



Technology Commercialization Opportunity

Host Supported Genetic Biosensors

Inventor(s):

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Technology Description:

Determining physiological levels of molecules or analytes (e.g., glucose, vitamins, biomarkers, signaling molecules, therapeutic drugs, hormones) normally entails withdrawing a blood sample from a patient, and then analyzing the sample *in vitro*. This approach has limitations that may include high cost, time delay in obtaining results, patient discomfort and inconvenience associated with periodic blood draws, and testing prerequisites such as fasting. The present invention overcomes these limitations and allows for continuous, non-invasive analyte measurement via host supported genetic biosensors. This method involves providing an expression vector that encodes a biosensor molecule, the biosensor molecule comprising an analyte binding domain and a signal domain. The expression vector is introduced locally into *in vivo* cells of a subject under conditions effective to express the biosensor molecule in the cells. The biosensor molecule produces a signal from the signal domain upon binding of the analyte by the analyte binding domain. The signal is then detectable by a non-invasive means such as an optical method, thereby monitoring the analyte in the subject *in vivo*.

While the past several decades have witnessed considerable focus on development of both implantable and external devices for continuous analyte (e.g., glucose) monitoring, sensor lifetimes continue to be an issue. The genetically expressed biosensors described in the present invention offer a new approach to continuous detection of physiological molecules and analytes at localized locations in a subject. This will lead to efficient detection, prevention, and better management of a variety of biological disorders by providing continuous physiological feedback via a non-invasive detection means.

Keywords: Biosensor, expression vector, analyte, non-invasive, glucose

Technology Readiness:

Host supported genetic biosensors is currently in the prototype stage, with some preliminary *in vivo* data work targeting glucose detection in a mice.

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| Idea | Concept | Prototype | Alpha Version | Beta Version | Released |
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Intellectual Property (IP):

This technology is the subject of a pending U.S. patent application 20120076736.

Applications:

The technology can be used for continuous detection of any analyte for which a genetically expressed biosensor probe is created. Examples include continuous glucose detection, biomarkers for disease

states (cardiac, cancer, etc), pharmaceutical dosage monitoring, and drug addict recovery monitoring. Detection can be accomplished via an external system or an implanted system.

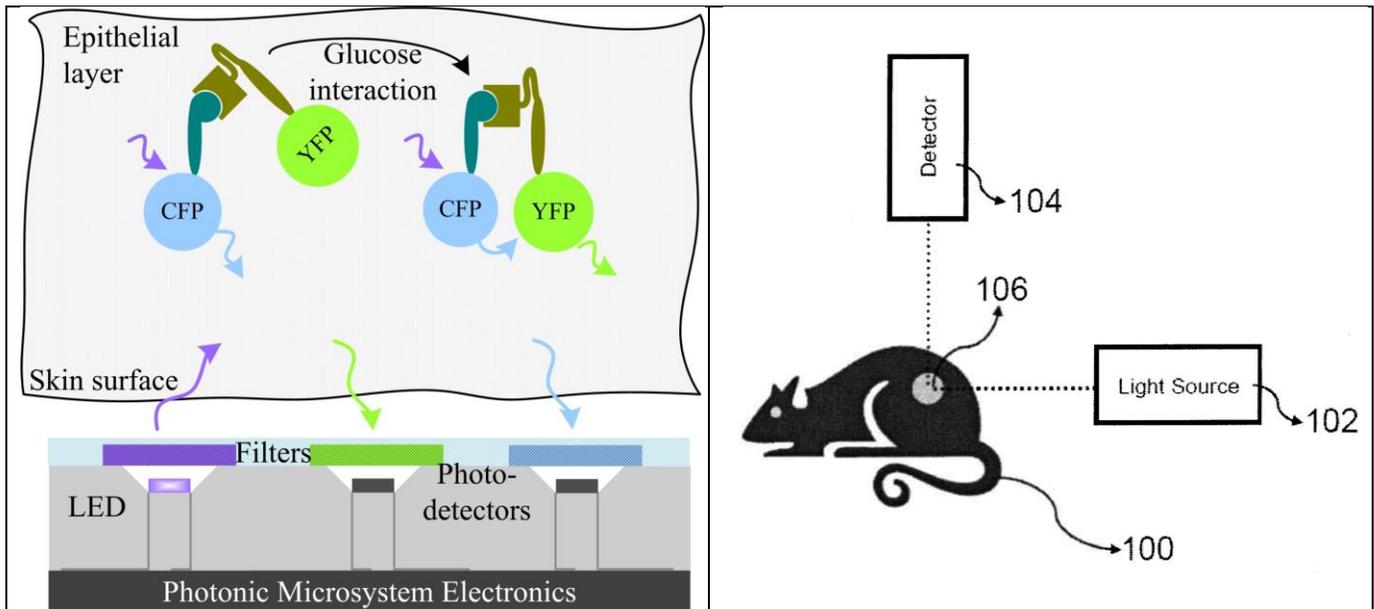


Figure 1.

LEFT: Concept description with a FRET construct serving as the biosensor for detection of glucose and a microsystem implementation for optical interrogation. Spectral shift associated with glucose binding.

RIGHT: Exemplary prototype stage *in vivo* work aiming to detect glucose in the epithelial layer of mice with a FRET construct and a fluorescence microscope.

Note: CFT-Cyan Fluorescent Protein; YFP-Yellow Fluorescent Protein; FRET-Fluorescence Resonance Energy Transfer

Target Customers:

- Biotechnology companies
- Academic institutions

Opportunity:

RIT's Intellectual Property Management Office (IPMO) is interested in working with those parties who are qualified and interested in the commercialization of this Host Supported Genetic Biosensors IP. Arrangement types include licensing the application to existing organizations or new organizations that have expertise in the field or related fields. The inventor of the technology is available to work with licensees.

Contact:

Those interested in learning more about this opportunity should contact:

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