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## Inside Dentistry

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### Salivary Diagnostics

Salivary diagnostics involves routine and advanced techniques for laboratory testing, with the goal of using saliva as the sample source to identify disease, or for preventing disease and evaluating the risk of disease. However, never to be overlooked is the careful and expert clinical examination. In this day and age, the clinical examination is improved by incorporating digital photography to document and highlight observations from the operatory suite. These images can, in turn, be transmitted to experts via the Internet to create a medium for consultation in real time.

Whereas seeing is believing, adding vital fluorescent dyes that enhance features of the tissue—such as the vascularity, abnormal patterns, or growth and even the localization of specific proteins within cells—provides a view of the near-microscopic anatomy which, in turn, can be confirmed by biopsy. These technologic advances to routine procedures are enhanced further when they are linked to the molecular and biochemical testing that a sample of saliva provides.

Saliva is comprised of both exfoliated cells from the oral cavity and fluid secreted from the salivary glands. Biochemically, salivary fluid is a transudate, which refers to the quantity of protein dissolved into the mostly saline-like fluid. Salivary transudate is a reflection of the cells that make up the glands that secrete the fluid, but it is also an extraction of the bloodstream that supports them. As such, saliva reflects the composition of proteins circulating in the body, as well as the health and disease within the body.

Presently, several areas of research purport that novel proteins, shed or secreted from cells throughout the body, can be measured in saliva. These include markers indicative of breast and pancreatic cancer, cardiovascular disease, incipient infection, and metabolic disorders such as diabetes mellitus. Because of the ease in collection, transport, and storage, it is likely that with further refinement of such molecular and biochemical tests, saliva will be the sample of choice for many screening and diagnostic programs.

Beyond using salivary diagnostics for diagnosing disease is the issue of testing patients “at risk” for disease. This distinction is not subtle. New testing technologies, such as PCR for molecular genetics, or mass spectroscopy for protein analysis, reach levels of sensitivity that go below those required to offer treatment, but at the same time identify people who should be counseled about changes in their lives that can prevent disease from developing. Two examples illustrate this point.

The causes of periodontitis continue to be debated. However, the following two—bacteria and inflammation—are at least known to be involved. Testing for mediators of inflammation, such as cytokines, is not yet available for routine clinical testing, but testing for the genetic markers of high or lower levels of cytokine release is. Therefore, testing patients for variance in the genetic sequences for the interleukin 1 genes classifies patients both with and without bacterial periodontitis into those at high or low risk of this causative factor in disease. This is a powerful vantage for practitioners who seek to promote patient wellness, as well as serve their interest to cure the patient who is sick.

Testing for oral HPV shares a similar vantage of better serving individuals at risk for developing oral cancer than those who already host a lesion on its way to becoming a tumor. HPV testing, by virtue of the sensitivity of the testing methodology, identifies individuals who are at risk of epithelial lesions because it is one of the prerequisite factors that cause hyperplastic growth of infected cells. However, relatively few patients with HPV infection progress, and the virus typically will “become quiet.” With a greater focus on identifying risk and less on confirming a diagnosis, HPV testing is one area where the clinician shows their concern by practicing preventive medicine.

Salivary diagnostics implies the use of tests that are highly sensitive and are thus capable of finding disease before it is detectable by other modalities. In some situations, the effect of this extraordinary sensitivity leaves the clinician without a specific action plan other than to prescribe necessary follow-up, and/or watch and wait. This is a situation where clinicians and patients may become frustrated by dealing with information that places new responsibilities on each, while not relying on a therapy to solve the problem.

For patients coping with test results that project disease risk, the goal to avoid sickness falls on their shoulders. In general, the patient’s responsibility will be centered on changes in lifestyle, diet, exercise, and the obligation to follow-up and watch for changes. This is well exemplified by tests that look for markers of incipient cardiovascular disease, such as C-reactive protein (CRP). CRP levels

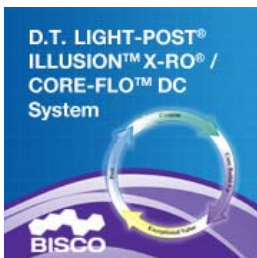


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are measured in the blood or saliva, and elevated levels indicate a heightened state of inflammation that accelerates the progression of atherosclerosis.

For the doctor, practicing preventive medicine means more time committed to patient education and counseling. Ordering CRP levels of patients creates a need for time between clinician and patient focused on what these tests are and what to do to change their values, which is generally about changes that promote good health overall (eg, weight reduction, lowered fat in the diet, and improved periodontal care). In this example, CRP as a marker of cardiovascular health creates the obligation to talk with patients about things outside the office and on matters where there is very little control over the outcome.

The laboratory is a service business. In recent years, innovations in cellular and molecular technology have brought advanced science into the clinical arena, where the type of information created requires better means of communicating those data. For the laboratory, employing genetic counselors and clinical specialists to liaison with the doctor's office are required to shoulder the ongoing need for educating and updating on the use of these tests.

For the clinician, the best way to incorporate these new technologies is to allow the laboratory to provide these services. Salivary diagnostic testing is a new area of medicine, and many of the standards of practice are not yet established. Using these new types of tests raises concerns by clinicians, who feel they are untrained in subjects now being examined by these tests, and indicates a greater need for doctors and laboratory experts to work together in consultation.

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