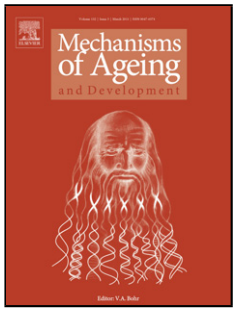

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Regulated expression of the lncRNA TERRA and its impact on telomere biology

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Highlights

- Telomeres prevent genomic instability by reducing end resection of genetic material
- The role of long non-coding RNAs in this context is not well resolved
- TERRA favors telomere capping and chromatin compaction
- Telomere integrity is strongly related with age-associated diseases
- It is highly relevant to know how TERRA controls telomere shortening

Abstract

The telomere protects against genomic instability by minimizing the accelerated end resection of the genetic material, a phenomenon that results in severe chromosome instability that could favor the transformation of a cell by enabling the emergence of tumor-promoting mutations. Some mechanisms that avoid this fate, such as capping and loop formation, have been very well characterized; however, telomeric non-coding transcripts, such as long non-coding RNAs (lncRNAs), should also be considered in this context because they play roles in the organization of telomere dynamics, involving processes such as replication, degradation, extension, and heterochromatin stabilization. Although the mechanism through which the expression of telomeric transcripts regulates telomere dynamics is not yet clear, a non-coding RNA component opens the research options in telomere biology and the impact that it can have on telomere-associated diseases such as cancer.

Abbreviations

TERRA- Telomere repeat-containing RNA

TRF1/2- Telomeric Repeat-binding Factors 1 and 2

POT1- Protection of Telomeres 1

TIN2- TRF1-Interacting Nuclear Factor 2