Direct Electron Transfer Glutamate Biosensor using Platinum Nanoparticle and Carbon Nanotubes

A highly sensitive and selective glutamate biosensor provides improved diagnostic tools for understanding and monitoring neurological injuries.

Glutamate excitotoxicity (GE) is a dynamic process by which neurons are damaged due to excessive amount of glutamate in the cell. It is hypothesized by scientists that glutamate excitotoxicity is a secondary injury that can occur after spinal cord injury (SCI). The limited knowledge of the role of glutamate in secondary injury has limited the development of therapeutics for GE. In 2016, the National Spinal Cord Injury Statistical Center reported 300,000 people currently live with spinal cord injury (SCI) in the United States. SCI is a debilitating illness that often leaves patients with limited mobility. The lifetime healthcare cost per patient can range from $1,200,000 to $5,000,000 per patient. Current bioanalytical techniques such as nuclear resonance imaging have low spatiotemporal resolution and poor sensitivity for determining glutamate levels. Since glutamate excitotoxicity is dynamic in nature and can progress over time, it is crucial that the glutamate diagnostic tools possess high spatiotemporal resolution and sensitivity of glutamate.

Researchers at Purdue University have developed a biosensor with superior sensitivity for measuring glutamate levels in hopes to better understand GE. In in vitro studies, it was found that the newly developed biosensor exhibited 6 times higher glutamate sensitivity in comparison to glutamate biosensors fabricated in other labs. The biosensor had high selectivity for glutamate with a detection limit 14 ÂµM.

Advantages:

- Superior sensitivity for glutamate

- High selectivity for glutamate

- Simplify process of measuring glutamate

Technology ID
2018-LEE-68334

Category
Biotechnology & Life Sciences/Biomarker Discovery & Diagnostics

Authors
Hyowon Lee
Tran Nguyen

Further information
Patrick Finnerty
pwfinnerty@prf.org

View online

Potential Applications:

- Glutamate biosensor

TRL: 3

Intellectual Property:

Provisional-Patent, 2018-07-06, United States | Provisional-Patent, 2019-07-07, United States | PCT-Patent, 2020-07-06, WO | NATL-Patent, 2022-01-06, United States

Keywords: Glutamate excitotoxicity, spinal cord injury, SCI, biosensor, glutamate, high sensitivity, high selectivity, diagnostic tools, secondary injury, bioanalytical techniques

Explore other available products test at [The Office of Technology Commercialization Online Licensing Store](#)