what other benefits does telomerase provide

Telomerase provides several benefits beyond its canonical role of maintaining telomere length:

- Protection against oxidative stress, which helps reduce cellular damage caused by reactive oxygen species.
- Regulation of chromatin modifications and gene transcription, influencing gene expression patterns beneficial for cell survival.
- Role in metabolic regulation, including mitochondrial function and glucose metabolism, supporting cellular energy balance.
- Promotion of cell survival and proliferation, allowing sustained cell renewal in stem cells and healthy tissues.
- Telomerase activity is involved in angiogenesis, facilitating the formation of new blood vessels which supports tissue repair and regeneration.
- It contributes to DNA repair mechanisms, protecting genomic integrity beyond telomere maintenance.
- Telomerase supports stem cell function and tissue homeostasis.
- Telomerase re-activation or gene therapy in animal models has shown improved healthspan and lifespan by mitigating aging markers without increasing cancer incidence.

These extra-telomeric functions of telomerase clearly expand its influence on cellular aging, metabolism, and regenerative capacity, making it a critical molecule for aging and disease management research.[1][2][3][4]

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1. https://pubmed.ncbi.nlm.nih.gov/37041671/
2. https://www.nature.com/articles/cr200874
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6. https://med.stanford.edu/news/all-news/2015/01/telomere-extension-turns-back-aging-clock-in-cultured-cells.html

7. https://learn.genetics.utah.edu/content/basics/telomeres/

8. https://www.sciencedirect.com/science/article/pii/S1568163725001199