

Nanopore Antennas for Ultrahigh Speed DNA Sequencing

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WARF: P140109US01

[View U.S. Patent No. 9,488,600 in PDF format.](#)

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing new nanopore antennas for analyzing DNA, RNA and other long molecules.

OVERVIEW

'Nanopore sequencing' allows a single molecule such as DNA to be analyzed without conventional tools like chemical labels or costly optical instruments. In the process, DNA strands and a stream of ions are driven through a nanoscale pore in a device. Each nucleotide base of the DNA strand passes individually through the pore and obstructs the flow of ions to a different, characteristic degree.

Ideally, measuring the changes in ion flow would enable the DNA strand to be sequenced one base at a time. However, these electrical fluctuations are very small and rapid, and existing devices do not have the resolution to deliver very reliable measurements. In fact, sequencing speed has to be reduced drastically because the recording mechanisms are simply not fast enough.

Looking for a solution, UW-Madison researchers developed several technical strategies to enable sequencing at radiofrequency speeds for the first time (see WARF reference numbers P07084US and P130074US01).

THE INVENTION

Building on their work, the researchers have now developed metallic nanopores for ultrahigh speed molecule sequencing. The new nanopores are electrically conductive and function as antennas, transmitting radiofrequency signals with utmost precision.

Unlike competing technology, the nanopores feature both genetically and electrically engineered components. They can be constructed of DNA attached with metal particles to enhance electromagnetic wave reception. This is achieved by replacing the side chains of the DNA molecule with sulfur groups that in turn link to gold particles. Metalized DNA strands or 'arms' can be added to increase antenna size and tune polarization.



THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.



APPLICATIONS

- Nanopore antennas for sequencing DNA, RNA, peptides and other molecules

KEY BENEFITS

- Faster analysis
- Highly sensitive
- Can isolate and analyze individual molecular strands

ADDITIONAL INFORMATION

Related Technologies

[WARF reference numbers P07084US](#)

[and P130074US01 describe macro- and microscale antenna transduction circuitry developed by the researchers.](#)

[WARF reference number P130036US01 describes piezoelectric nanopores for sequencing DNA and other molecules.](#)

Tech Fields

Research Tools - DNA & RNA tools

Research Tools - Genomics & proteomics

CONTACT INFORMATION

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854.

