Beyond Nonsense: New Molecules as Precision Therapy for Rare Genetic Diseases

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Precision medicine in the field of genetic diseases is increasingly focused on directly targeting the underlying genetic causes of pathology. Approximately 12% of all genetic disorders are caused by nonsense mutations, for which effective treatments are currently lacking.[1] These mutations introduce premature termination codons (PTCs) into the DNA sequence, leading to truncated, non-functional proteins and loss of gene function.

A promising precision medicine strategy aims to induce translational readthrough of PTCs, allowing ribosomes to bypass the stop signal and produce full-length, functional proteins.[1,2] By addressing the root cause of multiple diseases, this approach holds therapeutic potential for a broad patient population sharing nonsense mutations as a common molecular defect.

Our research focuses on small molecules, oxadiazoles and triazoles, known as Translational Readthrough Inducing Drugs (TRIDs), which can restore protein synthesis by promoting readthrough of PTCs. We evaluate the efficacy of these compounds across various genetic diseases caused by nonsense mutations, exploring their potential as a cross-disease therapeutic strategy.[2–5]

References:

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