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Buccal Tablets as an Effective Drug Delivery Platform: Advances and Challenges

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Abstract: Buccal tablets have gained significant attention as a novel and effective platform for drug delivery, especially for therapeutics requiring rapid onset of action or protection from harsh gastrointestinal conditions. Administered via the buccal mucosa, these tablets allow direct absorption into the systemic circulation, bypassing first-pass hepatic metabolism and enhancing the bioavailability of many drugs. This route is particularly advantageous for peptides, proteins, and drugs with low solubility or stability in the gastrointestinal tract. The incorporation of mucoadhesive polymers, permeation enhancers, and controlled-release technologies has contributed to improved retention time, targeted delivery, and consistent drug absorption profiles. Additionally, patient compliance is generally high due to the non-invasive nature and ease of administration. Despite these benefits, several challenges limit the widespread adoption of buccal tablets. The buccal cavity has a relatively small surface area for drug absorption and is continuously exposed to saliva, which may dilute the drug and affect its bioavailability. Moreover, interpatient variability in mucosal permeability and potential for irritation or allergic reactions can complicate formulation and dosing strategies. Ensuring adequate adhesion, drug stability, and controlled release over time remains a critical area of ongoing research. Overall, buccal tablets present a promising alternative for targeted and systemic drug delivery, particularly for drugs that are unsuitable for oral or injectable routes. Continued advancements in polymer science, nanotechnology, and drug formulation are expected to overcome existing barriers and further establish buccal tablets as a versatile and reliable drug delivery system in clinical practice.

Keywords: Buccal tablets, drug delivery, mucoadhesive polymers, bioavailability, controlled release, oral mucosa, systemic absorption

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