ECRONICON OPEN ACCESS

DENTAL SCIENCE
Opinion

# Human Saliva: A Future Diagnostic Tool

**Zohaib Khurshid[1], Muhammad Sohail Zafar[2]*, Shariq Najeeb[3] and Sana Zohaib[4]**

*[1]Department of Biomaterials, School of Metallurgy and Materials, University of Birmingham, UK*
*[2]Department of Restorative Dentistry, College of Dentistry, Taibah University, Madina Al Munawwarrah, Saudi Arabia*
*[3]Restorative Dental Sciences, Al-Farabi Colleges, King Abdullah Road, Riyadh, Saudi Arabia*
*[4]Department of Biomedical Engineering, King Faisal University, Al-Hofuf, Saudi Arabia*

***Corresponding Author:** M S Zafar, Department of Restorative Dentistry, College of Dentistry, Taibah University, Madina Al Munawwarrah, Saudi Arabia.

**Received:** January 27, 2016; **Published:** February 27, 2016

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 andCraniofacial 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™, VerOFy®, 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

1. Su S-B., *et al*. "Human Body Fluid". BioMed Research International (2013): 2-4.
2. Schipper RG., *et al*. "Saliva as research material: Biochemical, physicochemical and practical aspects". *Archives of Oral Biology* 52.12 (2007): 1114-1135.
3. Khurshid Z., *et al*. "Oral antimicrobial peptides: Types and role in the oral cavity". *Saudi Pharmaceutical Journal* (2015): doi:10.1016/j.jsps.2015.02.015.
4. Javaid MA., *et al*. "Saliva as a diagnostic tool for oral and systemic diseases". *Journal of Oral Biology and Craniofacial Research* (2015): Epub ahead of print. doi:10.1016/j.jobcr.2015.08.006.
5. Falcão DP., *et al*. "Sialometry: aspects of clinical interest". *Revista Brasileira de Reumatologia* 53.6 (2013): 525-531.
6. Henson BS and Wong DT. "Collection, storage, and processing of saliva samples for downstream molecular applications". *Methods in Molecular Biology* 666 (2010): 21-30.
7. Thomadaki K., *et al*. "Whole-saliva Proteolysis and Its Impact on Salivary Diagnostics". *Journal of Dental Research* 90 (2011): 1325-1330.
8. Mohamed R., *et al*. "The impact of saliva collection and processing methods on CRP, IgE, and Myoglobin immunoassays". *Clinical and Translational Medicine* 1 (2012): 19.
9. Garg K., *et al*. "Molecular and genetic aspects of odontogenic tumors: a review". *Iranian Journal of Basic Medical Sciences* 18.6 (2015): 529-536.
10. Huynh a. HS., *et al.* "Gingival crevicular fluid proteomes in health, gingivitis and chronic periodontitis". *Journal of Periodontal Research* 50 (2015): 637-649.
11. Mali SB. "Proteomics for Early Diagnostics". *Journal of Craniofacial Surgery* 26.4 (2015): 1013-1014.
12. Rudney JD., *et al*. "Potential biomarkers of human salivary function: A modified proteomic approach". *Archives of Oral Biology* 54.1 (2009): 91-100.
13. Gröschl M., *et al*. "Evaluation of saliva collection devices for the analysis of steroids, peptides and therapeutic drugs". *Journal of Pharmaceutical and Biomedical Analysis* 47.3 (2008): 478-486.
14. Topkas E., *et al*. "Evaluation of saliva collection devices for the analysis of proteins". *Clinica Chimica Acta* 413 (2012): 1066-1070.
15. Zafar MS. "Effects of surface pre-reacted glass particles on fluoride release of dental restorative materials". *World Applied Sciences Journal* 28 (2013): 457-462.
16. Ullah R and Zafar MS. "Oral and dental delivery of fluoride: a review". *Fluoride* 48.3 (2015): 195-204.
17. Zafar MS and Ahmed N. "Therapeutic roles of fluoride released from restorative dental materials". *Fluoride* 48.3 (2015): 184-194.
18. Wong DT. "Salivary diagnostics powered by nanotechnologies, proteomics and genomics". *The Journal of the American Dental Association* 137.3 (2006): 313-321.
19. Caswell SV., *et al*. "Advances in Salivary Diagnostics". (2015): 121-129.

**Volume 3 Issue 6 February 2016**