Revealing Saliva Secrets

Biochemicals, genetic markers and proteins found in saliva render great diagnostic potential for many cancers and diseases.

BY JOANN MILIVOJEVIC

IN THE NOT-TOO-DISTANT FUTURE, SALIVA TESTS MAY REPLACE THE need for many blood and urine samples. Of course, that's good news to patients. Who wouldn't prefer spitting to being pricked? The good news also extends to physicians, because saliva tests are also simpler and safer, especially in settings when it may be difficult to obtain samples. And they just may prove to be cheaper, too.

Saliva is a practical fluid to test. Ancient Chinese medicine looked at saliva as a diagnostic element hundreds of years ago. Today, scientists have developed saliva tests for analyzing hormone levels, checking for HIV and charting alcohol use. Saliva is a good prognosticator because it is filtered from blood, and therefore, has many of the same proteins and biochemicals, although at much lower concentrations. But through genetics and new technologies, scientists are gaining a new view of salivary properties and their diagnostic potential.

IN THE WORKS

About five years ago, the National Institute of Dental and Craniofacial Research invested heavily in making saliva testing a greater clinical reality. Researchers at UCLA, under the direction of David T.W. Wong, D.M.D., professor and associate dean of research, were among those to secure early funding. They enabled further diagnostics by defining and cataloging the elements in saliva, which Dr. Wong calls the "saliva alphabet."

"We now look at saliva and no longer say, well let's find out what's in there," says Dr. Wong. "We know A to Z, all the protein and genomic information."

To prove the usefulness of this knowledge, Dr. Wong and his team developed the first standardized saliva tests for oral cancer. Dentists formerly discovered oral cancer only in its late stages, when physical signs such as swelling and sores are obvious. But saliva tests allow physicians to detect cancer much earlier, which could significantly increase survival rates.

Researchers developed a handheld device that quickly detects dental diseases. Dubbed the "lab on a chip," it can detect MMP-8, an enzyme associated with the chronic gum disease periodontitis, at an early stage. In the future, the device may also be used to quickly diagnose breast and prostate cancer and detect the presence of biotoxins.

Like saliva, sputum (phlegm) diagnostic tests are also showing new promise in early cancer detection. Lung cancer claims more lives worldwide than any other cancer. Researchers at the University of Maryland School of Medicine designed a sputum diagnostic test to find missing genes thought to suppress tumors. In their study, researchers found that 76 percent of stage 1 lung cancer patients were missing those tumor-suppressing genes. Currently available sputum tests, which reveal cell structure changes, identified only 47 percent of lung cancer patients in the study. "It's very promising," says Feng Jiang, M.D., Ph.D., assistant professor of pathology at the University of Maryland School of Medicine. "But we are looking to find new biomarkers to increase the sensitivity and specificity" of the diagnostic tests, he says.

If Jiang and his team are successful, the test will move on to another lab for independent validation, then to the FDA for approval. The process could take about five years.

THE FUTURE

According to the National Institutes of Health, doctors may one day routinely test saliva to map your protein profile. Each time you visit, a new salivary profile could be generated to look for changes that could point to diseases such as cancer, heart disease or diabetes. Earlier detection means earlier treatment and increased chance of recovery and survival. New saliva tests are expected to show up in doctors' offices by 2011.

POINT OF CONTACT:

» For more information about salivary diagnostics, visit the National Institutes of Health's Web site, www.nih.gov, and search for "salivary diagnostics."