Chip-Based Detection Of Diabetes Related Biomarkers

Tech ID: 30370 / UC Case 2019-197-0

BACKGROUND

A major goal in disease screening, diagnosis, and control has been to develop bioassay platforms capable of simultaneous measurements of different analytes in a single assay. Significant advances toward multiplexed biomarker detection chips based on either immunoassays or enzymatic bioassays have thus been reported. However, the combination of enzymatic and immunoassay sensing into a single disposable system has hitherto not been addressed.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a disposable electrochemical chip platform for on-the-spot monitoring of multiple diabetes-relevant biomarkers found in human blood, saliva and interstitial fluid. In an exemplary embodiment, a dual-marker biosensor integrates enzyme and antibody-based assays for simultaneous electrochemical measurements of insulin (I) and glucose (G). Simultaneous G/I sensing was realized by addressing key fabrication and operational challenges associated with the different assay requirements and surface chemistry. The I immunosensor relies on a peroxidase-labeled sandwich immunoassay, while G is monitored through reaction with glucose oxidase. The dual diabetes biomarker chip offers selective and reproducible detection of picomolar I and millimolar G concentrations in a single microliter sample droplet within less than 30 min, including direct measurements in whole blood and saliva samples.

APPLICATIONS

Personalized, point-of-care multiplexed biomarker detection

ADVANTAGES

Inexpensive, wearable integrated enzymatic-immunoassay biosensor

STATE OF DEVELOPMENT

Working prototype

INTELLECTUAL PROPERTY INFO

Provisional patent application

RELATED MATERIALS

▶ Eva Vargas, Hazhir Teymourian, Farshad Tehrani, Ece Eksin Esther Sánchez-Tirado, Paul Warren, Arzum Erdem, Eyal Dassau, Joseph Wang. “Enzymatic/Immunoassay Dual-Biomarker Sensing Chip: Towards Decentralized Insulin/Glucose Detection“. Angew. Chem. Int. Ed. 58 (2019) 6376-6379 https://doi.org/10.1002/anie.201902664 - 03/13/2019

PATENT STATUS

Patent Pending

CONTACT

University of California, San Diego
Office of Innovation and Commercialization
innovation@ucsd.edu
tel: 858.534.5815.

INTRODUCING
UC TechAlerts
New technology matches delivered to your email at your preferred schedule
SEARCH ▸ SAVE SEARCH
Learn More

OTHER INFORMATION

KEYWORDS

Biosensors, diabetes monitoring, dual-marker detection, electrochemistry, immunoassays

CATEGORIZED AS

- ▶ **Medical**
  - ▶ Devices
  - ▶ Diagnostics
- ▶ **Sensors & Instrumentation**
  - ▶ Biosensors
  - ▶ Medical

RELATED CASES

2019-197-0

© 2019, The Regents of the University of California
Terms of use
Privacy Notice