Special Feature:

Saliva as an emerging diagnostic biological fluid

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Saliva is a clear, slightly acidic (pH 6.0-7.0) and hypotonic exocrine secretion of major and minor salivary glands. The daily production of saliva in a healthy adult ranges from 0.5-1.5 L, with a flow rate of approximately 0.5 mL/minute.[1] Lubrication and protection of oral tissues, perception of taste, buffering capacity, and digestion of carbohydrates are some of the important functions of saliva.[2] Components of saliva include water, electrolytes and organic molecules such as amino acids, proteins and lipids.[3] The different components interact and are responsible for the functions attributable to saliva.

Traditionally, systemic diseases are diagnosed based on patient's symptoms, medical history and examination and analysis of blood and/or other biological fluids.[4] Saliva samples are usually collected on suspicion of presence of oral pathology and saliva based diagnostics are used for oral diseases such as periodontal diseases and studying the risk of caries. However, in recent times, saliva is also being considered as an additional means of diagnosis of systemic diseases as a replacement for blood. This is because similar or almost identical information can be obtained from analysis of saliva, which is easy to collect and does not require invasive procedures of drawing of blood sample.4 The identification of saliva to be functionally equivalent to serum in reflecting the physiological state of the body, including emotional, hormonal, nutritional and metabolic variations has further enabled the researchers to test its usefulness in diagnosing systemic diseases.[5]

However, salivary composition is influenced by the method of collection and stimulation of salivary flow.[2] Saliva can be collected under unstimulated conditions or stimulated conditions.[6] Unstimulated saliva can be collected by draining/drooling method, spitting method, swabbing method and suction method; stimulated saliva is collected either by chewing of a piece of a paraffin and/or by application of approximately one drop of citric acid to tongue.[6] Presently, commercial saliva collection devices are being manufactured by some companies for diagnostic and research purposes.[2] Handling of saliva is easier than blood as it does not clot thus reducing the number of manipulations required.[5] Salivary method is inexpensive and causes less inconvenience to participants of repeat sample analysis which can be an advantage in monitoring patients of chronic diseases such as those with diabetes mellitus and chronic kidney disease.[7] Compared with serum or urine, the storage and transport of saliva can be carried out economically. Even for health care professionals, a salivary test is safer than serum as it reduces the risk of blood borne infections.[5]

Saliva as a diagnostic specimen of choice can be used to diagnose a wide range of conditions including periodontal, cardiovascular, autoimmune, endocrine, renal, infectious diseases and also in forensic studies.[4] Application of saliva in diagnosis and prognosis of various malignancies including carcinoma breast, ovarian cancers and squamous cell carcinoma of oral cavity using specific and non-specific tumour markers has been extensively studied.[8-10] Evaluation of cardiac markers

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using saliva for early diagnosis of acute myocardial infarction[11] and assessment of salivary creatinine levels in diagnosis and monitoring of kidney failure have yielded promising results.[12] Saliva may also be considered as alternative diagnostic specimen of choice for diagnosing various infectious diseases like human immuno deficiency virus, hepatitis c virus and human papilloma virus.[13]

One of the challenges of salivary diagnostics is the identification of diagnostic markers of disease and their application in clinical practice.[5] Although saliva contains most of the compounds found in blood, the concentration of some of these analytes may be less than that in blood causing laboratory estimation related issue.[5] However, the emerging highly sensitive technologies coupled with parallel detection of disease markers enable the use of saliva as an important diagnostic fluid. The gap between saliva and other bodily fluids such as blood, urine and cerebrospinal fluid with regards to diagnostic capability is becoming narrower as a result of these developments. Thus, with its distinctive advantages, saliva is now being incorporated into diagnosis as well as monitoring of diseases. In addition, the development of saliva based point of care testing devices enables rapid diagnosis and/or screening of diseases.[2] Saliva based diagnostics provide great opportunities for research and also have the potential to become important components of routine health monitoring, early detection of diseases through population based screening programmes, confirmatory diagnosis of diseases, risk stratification, determination of prognosis, therapy response monitoring.

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