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CRISPR Technology: Transforming Therapeutics and Diagnostics in Precision Medicine

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The advent of Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) has revolutionized healthcare biotechnology, enabling precise genome editing and innovative molecular diagnostics. On the therapeutic front, CRISPR-Cas systems are advancing targeted interventions for genetic disorders, cancer, and infectious diseases, offering solutions that are more specific, efficient, and cost-effective than conventional methods. In diagnostics, platforms such as SHERLOCK and DETECTR provide ultrasensitive, point-of-care detection of pathogens and biomarkers, supporting early disease identification and personalized treatment strategies. The integration of CRISPR with nanotechnology, artificial intelligence, and synthetic biology further expands its applications, from programmable gene therapies to smart biosensing platforms. Despite its transformative promise, challenges including off-target effects, ethical considerations, and large-scale clinical translation remain. Addressing these frontiers will be critical to realizing CRISPR's full potential in delivering accessible, sustainable, and highly personalized healthcare solutions.

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