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Non-Confidential Description - PSU No. 3479*
"Method and Apparatus for Glucose Monitoring"

Keywords:

Glucose sensors, ionophoresis, intradermal implants, finger prick alternatives

Links:

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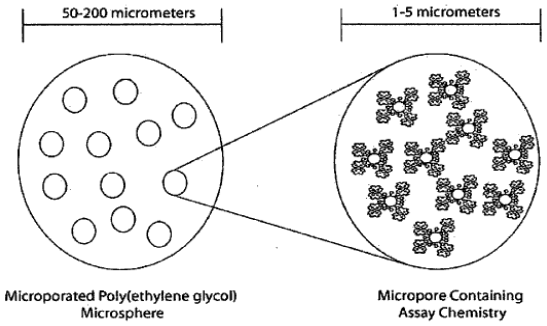

Background

Existing blood glucose sensors available to diabetics are chemical sensors that offer readings based on the enzyme glucose oxidase, which breaks down glucose in the presence of oxygen into hydrogen peroxide. These commercial sensors typically have an error rate of less than 15 mg/dL. However, despite their accuracy, they have the disadvantage that blood be drawn from the patient via foreman or finger pricking, resulting in pain to the patient and increased risk of infection. As a result, pricking methods have low patient compliance and lower than recommended monitoring frequencies. Newer sensors based on ionophoresis of the epidermal layer of skin, resulting in leakage of interstitial fluid, have been shown to be less accurate than traditional direct sensing approaches but are nevertheless a convenient alternative to pricking devices. Studies have shown that the interstitial fluid, while not containing the same amount of glucose as the blood, correlates well to blood with the exception of a time lag of approximately 5 minutes due to physiological difference between the two locations. Interstitial technologies used on dogs, cats and horses were shown to perform well and alleviate the stress caused from using traditional blood glucose devices, however, these technologies also result in irritation of the skin at the probing site and therefore have not been used for long-term glucose monitoring.

Invention Description

The disclosed invention includes both a novel method and apparatus for intradermal implantation of chemically sensitive particles and the monitoring of those particles for determining glucose readings in diabetics. The invention measures glucose using an affinity reaction coupled with a change in fluorescence. These changes can be monitored by an external electro-optic device. The new sensor technology dramatically improves performance over the prior art in implantable glucose sensing and has potential for use in both *in vitro* (i.e., cell culture monitoring) and *in vivo* (i.e., diabetic glucose monitoring) applications.

Advantages/Applications

- Increases dynamic range of glucose testing by using dendrimer molecules
- Near real-time reading
- External sensing device is non-invasive and non-obtrusive
- Equipped with an alarm that detects extreme hypo- and hyper-glycemia

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*** This technology is jointly owned with Texas A&M University**

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