Human Saliva: A Future Diagnostic Tool

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Human saliva is a mouth fluid produced by a combination of three major glands (parotid, submandibular, and sublingual) and more than 400 minor glands located within the oral cavity [1]. Saliva performing dynamic roles in the oral cavity such as protection of oral mucosa, maintenance of oral homeostasis, facilitates taste perception, contains enzymes (amylase) for preliminary food digestion, help in healing of mucosa (oral, gastric, and oropharynx), contain proteins (statherin, proline rich proteins) help in tooth enamel mineralization [2]. Saliva is first line of defence against pathogen through antimicrobial peptides (defensins, cathelicidins, histatin and adrenomedullin) [3].

Saliva collection for diagnostic analyses has a number of benefits such as inexpensive, non-invasive, less cross-contamination, ease of collection, patients’ convenience and can easily be stored [4]. Human whole mouth saliva (WMS) is basically composed of secretions from major and minor salivary glands, gingival crevicular fluid (GCF), mucosal transudates from all surfaces of the mouth, microorganisms, proteins from food debris, and desquamated epithelial cells [5]. Because of compositional changes saliva divided into non-stimulated whole saliva, stimulated saliva (whole saliva, ductal secretion, parotid glands, submandibular, and sublingual glands), direct secretion (parotid gland and submandibular, and sublingual gland). All these types have different biochemical composition due to time of sampling, ages of subject, and nature of collection methods [6-8].

Over a last decade, saliva has been used to detect oral diseases like dental caries, gingivitis, periodontitis (chronic/aggressive), oral cancers, cleft palate, salivary gland diseases, bechet disease, oral leukoplakia, chronic graft-versus-host disease (cGVHD), and systematic diseases such as breast cancer, diabetes, human immune deficiency virus (HIV) [9-12]. In addition, saliva has been used for the forensic investigations, therapeutic drug monitoring (TDM), and for the assessment of the drug abuse [13,14]. In terms of therapeutic applications, saliva is essential for topical transportation of medicaments. For example, fluoride is well known for caries prevention [15-17] that flushes at targeted sites through saliva. Up to date approximately 3000 different human salivary protein identified and profiling is done in omics salivary database (http://www.hspp.ucla.edu/skb.swf) is fully accessible to oral health practioners, biodental researchers and undergraduate students. With the advancements in proteomics science many unrevealed proteins were now detected and help in early diagnosis of disease and monitoring them. The most high profile organizations such as American Dental Association, American Association of Dental Research, Federation DentaleInternationale (FDI, World Dental Federation), National Institutes of Health (NIH), and the National Institute of Dental and Craniofacial Research (NIDCR) and other organizations reinforcing for using salivary diagnostics and provide funding to overcome the developmental barriers [18]. Currently, there are many manufacturer producing saliva collection devices for obtaining stimulated and unstimulated saliva namely Oasis Diagnostics® (Pure•SAL™, Mini•SAL™ and Midi•SAL™ DNA isolation kits, Pedia•SAL™, DNA•SAL™, Accu•SAL™, RNAPro•SAL™, Super•SAL™, VeriOFAST®, Versi•SAL®, and UltraSal-2™), DNA Genotek (Oragene•DNA, ORAcollect•DNA, and Oragene•RNA), OraSure Technologies (OraSure® HIV-1), Greiner Bio-one (GBO-SCS®), and the Sarstedt Germany (Salivette®)[19].

Conclusion
In conclusion, saliva accuracy, ease of use, efficacy and cost effectiveness made more attractive diagnostic fluid for future basic and clinical application. Moreover the information obtained from salivary proteins and peptides promising for improvement in drugs development and modifications of biomaterials.

Bibliography