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Innovative Intraoral Systems for Drug Delivery

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Introduction

In the clinic, drug administration through the mouth is regarded as a convenient, effective and time-saving strategy with high safety and quick onset, particularly for patients who are afraid of needles and have trouble swallowing. Without the debasement in gastrointestinal lot and first-pass digestion, the intraoral drug conveyance framework ends up being an alluring choice for macromolecule retention, which will give a promising stage to the effective conveyance of protein, peptide, nucleic corrosive and polysaccharide. However, conventional intraoral drug delivery systems' limited bioavailability, short retention time and low reproducibility are major obstacles to their continued use. On-going advances in synthetic, material and designing methods carry extraordinary chances to improve intraoral framework manufacture and applications, attributable to the high biocompatibility and utilitarian variety. Fast dissolving oral films, medicinal chewing gum systems, intraoral mucoadhesive systems, physical assisted systems, intelligent intraoral device systems and chemically assisted systems are just some of the recent developments in smart intraoral drug delivery systems that we systematically summarize in this review.

Description

Additionally, the difficulties and possibilities for clinical and modern utilizations of current techniques are all around examined. The smart intraoral system is thought to be a promising candidate for enhancing human life in the near future. When compared to injection, it eliminates the patient's needle phobia by passing through capillaries or in a minimally invasive way through the oral epithelium. Not negligibly, it is well protected from gastrointestinal degradation and hepatic first-pass effect, both of which are crucial for the delivery of macromolecules (e.g., protein, peptide, nucleic acid and polysaccharide). More importantly, with the help of material optimization mucosal delivery via transoral route and topical treatment While topical treatment is mostly associated with the treatment of gingivitis, buccal lesions, caries and bacterial infections, indicating highly clinical values, in this review, we systematically summarize the recent development of smart intraoral drug delivery systems based on the advancements in the chemical, material and engineering fields. Transoral mucosal delivery has proven to be a prominent approach to treat xerostomia, hypertension, diabetes and so on. The oral cavity's anatomical structure and physiological environment were first shown in detail, followed by SIS fabrication material and method illustrations. Intraoral systems are now widely used to administer a wide range of medications due to their ease of use and accessibility. In particular, SIS has made significant strides toward overcoming the oral barrier and achieving effective drug treatment [1,2].

Regardless, clinical translation and future commercial deployment of the SIS for specific indications will require additional research and optimization on multiple fronts. Although imaging technology could help SIS therapy by providing quick and accurate information, the high cost of the expensive apparatus or equipment significantly increases the financial burden on patients, necessitating immediate cost control. Patients who are not medical professionals are unable to operate certain systems, necessitating frequent trips to the home hospital. This may reduce people's enthusiasm, patience and interest, which in turn may weaken their compliance and adherence. The contamination of the microbiota poses a serious threat to the oral systems because microorganisms would colonize foreign materials and tissue, resulting in bacterial infection, tissue destruction, pathogen spread and device malfunction. Additionally, stain materials would become reservoirs of infection in the normal tissue that surrounds them, where bacteria would dwell and continue to grow. Device swallowing will be triggered by oral food intake (movement of the jaw, muscles, tongue and saliva) and pose a significant risk to patients. Individual differences brought on by distinct lifestyles hinder both the reproducibility of the drug release profile and the reliability of the formulations and devices [3].

Typically, the usage of scaled down gadgets could empower Sister Improvement to diminish creation costs and hoist individual solace, which is a promising course in this field. Additionally, surface modification may be a viable strategy for combating the sticky biofilm to prevent germ infiltration. For instance, bio surfactants, antimicrobial envelopes and polymer coatings have all been shown to be highly effective at reducing or eliminating microbial adhesion on biomaterials. Due to their deep penetration and precise actuation, enzyme-mediated strategies, nanotechnologies, phage therapy and immunotherapy emerge as promising strategies for compromising biofilm-mediated infections. Moreover, it would be a positive move to combine traditional formulation with cutting-edge technologies in the future. It has been demonstrated that popular daily-use sonic toothbrushes enhance the mechanical rinsing effectiveness of standard antibacterial mouthwashes. These toothbrushes could be incorporated into the SIS to enhance its therapeutic performance by providing enhanced in situ suspension and absorption [4-6].

Conclusion

In a similar vein, a combination of recently developed technologies, such as mouthwash liquid, dental floss and even dentures, could have a significant impact, demonstrating the synergistic advantage of both conventional and innovative systems. SIS has been shown to improve intraoral and systemic drug delivery in a controllable and intelligent manner, despite the fact that there are still some obstacles to overcome. This suggests that it has enormous clinical translational potential. In the not-too-distant future, SIS will undoubtedly continue to be a hot topic for facilitating various drug treatments. Improving patient compliance and adherence may make it possible for it to hopefully move from the bench to the bedside.

References

1. Lin, Hui Xian Jaime, Sanda Cho, Veeraraghavan Meyyur Aravamudan and Hnin Yu Sanda, et al. "Remdesivir in Coronavirus Disease 2019 (COVID-19) treatment: A review of evidence." *Infection* 49 (2021): 401-410.
2. Zhu, JiaYi, Yuchong Li, Jady Liang and Samira Mubareka, et al. "The Potential Protective Role of GS-441524, a Metabolite of the Prodrug Remdesivir, in Vaccine Breakthrough SARS-CoV-2 Infections." *Intensive Care Research* (2022): 1-12.
3. Gritsch, Lukas, Muhammad Maqbool, Viviana Mouriño and Francesca E. Ciraldo, et al. "Chitosan/hydroxyapatite composite bone tissue engineering scaffolds with dual and decoupled therapeutic ion delivery: Copper and strontium." *J Mater Chem* 7 (2019): 6109-6124.
4. Batool, Sadaf, Usman Liaqat, Zakir Hussain and Manzar Sohail. "Synthesis, characterization and process optimization of bone whitlockite." *Nanomaterials* 10

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(2020): 1856.

5. Li, Yingjun, Liu Cao, Ge Li and Feng Cong, et al. "Remdesivir metabolite GS-441524 effectively inhibits SARS-CoV-2 infection in mouse models." *J Med Chem* 65 (2021): 2785-2793.

6. Chang, Yuchen, Renliang Zhao, Hui Wang and Libin Pang, et al. "A novel injectable whitlockite-containing borosilicate bioactive glass cement for bone repair." *J Non Cryst Solids* 547 (2020): 120291.

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