

Heparin degradation measurement through a solid-state nanopore formed by dielectric breakdown

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Heparin is a polyanion chain often used as an anti-coagulant for a variety of diseases and conditions. More than a decade ago, a contamination with oversulfated chondroitin (OSCS), an inhibitor of heparin enzymatic degradation, caused the death of more than 200 individuals. The only way to detect this contamination is to study the enzymatic degradation of heparin. Moreover, Solid-state silicon nitride nanopores (SiN) are a promising new tool for the detection and study of biological polymers and their enzymatic degradation. However, recent development in the method of dielectric breakdown for SiN fabrication have brought this technology closer to commercial scale. In this report, we study the enzymatic degradation kinetics of heparin using heparinase using resistive pulse with a 5 to 7 nm SiN nanopore that was fabricated using dielectric breakdown, we then studied the difference between the presence and absence of OSCS