

RNA Interference in Gene Regulation

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Abstract. This article investigates the role of RNA interference (RNAi) in regulating gene expression at the molecular level. Through a series of experiments, we demonstrate how RNAi can selectively inhibit gene activity, offering potential therapeutic strategies for genetic disorders. Our research provides insight into the mechanisms of gene silencing and highlights the therapeutic potential of RNAi in treating diseases caused by gene overexpression.

Keywords: RNA Interference, Gene Regulation, siRNA, Gene Silencing, Therapeutic Strategies

Introduction

RNA interference (RNAi) is a crucial regulatory mechanism in cells, controlling gene expression by silencing specific mRNA molecules. This process involves small interfering RNAs (siRNAs) that guide the RNA-induced silencing complex (RISC) to target mRNA, leading to its degradation and subsequent inhibition of gene expression. Our study focuses on unraveling the molecular mechanisms underlying RNAi and its potential applications in medicine. By employing various experimental approaches, we illustrate how RNAi can be harnessed to downregulate genes implicated in diseases such as cancer and viral infections. This research opens new avenues for developing RNAi-based therapies, offering hope for conditions where traditional treatments are ineffective.

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References

1. Sharma, V. K., Basu, S., & Chakraborty, S. (2015). RNAi mediated broad-spectrum transgenic resistance in *Nicotiana benthamiana* to chilli-infecting begomoviruses. *Plant cell reports*, 34(8), 1389-1399.

2. Sharma, V., Zheng, W., Huang, J., & Cook, D. E. (2020). CRISPR-Cas RNA targeting using transient Cas13a expression in *Nicotiana benthamiana*. In *RNA Abundance Analysis: Methods and Protocols* (pp. 1-18). New York, NY: Springer US.