Nanotransistor Boosts Sensitivity of Gene Sequencer

Summary posted by Meridian on 12/22/2011

Source: IEEE Spectrum (December 2011)
Author(s): Neil Savage

Researchers at Harvard University, United States, have announced that they have taken a big step toward being able to sequence anybody's genome for less than US$1,000. One of the candidate technologies for achieving this goal is "nanopore sequencing," in which an electric field pulls ions in the water and strands of DNA through a nanopore in a solid-state membrane. Each of the four nucleic acids in DNA – G, T, C and A – can be identified by their distinct effect on the current. The current, however, is very small, and the DNA passes through the nanopore at a rapid clip, making it difficult to distinguish the signal in so short a time. One approach has been to try to slow the speed at which the DNA moves through the nanopore, but the Harvard researchers instead decided to try and boost the signal. Their device consists of a chip with a transistor that amplifies the change in current. Current nanopore systems measure signals from tens of picoamps to a few nanoamps. Now, says Ping Xie, a postdoctoral researcher, "…we can measure tens of nanoamps to hundreds of nanoamps." Still, a single nanopore is not sufficient to sequence an individual genome. Instead, practical sequencers would have to consist of multiple nanopores, but previous designs have been challenged by cross talk between adjacent nanopores. The Harvard version relies on highly localized voltage, preventing cross talk. According to Joshua Edel, a senior lecturer at Imperial College London, United Kingdom, this scheme could work. It "ultimately…has the potential to achieve much higher resolution in order to distinguish different DNA bases when compared [with] the ionic current approach." The team's work was described in the online version of Nature Nanotechnology.

The original article may still be available at
http://spectrum.ieee.org/biomedical/diagnostics/nanotransistor-boosts-sensitivity-of-gene-sequencer/0

As tagged by Meridian Institute:

Stakeholders: Academia, Government

Implications: Economic Competitiveness, Human Enhancement, Governance

Regions: North America

Nanomaterial Category: Metal Nanoparticle

Health and Medical: Diagnostics, Devices, Diseases

Share | Email

Follow Nanotechnology & Development News on Facebook.

Search Archives Search

Nanotechnology and Development News

A Clean-Energy Promise: Hope Meets Hype
The New Haven Independent (2 Jan 2012) (1/5/2012)

This article explores the sector of nanotechnology-enabled "green energy" in an attempt to determine if it is more hype than reality, and if so, than what can this nano-energy, sought and subsidized b... **more**

Where Nanotechnology and Medicine Meet
Canadian University Press (3 Jan 2012) (1/5/2012)

A University of Alberta, Canada, oncology professor, and the Canada Research Chair in Biomedical Nanotechnology, Linda Pilarski, has been working to help make medical tests more affordable for rural ... **more**

Fewer Animal Experiments Thanks to Nanosensors
Fraunhofer (2 Jan 2012) (1/5/2012)

Researchers at the Fraunhofer Research Institution for Modular Solid State Technologies EMFT, Germany, may have found an alternative approach to testing on laboratory animals. Millions of animals die... **more**

Read More

XML

Really, read some more.