National University Hospital (NUH) and Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine), have developed a novel fluorescent nanosensor capable of rapidly detecting indole-3-propionic acid (IPA), an emerging biomarker linked to gut health and disease.

IPA is a metabolite produced by gut bacteria during the breakdown of dietary tryptophan, an amino acid essential for protein synthesis. It plays an important role in regulating inflammation and oxidative stress, and has been associated with conditions such as inflammatory bowel disease (IBD), type 2 diabetes, and liver disease.

However, current detection methods rely on traditional mass spectrometry-based analytical techniques, which are costly and time-consuming, making it impractical for routine screening or point-of-care use.

The newly developed platform, the first reported optical nanosensor specifically designed to detect IPA, addresses a long-standing gap in gut metabolite sensing. Using a fluorescence-based approach, the sensor produces a rapid optical readout within minutes, offering a significantly faster and more accessible alternative to conventional analytical techniques.

For pharmaceutical and therapeutic research, the nanosensor could be used to conduct rapid functional tests to determine the efficacy of new therapeutics or probiotics.

Looking ahead, the research team has been awarded an Innovation to Startup (I2Start) Innovation Grant to incubate a Singapore proto-startup to advance validation and development.