

Quanterix's Ultrasensitive Simoa™ Technology Forges New Ground with Direct Detection of Genomic DNA in Human Blood and River Water

Study published in Analytical Chemistry demonstrates the utility of Simoa to achieve direct measurements of bacterial genomic DNA at concentrations similar to those possible with PCR.

LEXINGTON, Mass., January 22, 2013 – Quanterix Corporation announced today that *Analytical Chemistry* has published a ground-breaking study in which its Simoa technology was used to directly measure bacterial genomic DNA of *S. aureus* in both human blood and river water at sub-femtomolar concentrations without any pre-concentration or amplification steps, achieving similar detection limits as the gold standard method set by PCR.

The paper describes the Simoa approach, in which DNA fragments are hybridized to complementary probes on paramagnetic beads, before being isolated in single-molecule arrays where they can be digitally counted. While PCR is susceptible to false negatives from polymerase inhibition by sample components, false positives from erroneous amplification of non-target sequences, and cross-contamination by the high concentrations of amplicon produced by PCR, Simoa greatly reduces these problems by directly detecting single molecules without amplification. Furthermore, the simplicity of the Simoa assay means it can be performed more cost-effectively than PCR.

The reported Simoa assay was able to achieve an average limit of detection (LOD) of *S. aureus* in whole blood of 0.074 fM, or 1100 bacteria per 25 µl sample. Similarly, using water taken from the Charles River, they obtained an LOD of 1300 bacteria per 50 µl (0.042 fM). Simoa was able to detect similar concentrations of bacterial DNA as comparator PCR assays, and met the analytical thresholds required for both applications. “We have shown that Simoa is a viable alternative to PCR for early detection of fecal contamination of environmental water and bloodstream infections caused by bacteria,” explained Dr. David Duffy, lead author on the paper. “The direct detection of single target DNA molecules has benefits over molecular amplification methods, especially limiting the chance of cross-contamination.”

“While Simoa has already gained widespread recognition among researchers for regularly achieving a 1000-fold improvement in sensitivity over conventional immunoassays for protein biomarkers, this is the first time the platform has been demonstrated to offer significant benefits for measuring nucleic acids,” said Paul Chapman, President and Chief Executive Officer of Quanterix. “There is a large unmet need for ultrasensitive protein detection, but the ability to use the same platform for measuring DNA marks a turning point in the technology’s development and opens up another vast market of potential applications.”

More information about the study can be found on the company’s website, at www.quanterix.com/DNA.

About Quanterix

Quanterix is a developer of ground-breaking tools in high definition diagnostics. Its Simoa platform uses single molecule measurements to access previously undetectable proteins. With this unprecedented sensitivity and full automation, Simoa offers significant benefits to both research and clinical testing applications. Quanterix was established in 2007 and is located in Lexington, Massachusetts.

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