Docket #: S23-420

Electrochemical Sensor Enables Long-term Analyte Detection In Complex Biological Samples

Stanford researchers have designed a electrochemical sensor system for continuous analyte measurement and tracking in complex biological samples (i.e. blood and serum) with a wide range of clinical and non clinical applications.

Blood tests are a routine component of clinical care and health monitoring, but the vast majority of blood tests are designed to provide only instantaneous measurements for a specific time point. Further, electrochemical sensor platforms previously utilized to characterize changes in analyte concentration are not suitable for extended use in complex environments such as the bloodstream. This failure to achieve longer-term continuous sensing/detection can be attributed to a system's inability to maintain sensing functionality when exposed to complex biological matrices.

To address this gap, Stanford researchers developed an electrochemical sensor system for blood *in situ* tracking which features excellent sensitivity and stability for detecting analytes, such as the antibiotic kanamycin, in tissue environments and complex biological fluids including blood and serum. This technology has relevance in the compact or wearable sensor space as it could be further developed to enable continuous measurement of circulating analytes. The improved sensor may greatly extend the utility of blood-based monitoring by tracking disease states, drug dosing, or metabolic and physiological activity.

Stage of research

In vivo data

Applications

- Blood-based monitoring (i. e. continuous sensing/detection directly from blood)
- Tracking disease states, drug dosing, or metabolic and physiological activity
- Real-time biomarker concentration in complex biological matrices
- Research tool for pharmacokinetics, metabolism, and proteomics

Advantages

- Sensitive, rapid, and highly specific response to changes in analyte concentration (i.e. kanamycin)
- Month-long biochemical sensing/detection in complex biological matrices
- >75% baseline stability for kanamycin detection after four days—longer than several published *in vivo* sensors that featured less than half a day of detection

Patents

- Published Application: WO2025129046

Innovators

- H. Tom Soh
- Yihang Chen
- Kaiyu Fu

Licensing Contact

Eileen Lee

Email