Saliva in the “omics” era – A promising tool in the early diagnosis of oral cancer

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**Commentary:**

The term ‘Saliva’ refers to mixed fluid in the oral cavity. It is a vital component of the oral environment. It plays a major role in maintaining the health of both the soft and hard tissues of the oral cavity. Saliva is essential for several functions including mastication, deglutition, and speech. The whole saliva, which is a mixture of resting and stimulated saliva is composed of inorganic and organic components like proteins, amino acids, amylase, immunoglobulins, urea, uric acid, electrolytes, etc1. These components in saliva paved the way to the concept of salivary biomarkers. Salivary biomarkers are defined as cellular, molecular and biochemical characteristics by which normal or abnormal processes can be recognized and monitored. Salivary biomarkers are classified based on biomolecular profiles, such as DNA, RNA, and protein biomarkers, and based on disease state as, diagnostic and prognostic biomarkers. Technologies that can measure the role and actions of various types of cellular molecules, such as genes, proteins, or small metabolites, are generally named by appending the suffix “-OMICS”. Salivaomics is an emerging field in the diagnosis of oral and systemic diseases2. Salivaomics deals with five diagnostic alphabets namely proteome, transcriptome (mRNA), microRNA (miRNA), metabolome, and microbiome which are regarded as the basic omic constituents. Salivaomics is a promising tool especially in the field of oral cancer where it offers a robust alternative for invasive investigations while guiding the clinicians in the early diagnosis of carcinogenic changes at the molecular level thus improving the survival rates3. The different salivary analytes are extracted from saliva for diagnostic purposes using the following methods:

1. Non-organic compounds are extracted by Flame photometry, atomic absorption, and spectrophotometry,
2. Proteins and peptides are by High-performance liquid chromatography (HPLC), ELISA, 2D Electrophoresis, Mass spectrometry, and
3. DNAs, mRNAs, microRNA are by PCR, qPCR, HPLC, and microarrays4.

The proteome consists of defensin-1, p53, alpha-amylase, IL8, IL6, IL1, TNFA, IL1B, CD44, MMP2,9. Transcriptome includes DUSP1, H3F3A, IL1B, IL8, SAT, S100P whereas miR135, miR300a, miR31 are the substitutes of MicroRNA. Phenylalanine, valine, Lactic acid, Taurine, and Piperidine constitute metabolome and Capnocytophaga gingivalis, Prevotella melaninogenicus, Streptococcus mitis are the constituents of the microbiome5. The basic pathophysiology behind these omic constituents in carcinogenesis are alterations in gene expression, cellular DNA, mRNA transcripts, protein status, and metabolites6. The merits of this novel technology include, that it is inexpensive, non-invasive, cost-effective, possible early detection of carcinomas, there is a convenient medium for multisampling and safe for health professionals compared to blood and serum and the demerits are lack of standardization procedures like sample collection and storage, variability in the levels of salivary biomarkers and validation in oral inflammatory conditions. The specificity and sensitivity of salivaomics in detecting oral cancer are 91% respectively7. Thus, to conclude, salivaomics could potentially provide vital diagnostic and prognostic biomarkers for early diagnosis and effective monitoring of the oral cancer disease status.
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References