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Letter to the Editor, "Advancements and Challenges in Precision Dentistry"

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Dear Editor,

I am writing to highlight the burgeoning field of precision medicine, an innovation increasingly garnering attention across academic and clinical landscapes. This transformative approach to healthcare customizes treatments based on a patient's unique genetic makeup, environmental factors, and behavioral patterns. Recent systematic and perspective reviews have extensively classified the advancements in the specific application of precision medicine to dentistry [1-2].

Harnessing omics technologies _including genomics, proteomics, transcriptomics, and metabolomics_ along with advanced imaging and health analytics, precision dentistry is set to revolutionize the diagnosis, management, and treatment of oral health conditions. Applications range from proactive cancer prevention to nuanced pain management and the early identification of orofacial clefts [1-2]. Despite its potential to inform evidence-based guidelines and shape learning health systems [3], the field is not without challenges that must be addressed.

One particularly promising avenue in precision dentistry is the use of salivary biomarkers for personalized oral healthcare, as highlighted in a recent scoping review [4]. Saliva-based diagnostics provide a non-invasive, convenient method for evaluating periodontal health and facilitating customized treatment plans. Recent research has also showcased the utility of genetic markers in predicting susceptibility to periodontal disease, dental caries, and orofacial abnormalities. The adoption of next-generation sequencing technologies for evaluating the oral microbiome offers further prospects for personalized periodontitis treatments [5].

However, several obstacles must be surmounted for these advanced technologies to reach their full potential. Chief among them are the issues of data standardization and interoperability. A lack of unified data repositories currently hampers the efficient sharing and analysis of multi-omic data. Ethical questions surrounding data privacy must also be robustly tackled to maintain public trust. Further, the high costs

associated with these technologies create accessibility issues, exacerbating healthcare disparities.
Moreover, interdisciplinary collaboration is imperative to address the complex challenges intrinsic to the implementation of precision dentistry. Beyond dental professionals, computer scientists, bioinformaticians, and ethicists must also contribute to ensuring both the efficacy and ethicality of these advancements.
In summary, while the progress in precision dentistry holds exciting possibilities for enhancing oral healthcare, overcoming the existing challenges requires a concerted effort from the scientific community. As we pivot towards an era of increasingly personalized oral healthcare, the time is ripe to lay a robust foundation for this promising field.
Thank you for considering this letter for publication. The topic is of the utmost importance, and an open discourse will significantly contribute to its advancement.

CONFLICT OF INTEREST STATEMENT

None declared.

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