



Home > A Glucose Meter That Detects Viruses

Pick a field — C&EN will keep you up to date
analytical | environmental | materials | biological**SCENE**

January 18, 2012 | Latest News

A Glucose Meter That Detects Viruses

Medical Diagnostics: Researchers convert device for monitoring diabetes into one that can spot hepatitis B

By Erika Gebel

5

5



Email Print

Department: [Science & Technology](#)Keywords: [Glucose meter](#), [DNA quantification](#), [viral DNA](#), [Hepatitis B](#), [invertase](#)

[+]Enlarge



Virus Meter?

By making glucose a signal for viral DNA, researchers repurposed a glucose meter into a virus detector.

Credit: Shutterstock

Although scientists have developed a variety of cheap, portable instruments for doctors to use in the field to pinpoint viruses, none have hit the market. To speed things along, researchers have now [converted a commercially available device](#)—a glucose meter—into one that can spot viral DNA (*Anal. Chem.*, DOI: [10.1021/ac203014s](#)).

“Our idea was to start with a technology that is already mature,” says [Yi Lu](#) of the University of Illinois, [Urbana-Champaign](#). He and his team repurposed glucose meters, which people with diabetes commonly use to monitor their blood sugar, into virus meters by using glucose as a proxy for viral DNA. The scientists designed a chain of biomolecular interactions to link the two.

With hepatitis B as the virus they chose to detect, they first made two DNA probes that each would recognize half of the virus's DNA sequence. The researchers then attached one probe to a tiny magnetic bead and the other to invertase, an enzyme that turns sucrose into glucose.

They tested their system by adding both probes to a solution of hepatitis B DNA at a known concentration. As the mixture incubated for a couple of hours, each strand of viral DNA bound both probes, thereby linking the enzymes to the beads. The researchers then isolated the beads with a magnet and placed them in a sucrose solution, where the enzymes slowly produced glucose. After three hours, the scientists removed the beads and measured the solution's glucose concentration with a glucose meter.

Based on the measurement, they could determine how much invertase was present and, in turn, the amount of viral DNA in the original solution. Their system could detect hepatitis B DNA down to 40 pM, a level adequate to diagnose the disease at some stages, but not all. To improve the method's sensitivity, Lu wants to increase incubation times and possibly engineer an enzyme that produces more glucose.

Chemical & Engineering News
ISSN 0009-2347
Copyright © 2012 American Chemical Society

MOST POPULAR

Viewed Commented Shared

[The Arsenic-Based-Life Aftermath \(2779 views\)](#)[Where Drug Names Come From \(2423 views\)](#)[Assaying Antibodies \(954 views\)](#)[Unexpected Glow \(827 views\)](#)[Biofuel Research Suffers From Gaps \(770 views\)](#)

RELATED ARTICLES

[Using Commercially Available Personal Glucose Meters for Portable Quantification of DNA](#)[A Personal Meter For Everything](#)[Spotting A Single Strand](#)[With A Twist, Chip Measures Viral Loads](#)[Click Here For A Directory of](#)**C&EN**
CONTEXTUAL ADVERTISERS

Stay a step ahead with the most relevant offerings.

Comments

Jesse_EngAmer (01/18/2012 at 8:22 PM)

It's amazing the FDA approved this. With devices like this come the risk of disease transmission as well as a potential loss of money for Big Pharma. Bravo for aiding progress and taking a hit. Let's just pray this wasn't another rushed release leading to a recall: <http://eng.am/uPoD3T>

» Reply

[Leave A Comment](#)

Name

Email Address(Required to comment)

SUBMIT

Chemical & Engineering News

- [Home](#)
- [Magazine](#)
- [News](#)
- [Departments](#)
- [Collections](#)
- [Blogs](#)
- [Multimedia](#)
- [About](#)

- [Subscribe](#)
- [Advertise](#)
- [Contact](#)
- [Join ACS](#)



- [Help](#)
- [Sitemap](#)

SEARCH

[Advanced Search](#)

American Chemical Society

- [ACS.org](#)
- [Journals](#)
- [CAS](#)