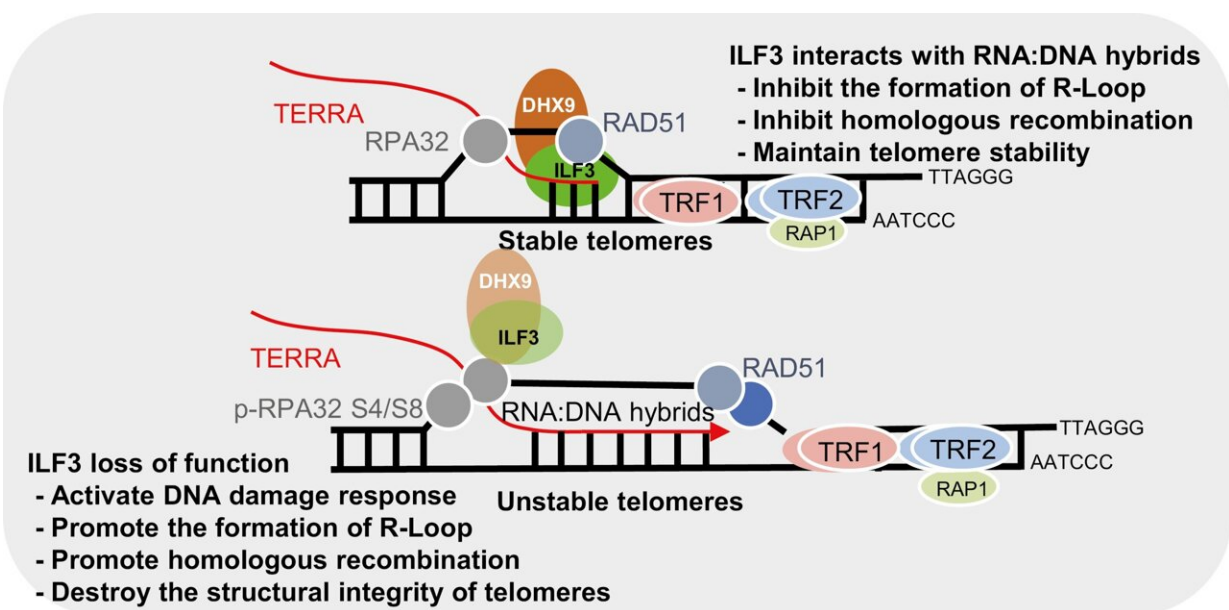


# Findings suggest ILF3 may function as a reader of telomeric R-loops to help maintain telomere homeostasis

April 22 2024



Graphical abstract. Credit: *Protein & Cell* (2023). DOI: 10.1093/procel/pwad054

Dysregulated R-loops can cause stalled replication forks and telomere instability. However, how R-loops are recognized and regulated, is still not well understood, particularly at telomeres.

In a new study, researchers used proximity-dependent biotin identification (BioID) technology to identify the ILF3 interactome and

discovered that ILF3 interacts with several DNA/RNA helicases, including DHX9. This interaction suggests that ILF3 may facilitate the resolution of telomeric R-loops, thereby preventing abnormal homologous recombination and maintaining telomere homeostasis.

The work, titled "[ILF3 safeguards telomeres from aberrant homologous recombination as a telomeric R-loop reader](#)," was published in *Protein & Cell*.

Key findings from the study include:

1. ILF3 exhibits selective interact with telomeric R-loops, thereby safeguarding telomeres against aberrant homologous recombination.
2. ILF3 loss of function consequently elevates TERRA levels, triggering the accumulation of R-loops at [telomeres](#). This accumulation induces DNA damage response (DDR) and telomere dysfunction, characterized by elevated TIFs, telomere fragility, and the presence of extra-chromosomal telomere fragments, which may in turn activate the ALT pathway.
3. Additionally, mapping the ILF3 interactome revealed interactions with various DNA/RNA helicases, including DHX9, with a significant implication that ILF3 potentially assists in resolving telomeric R-loops through its interaction with DHX9.
4. ILF3 potentially acts as a reader for telomeric R-loops, aiding in the prevention of aberrant homologous [recombination](#) and the maintenance of telomere homeostasis.

These results support that ILF3 interacts with telomeric RNA:DNA hybrid structures such as R-loops and promotes the resolution or inhibits excessive accumulation of R-loops through the RNA helicase DHX9.

This research provides new insights into the regulation of telomeric R-

loops and the mechanisms that maintain telomere homeostasis, with implications for aging biology.

**More information:** Chuanle Wang et al, ILF3 safeguards telomeres from aberrant homologous recombination as a telomeric R-loop reader, *Protein & Cell* (2023). [DOI: 10.1093/procel/pwad054](https://doi.org/10.1093/procel/pwad054)

Provided by Frontiers Journals

Citation: Findings suggest ILF3 may function as a reader of telomeric R-loops to help maintain telomere homeostasis (2024, April 22) retrieved 4 May 2024 from <https://phys.org/news/2024-04-ilf3-function-reader-telomeric-loops.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.