Saliva Biomarkers: The Unsung Hero of Diagnostics
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Abstract
With the advancement in technology, compositional analysis of saliva for diagnosis of various medical conditions has attracted the researchers over the last decade. Monitoring the salivary biomarkers help in early detection of diseases and increase the rate of success of the treatment. Sampling of saliva is safe, simple, cost effective and does not demand an expertise for collection. Therefore, saliva can be an important diagnostic armamentarium for mass screening for a specific disease or in remote areas. However, despite of various research, there are no definite guidelines regarding sensitivity and specificity of salivary diagnostic tools. Health care professionals must go hand in hand with government agencies to develop more research so that a general acceptance can be developed like that of traditional blood/urine analysis.

Keywords: Salivary biomarkers; Autonomic nervous system; Gingival tissues

Introduction
The oral cavity is a dynamic field consisting of multiple structures working in harmony. Saliva, a prime component of the oral cavity, aids in digestion of food through its endogenous enzymes, buffers the salivary pH and facilitates the ion exchange between oral structures. Metabolites, electrolytes and other biomarkers are passively filtered into the saliva which are in harmony with the systemic and environmental conditions of an individual [1]. The potential of saliva as a biomarker fluid has been transformed by the development of highly sensitive proteomic analysis, which has identified over 2,000 proteins, approximately 25% to 30% of which are shared with blood (Table 1) [2]. Also, the ease of collection, easy storage, non-invasive sampling and possibility of repetition makes saliva an ideal fluid for the screening of diseases.

Literature Review
Saliva: The oral fluid
The normal salivary secretion is 1 to 1.5 liter per day for an adult. Each of the major salivary gland is regulated by autonomic nervous system. The serous portion of salivary gland is innervated by sympathetic system and mucous portion is innervated by both parasympathetic and sympathetic stimulation resulting in secretion of saliva. Parasympathetic stimulation leads to high flow of saliva with less quantity of organic and inorganic compounds. Sympathetic stimulation produces less quantity of protein-rich and potassium-rich saliva [3]. Intake of meal results in increase of total proteins and α-amylase in saliva [4].

However, the resultant salivary flow is also influenced by the age, oral hygiene, psychological conditions, nasal and visual stimulation, physical exercise. Thus, the saliva collected from the oral cavity is the complex mixture of secretary product of the three major and numerous minor salivary glands along with mucosal transudate [5], nasal secretion, cellular and food debris [6], oral microbes and various metabolites. The mode of entry of these constituents from the blood into the saliva is by passive intracellular diffusion and active transport or para-cellular routes by extra cellular ultrafiltration within the salivary glands or through gingival tissues [7].

Conclusion and Future potential
With the advancements in molecular diagnostics, days are not so far when our health status and sampling will be pain free and convenient. However, still the big challenge is to establish a standard, accurate and validated method to identify disease specific markers in saliva. Researchers are working to develop bio sensors capable of identifying salivary bio markers with high sensitivity and specificity [10]. This would be an incredible leap in health sector, reducing the diagnostic burden financially and creating new clinical opportunities of early diagnosis and prompt treatment.

Discussion
Can saliva be an alternative to blood for diagnostic procedures?
1. Collection of saliva is noninvasive procedure when compared to blood sampling.
2. The person collecting sample does not require specialized training.
3. Collection and storage of saliva is cost effective.
4. Saliva sampling can be used for screening large population and in remote areas.
5. Saliva does not clot so allows an ample amount of working time compared to blood.
6. Reduced risk of transmission/cross infection of diseases compared to blood.
7. Saliva sampling can easily be used in uncooperative children or in children with special needs.

However, there could be some limitations [8,9] as the salivary flow rate and the method of collection of a sample of saliva might cause variation in levels of bio markers present in it. The amount of salivary secretion is expected to vary for each person under different condition. Drugs, radiation therapy and chemo therapy administered during the treatment of cancer reduce the salivary gland function, and thus, the quality and quantity of saliva. Also, the proteolytic enzyme present in whole saliva may alter the stability of diagnostic biomarkers present in it.

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Received July 03, 2017; Accepted September 01, 2017; Published September 04, 2017

Citation: Mishra A (2017) Saliva Biomarkers: The Unsung Hero of Diagnostics. J Mol Genet Med 11: 288. doi:10.4172/1747-0862.1000288

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References

1. Podzimek S, Vondrackova L, Duskova J, Janatova T, Broukal Z (2016) Salivary markers for periodontal and general diseases. Dis Markers 2: 1-4.

2. Loo JA, Yan W, Ramachandran P, Wong DT (2010) Comparative human salivary and plasma proteomes. J Dental Res 89: 1016-1023.

3. Aps JK, Martens LC (2005) Review: The physiology of saliva and transfer of drugs into saliva. Forensic Sci Int 150: 119-131.

4. Messenger B, Clifford MN, Morgan LM (2003) Glucose-dependent insulinotropic polypeptide and insulin-like immunoreactivity following sham-fed and swallowed meals. J Endocrinol 177: 407-412.

5. Humphrey SP, Williamson RT (2001) A review of saliva: Normal composition, flow, and function. J Prosthet Dent 85: 162-169.

6. De Almeida Pdel V, Grégio AM, Machado MA, De Lima AA, Azevedo LR (2008) Saliva composition and functions: A comprehensive review. J Contemp Dent Pract 9: 72-80.

7. Lee JM, Garon E, Wong DT (2009) Salivary diagnostics. Orthod Craniofac Res 12: 206-211.

8. Gupta DK, Singh V, Singh A, Dubey RK, Gupta GB (2011) Saliva- A noninvasive diagnostic tool for aging population. J Indian Acad Geriat 7: 177-181.

9. Lee Y, Wong DT (2009) Saliva: An emerging bio fluid for early detection of diseases. Am J Dent 22: 241-248.

10. Wei F, Patel P, Liao W, Chaudhry K, Zhang L, et al. (2009) Electrochemical sensor for multiplex biomarkers detection. Clin Cancer Res 15: 4446-4452.