

Direct and Continuous Sensor for Heparin and Protamine

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Reference: Heparin Sensor

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Reference

Shvarev, A., Bakker, E.;
"Reversible Electrochemical
Detection of Non-Electroactive
Polyions", *J. Am. Chem. Soc.*;
2003; 125; 11192-11193

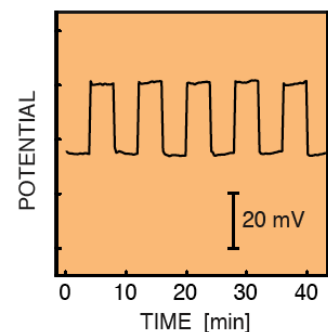
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Overview

Auburn University has invented a reversible electrochemical measurement technology for the blood anticoagulant heparin and its antidote protamine. This technology has potential applications in clinical point of care analysis, including monitoring during surgery and kidney dialysis.

Advantages

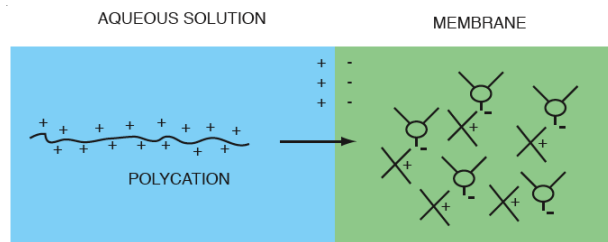
- Direct anticoagulant detection in undiluted whole blood
- Continuous reversible sensing
- Compatible with existing blood electrolyte measuring equipment
- Works with low molecular weight heparin
- Based on well-established polymeric membrane sensing technology



Sensor signal reproducibility between 10 mg/L protamine (higher readings) and physiological background.

Description

Heparin, a polyanionic polysaccharide, is administered to patients at the rate of about 500 million doses per year in order to prevent blood clotting. Accurate dosage of this drug is important because heparin is metabolized in the body and needs to be monitored and neutralized after surgery.



Electrochemically controlled polyion transfer into a specially formulated polymeric membrane: the basis for the polyion sensor technology.

This invention presents the first continuous, reversible sensor for the polyion heparin and its antidote protamine. While selective extraction principles for such drugs are available, all detection strategies reported thus far involve single-use tests that showed irreversible behavior or needed chemical treatment before reuse. Continuous monitoring technology is achieved here by controlling the detection behavior of a uniquely doped polymeric membrane by instrumental means. The concentration of the drug in the blood is not modified during the detection process.

Status

- This invention has been successfully verified by laboratory experiment; reversible and selective sensing in undiluted whole blood samples has been demonstrated.
- The investigator team has secured major NIH funding for further development.
- US and PCT patent applications have been filed.
- This invention has been licensed to a start-up company, Heparin Scientific.