Viral infections and saliva as a potential diagnostic tool

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Dear Editor,

Coronavirus disease 2019 (COVID-19) is a severe public health problem. It has caused significant disruption to the daily life of a majority of the world's population [1] by significantly disrupting public health and the social and economic structure of society. Covid-19 is a respiratory disease caused by the SARS-CoV-2 virus, as designated by the International Committee of Taxonomy of Viruses (ICTV) [2]

Viral infections of the oral mucosa and the perioral region are encountered in dental practice. They have been reported to be involved in the aetiology of some ulcers,[3] and tumours in the oral cavity and perioral region. Viruses isolated from the oral cavity include herpes simplex viruses 1 and 2, Epstein–Barr virus, cytomegalovirus, HIV, hepatitis B virus, human papillomavirus, etc. A future goal for optimal standard management of oral viral diseases would be to determine the diversity, frequency, magnitude, pathogenicity, and treatment of oral viruses and their diseases. Viral infection and transmission can occur through multiple paths, such as ingestion of contaminated food and drinks, sexual contact, exposure to infected blood, vertical transmission from mother to child, fecal-oral route, saliva exchange, or by aerosols generated by sneezing or coughing. Saliva is a hypotonic solution of salivary acini, gingival crevicular fluid and oral mucosal exudates; saliva is now considered a potential pool of biological markers [4] that range from DNA, RNA and proteins to the microbiota structure. It is relatively safe to collect saliva and minimizes the risk of virus spread. The advantages of saliva over other body fluid specimens include; ease of collection, elimination of fear of prick, the possibility of self-collection, lower cost of sample collection, no need for trained staff for sample collection, and requirement of little or no skills for collection. Saliva provides a new, non-invasive and simple way to help in the diagnosis of the disease; it is a convenient and accurate point-of-care diagnostic tool that can be used in a non-invasive manner [5].

Saliva has a complex composition [4] that includes urea, ammonia, uric acid, glucose, cholesterol, fatty acid, triglycerides, neutral lipid, glycolipid, amino acid, steroid hormones, mucin, amylase, lectin, glycoprotein, lysozyme, peroxidase and lactoferrin. It contains high concentrations of Na^+, Cl^-, Ca^{2+}, K^+, HCO_3^-, $H2PO^{4-}$, F^-, I^- and Mg^{2+} from the serum. Saliva harbours a wide range of circulatory components such as pro-inflammatory cytokines [1], chemokines, matrix metalloproteinases, mitochondrial DNA, genomic DNA, miRNAs, and extracellular vesicles.

Saliva studies like salivaomics encompass genomics, transcriptomics, proteomics, metabolomics, and microRNA

(miRNA) analysis. Salivary biomarkers can be exploited for the early diagnosis of some oral and systemic diseases. Diagnostic tests for viral infections currently rely on salivary biomarkers, such as viral DNA and RNA, antigens, and antibodies. There are saliva-based antibody tests at the proteomic level to detect viruses, including hepatitis A virus, hepatitis B virus, hepatitis C virus, HIV-1, measles virus, rubella virus [4], and mumps virus, among others.

Keywords

Infection, viral infection, saliva, diagnostic tool

Abbreviation

Coronavirus disease 2019 (COVID-19), international Committee of Taxonomy of Viruses (ICTV)

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