



Journal Menu

- Abstracting and Indexing
- Aims and Scope
- Article Processing Charges
- Articles in Press
- Author Guidelines
- Bibliographic Information
- Contact Information
- Editorial Board
- Editorial Workflow
- Reviewers Acknowledgment
- Subscription Information

- Open Special Issues
- Published Special Issues
- Special Issue Guidelines

Call for Proposals for
Special Issues

Journal of Sensors
Volume 2008 (2008), Article ID 346016, 11 pages
doi:10.1155/2008/346016

Research Article

Near-Infrared Resonance Energy Transfer Glucose Biosensors in Hybrid Microcapsule Carriers

Swetha Chinnayelka,¹ Huiguang Zhu,¹ and Mike McShane^{1,2,3}

¹Institute for Micromanufacturing, Louisiana Tech University, Ruston, LA 71272, USA

²Biomedical Engineering Program, Louisiana Tech University, Ruston, LA 71272, USA

³Department of Biomedical Engineering, Texas A&M University, 337 Zachry Engineering Center, College Station, TX 77843-3120, USA

Received 10 June 2008; Accepted 20 July 2008

Academic Editor: Igor Medintz

Abstract

Fluorescence-based sensing systems offer potential for noninvasive monitoring with implantable devices, but require carrier technologies that provide suitable immobilization, accessibility, and biocompatibility. Recent developments towards this goal include a competitive binding assay for glucose that has been encapsulated in semipermeable microcapsule carriers. This paper describes an extension of this work to increase the applicability to in vivo monitoring, wherein two significant developments are described: (1) a near-infrared resonance energy transfer system for transducing glucose concentration, and (2) novel hybrid organic-inorganic crosslinked microcapsules as carriers. The quenching-based assay is a competitive binding (CB) system based on apoglucose oxidase (AG) as the receptor and dextran as the competitive ligand. The encapsulated quencher-labeled dextran and near infrared donor-labeled glucose receptor showed a stable and reversible response with tunable sensitivity of 1–5%/mM over the physiological range, making these transducers attractive for continuous monitoring for biomedical applications.

- Abstract
- Full-Text PDF
- Full-Text HTML
- Linked References
- How to Cite this Article