Saliva and New Technologies: Where are We and Where are We Going?

Oscar Musalem-Dominguez*

Department of Dentistry, Faculty of Medicine and Dentistry, University of Valencia, Valencia 46010, Spain

Corresponding Author*

Oscar Musalem-Dominguez
Department of Dentistry,
Faculty of Medicine and Dentistry,
University of Valencia,
Valencia 46010, Spain
E-mail: osmudo@alumni.uv.es

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About the Study

The era of "Omics Sciences" began at the end of the 20th century, with the culmination of the complete sequence of the human genome and the emergence of new technologies, introducing genomics as one of its first areas of development [1,2]. These sciences are defined as; those dedicated to the detailed study of the different molecular levels that make up our organism and the interaction between them and with external elements (Figure 1).

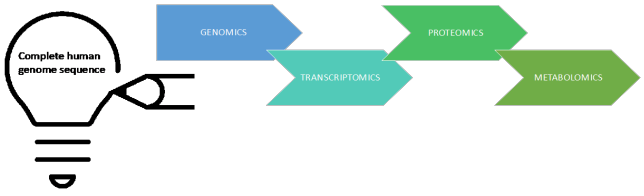

Figure 1. Flowchart of omics sciences.

The metabolomic science is the branch of omics sciences that studies metabolites through sophisticated analytical techniques, such as nuclear magnetic resonance spectroscopy and mass spectroscopy. Through these tools we can identify and quantify metabolites, which give us a reflection of the outcomes of the individual's genome and the influence of the environment, providing us with a more holistic view of the causes of diseases.

On the other hand, the role of saliva as a diagnostic method has been studied for quite some time. Indeed, in the mid-1950's, parotid saliva electrolytes were analyzed in children in search of their diagnostic value for fibrocystic disease of the pancreas [3]. Nowadays, one of the cutting-edge areas of research that focuses on saliva as a potential diagnostic bio-fluid is salivary metabolomics. This is a technique that in the last decade has demonstrated a series of advances in a large number of pathologies such as, cancer, neurovegetative diseases, autoimmune diseases and oral diseases. Regarding the latter, most studies are related to oral cancer followed by periodontal disease [4].

Regarding the application of salivary metabolomics in dental caries, although it has been less studied in comparison to other oral pathologies, its potential role should be highlighted considering that the latest WHO report of 2022 indicates that more than 2.5 billion people have caries [5-9]. Making it one of the most prevalent non-communicable diseases worldwide [10].

We still face challenges in the application of salivary metabolomics, especially compared to other bio-fluids such as urine or plasma that exhibit a higher level of evidence. In particular, one of its main limitations is the lack of standardized protocols that allow the subsequent comparison between different studies. Making it less possible to carry out research that is higher in the pyramid of scientific evidence, such as systematic reviews. However, these difficulties can be overcome as incumbent's advance in protocol-related research, as is the case of Gardner, et al. and Grootveld, et al. who guides us by providing us with recommendations for future studies in this area [11,12].

Conclusion

The development and progress of basic and applied sciences in the last decades have resulted in omics sciences. In these, salivary metabolomics is allowing us to approach a personalized and non-invasive dentistry that helps us to better understand the process of dental caries, with the goal of perfecting the prevention strategies of this disease. This is reflected in the studies by Pereira, et al. or Li, et al., which show us a path towards a better understanding of dental caries disease.

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