NISTTech

Immobilized Biological Membranes

Create novel biosensors and prosthetics using immobilized biological membranes

Description

Natural biological cell membranes offer significant advantages over artificial membranes in research and therapeutic applications. Artificial membranes require tedious isolation of membrane proteins, and attempts to reconstitute lipid bilayers with such isolated proteins. This method produces immobilized biological membranes that may be used as a sensing indicator in a biosensor, an adsorbent in a chromatography system, and as a coating for medical devices. Additionally, a functional immobilized biological membrane may be made for future prosthetics applications.

Applications

- **Biosensors - medical therapies**
  Useful screening agents and detectors for therapies.
- **Biosensors – environmental hazard detection**
  Detect the existence of microorganisms (e.g., bacteria, viruses, and parasites), chemical compounds in human body fluids (e.g., ions, glucose, LDL, antibodies, cytokines, immune effector cells), and other reactants present in the environment or in industrial settings.
- **Medical devices**
  Used in creating implantable medical devices including prosthetic devices or grafts.
- **Chemical and biochemical analysis**
  Used as an adsorbent in a chromatography system.

Advantages

- **Biological membranes attachable to various surfaces**
- **Many types of applications and substrates**
  Attaches a variety of different membranes to a variety of different substrates depending on anticipated use.
- **Retains functionality**
  Immobilized biological membranes retain at least a portion of the membrane function or activity as observed for the biological membrane in its natural setting (e.g., as part of a living cell).

Abstract

A composition comprising an immobilized biological membrane is provided. The functional immobilized biological membrane consists of a support structure, a metal layered onto a surface of the support structure, an alkanethiol monolayer assembled onto the metal, and a biological membrane deposited on the alkanethiol monolayer. Also provided is a method of producing the immobilized biological membrane, wherein the method involves contacting an alkanethiol with a metal surface of a support structure in forming an alkanethiol monolayer assembled onto the metal, and depositing a biological membrane onto the alkanethiol monolayer such that the biological membrane becomes associated with the alkanethiol monolayer. Uses of the biological membrane include as a sensing indicator in a biosensor, as an adsorbent in a chromatography system, and as a coating for medical devices.

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References

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Status of Availability

This invention is available for licensing.

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