

Omnisensing nanobiosensor

University of Southern Denmark
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Technical Field

Biotechnology - Health and medico-technical

Business Opportunity

Licensing
Collaboration

Current State of technology

At the present time, a nanobiosensor for one small chemical compound (adenosine triphosphate, ATP) has been developed as a proof-of-concept, and the development of nanobiosensors for other small chemical compounds is ongoing.

Applications

The nanobiosensor can be used in many contexts. Either in its original form in bioassays to analyze for chemical compounds in laboratories or in a modified form to be inserted into small portable instruments to measure specific compounds, e.g. sugar, amino acids, drugs, etc.

Product Advantages

The nanobiosensor can be utilised in cell's *in vivo* without affecting the cell's inner environment. Moreover, the nanobiosensor has a short response time of only a few seconds.

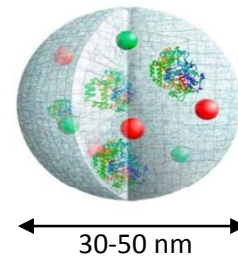


Illustration of the nanobiosensor. A polymeric network forms a spherical nanoparticle in which one or more sensing components (red and green circles) are embedded.

The Technology

The invention is a generic nanobiosensor, which can be tailored in the laboratory to measure virtually any small chemical molecule with a molecular weight less than 1000 g/mol and with high affinity and specificity. The sensor consists of a nanoparticle, 30-50 nm in diameter, made of polymer and a sensing component. The sensing component is encapsulated in the nanoparticle when the latter is synthesized. When the target of the sensor diffuses into the particle, which is porous, it binds to the sensing component. The binding is associated with a change in conformation, which is relayed to a change in signal from the sensing component. The signal is usually fluorescence, but other forms of signals can be built into the sensor.

Intellectual Property Rights

IPR's are owned by the University of Southern Denmark. Patent application filed July 2009



The inventors

The CelCom Research Group has currently the following members: One Associate Professor one postdoc and two PhD. Students and one laboratory technician. One more postdoc and PhD student will join the group in 2010. The group has specialized in developing methods to measure small chemical components (metabolites) in intact cells and in real time. The inventors of the present invention are shown below:

Lars Folke Olsen

Associate Professor , Institute of Biochemistry and Molecular Biology

Lars Folke Olsen has worked at Imperial College London, U.K. the University of Arizona, Tucson, USA, and at EML, Heidelberg, Germany. He has served as adjunct professor at the University of Arizona from 1993-1998 and is a member of the Danish Academy of Natural Sciences.



Veli Cengiz Özalp

Postdoc, Institute of Biochemistry and Molecular Biology

Cengiz Özalp has worked as a postdoc in the biosensor field at distinguished Universities in Spain, France and USA. He is the author of an authoritative review on biosensors. He has been awarded a Marie Curie Intra-European Fellowship for developing a biosensor-based sensor.



Lise Junker Nielsen

PhD. Student, Institute of Biochemistry and Molecular Biology

Lise Junker Nielsen is a Ph. D student with a background in bioorganic chemistry from the University of Southern Denmark. Her work has already amounted to a published proceeding and two submitted articles, and she is also a member of the Danish Chemical Society.



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