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Doctor says 'spit please'

Researchers turn to saliva to diagnose disease.

Heidi Ledford

It's an often unconsidered gateway to the human body that can reveal whether you're tired, stressed or drunk; how much testosterone, nicotine or caffeine you've ingested; or if you've been infected with HIV, measles or hepatitis. And now, thanks to recent technological advances, scientists are looking to expand the diagnostic range of that most humble of bodily fluids: spit.

At the International Association for Dental Research meeting in New Orleans this week, researchers described how a preliminary cancer test could one day be done as easily at the dentist's surgery as at the doctor's.

To this end, David Wong and colleagues at the University of California at Los Angeles are attempting to catalogue all the proteins present in saliva. Their latest triumph, colleague Jianhua Wang told the meeting, has been to pin down a series of markers linked to an autoimmune disorder called Sjögren's syndrome, which disturbs the function of many of the body's secretory glands, including the pancreas and the tear ducts. It affects more than 4 million people in the United States, mostly women, often leaving them with painfully dry mouths and eyes.

While Sjögren's syndrome lends itself naturally to diagnosis via saliva — the salivary glands are a primary target of the disease — Wong is optimistic that spit could be the key to easy diagnosis of other diseases as well.



The human body produces up to a litre and a half of saliva every day.

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"I think every disease is a subject for testing in saliva," he says. "If our liver is not happy — or our kidney, or our heart — our salivary glands will behave differently. They will begin to secrete a different panel of proteins."

Wong has already published preliminary results on the detection of oral cancer, and is presently exploring the use of saliva to diagnose pancreatic, breast and lung cancers, diabetes and Alzheimer's disease.

Mouth wash

The human body produces up to a litre and a half of saliva every day. Although spit is 99% water, the remaining 1% contains salts and proteins, some of which derive from the fluid part of the blood, the serum. Spitting in a cup provides an appealing, needle-free alternative for those who get queasy at the thought of having blood drawn.

“ Saliva flows like a river. ”

Charles Streckfus,
University of Texas Dental
Branch

The fluid found between the teeth and gums — called gingival crevicular fluid — may also provide a non-invasive diagnostic tool, says Michael Forde of the Mayo Clinic in Rochester, Minnesota. Forde, who will present his characterization of the protein content of this fluid on Friday at the meeting, says that although this fluid is orders of magnitude less abundant than saliva, it contains a higher

concentration of proteins. And some proteins that don't make it past the filters guarding salivary glands can be found here.

Gingival crevicular fluid can be collected simply by inserting a small strip of absorbent paper behind the gums. "It's no more uncomfortable than when you're having your teeth cleaned and they check how much gum you have left," Forde says.

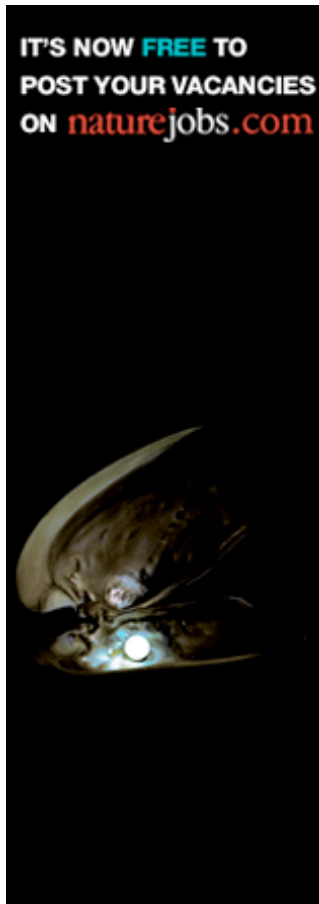
Microbial playground

In the past, researchers have been daunted by the difficulty of detecting the very low concentrations of protein in saliva or gingival crevicular fluid. Recent technological advances have lowered that barrier, but another problem remains: contamination.

The mouth is a microbial playground, and is highly susceptible to contamination from the outside environment as well. That contamination can complicate the protein landscape, making diagnosis more of a challenge.

Still, spit has its advantages, says Charles Streckfus, a researcher at the University of Texas Dental Branch in Houston, who has been looking for breast cancer markers in saliva. "It's a flowing system, not static like blood," says Streckfus. "The things in blood may be old or current — you don't know. But saliva flows like a river, so you're getting at what's happening at that moment in time."

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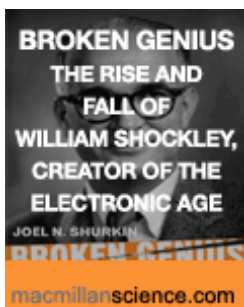
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