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# RNA Interference in the Age of CRISPR: Will CRISPR Interfere with RNAi?

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## Abstract

The recent emergence of multiple technologies for modifying gene structure has revolutionized mammalian biomedical research and enhanced the promises of gene therapy. Over the past decade, RNA interference (RNAi) based technologies widely dominated various research applications involving experimental modulation of gene expression at the post-transcriptional level. Recently, a new gene editing technology, Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) and the CRISPR-associated protein 9 (Cas9) (CRISPR/Cas9) system, has received unprecedented acceptance in the scientific community for a variety of genetic applications. Unlike RNAi, the CRISPR/Cas9 system is bestowed with the ability to introduce heritable precision insertions and deletions in the eukaryotic genome. The combination of popularity and superior capabilities of CRISPR/Cas9 system raises the possibility that this technology may occupy the roles currently served by RNAi and may even make RNAi obsolete. We performed a comparative analysis of the technical aspects and applications of the CRISPR/Cas9 system and RNAi in mammalian systems, with the purpose of charting out a predictive picture on whether the CRISPR/Cas9 system will eclipse the existence and future of RNAi. The conclusion drawn from this analysis is that RNAi will still occupy specific domains of biomedical research and clinical applications, under the current state of development of these technologies. However, further improvements in CRISPR/Cas9 based technology may ultimately enable it to dominate RNAi in the long term.

**Keywords:** CRISPR; Cas9; RNAi; RNAi interference; genome engineering; reverse genetic screens.

## Figures

**Figure 1** Schematic representation of CRISPR/Cas9 systems...