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Point-of-care tests with high sensitivity/accuracy using bioengineered enrichment tools and smartphone-based AI analysis

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Lecture : Point-of-care testing (POCT) is a medical diagnostic approach that provides rapid results to healthcare providers and patients. Current research trends in POCT include personalized medicine, diagnosis of infectious diseases, chronic disease management, and remote patient monitoring.
In this talk, I'll show two new approaches to highly sensitive POCT with sample preparation and AI techniques. First, we show bioengineered enrichment tools for lateral flow assays (LFAs) with enhanced sensitivity and specificity (BEETLES2). Combining sample enrichment of BEETLES 2 with commercial LFA provides breakthroughs in POCT detection since it meets all the requirements stated by WHO for POCT, i.e., ease of use, low cost, and accuracy. Second, we'll present deep learning-assisted smartphone-based LFA (SMARTAI-LFA) diagnostics to provide accurate decisions with higher sensitivity. Combining clinical data learning and two-step algorithms enables a cradle-free on-site assay with higher accuracy than the untrained individuals and human experts via blind tests of clinical data (n=1,500). I'll also discuss the possible POCT techniques for HBP Surgery.