Adaptive Delivery Strategies for Nanozyme Therapeutics

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Effective therapeutic delivery remains a critical challenge in developing nanozymebased treatments. Here, we present a multi-platform ceria nanozyme delivery strategy that enables targeted therapy for different medical conditions. By leveraging distinct delivery mechanisms, we achieve localized and sustained therapeutic effects tailored to each application. For gastrointestinal protection, a coacervate formulation ensures intestinal retention and controlled release, shielding the gut from radiation-induced damage and treating inflammatory bowel disease. For salivary gland protection against head and neck cancer radiation, a direct local injection of ceria nanozyme enables precise delivery, mitigating oxidative stress and preserving glandular function. For oral ulcer treatment, a microneedle patch provides a minimally invasive, adhesive platform for site-specific delivery, ensuring prolonged nanozyme activity within the lesion. These diverse delivery strategies demonstrate the adaptability of ceria nanozyme-based therapeutics, offering targeted, efficient, and clinically translatable approaches for treating radiation-induced and inflammatory conditions. This study highlights the potential of integrating nanomedicine with advanced biomaterialbased delivery systems to enhance therapeutic outcomes¹.



Figure 1 Overall schematic drawing: Nanozyme protection against radiation

References:

¹ Han, S. I. et al. Adv. Mater. 32, 2001566 (2020).