LATEST NEWS

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A Personal Meter For Everything

Sensors: System allows glucose monitors to measure other analytes

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Researchers have devised a way to use inexpensive personal glucose meters (PGMs) to detect and measure a wide variety of substances in solution, including cocaine, biomolecules like adenosine and interferon, and metal ions like uranium.

PGMs are widely used by diabetics to monitor glucose, and some cost only $10 or so. Bioanalytical and bioinorganic chemist **Yi Lu** of the University of Illinois, Urbana-Champaign, and postdoc **Yu Xiang** have now created reagent mixtures that can be used with the meters to make the devices much more useful as sensors.

"There is real genius in the idea of leveraging the ultracheap, ultrafast, high-precision glucose-sensing capabilities of PGMs to analyze other analytes," comments nanomaterials and chemical-sensing specialist **Reginald M. Penner** of the University of California, Irvine. "The word 'innovative' is often used, but it should be reserved for ideas like this one."

In the technique, DNAs that bind specific targets are selected from large libraries. A reagent mixture, containing target-specific DNA-invertase conjugates bound to magnetic beads, is added to a solution containing a target substance. The target binds selectively to the DNA, causing the DNA to break and release invertase. The beads are then removed from solution magnetically. When sucrose is added, the freed invertase catalyzes its breakdown, releasing glucose that a PGM can measure. The amount of target in the original sample is proportional to the amount of glucose produced.

The technique could be used to quantify diverse types of analytes, from "metal ions and small organic molecules to biomolecules and even viruses or cells," Lu and Xiang note (*Nat. Chem.*, DOI: **10.1038/nchem.1092**).

Lu envisions that kits could be developed for each such target. "We are interested in forming a company to license and commercialize the technology," he says.

It is not that either DNA sensors or personal glucose meters "are overly surprising," comments funtional nucleic acid expert **Andrew Ellington** of the University of Texas, Austin. "It is the engineering and development work done in their pairing, and showing that such a pairing can potentially have a huge impact in existing markets, that is surprising, novel, and extremely worthwhile."

"This is a major advance in practical applications of DNA-based sensing," says **Chunhai Fan** of Shanghai Institute of Applied Physics, who specializes in biosensors. "It is clearly a very wise idea that so easily breaks the long-standing bottleneck in biosensor applications. I expect that this technology will be easily expanded to detection of virtually any molecular targets with a PGM."

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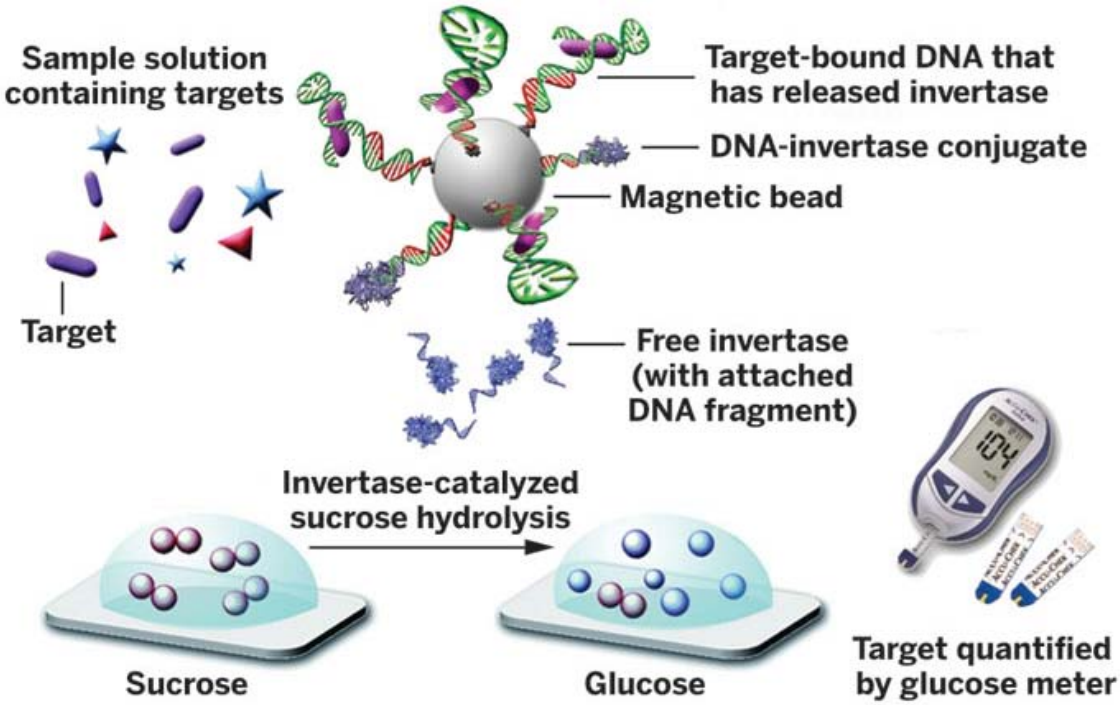

REPURPOSED Personal glucose monitors can measure invertase-catalyzed glucose production to quantify a target substance.

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