Position of telomeres in nucleus influences length

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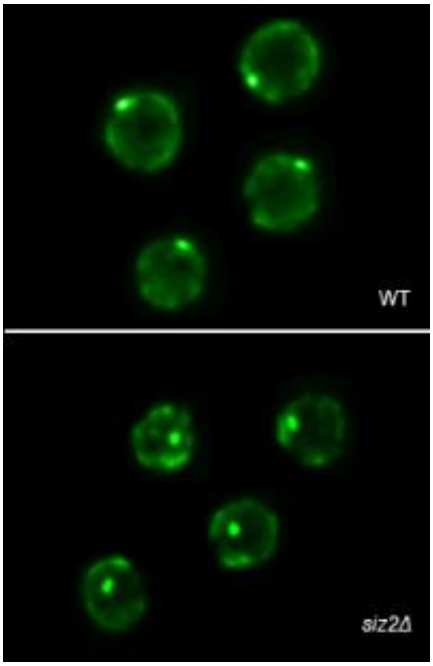

Top: Telomeres (bright green focus) localized to the nuclear periphery (green ring) in wildtype cells. on Bottom: Delocalization of telomeres to the nuclear interior in siz2Δ (SUMO-ligase deleted) cells.

(PhysOrg.com) -- A study the latest issue of *Nature Cell Biology* sheds light on the mechanism controlling telomere length in budding yeast. In this publication, scientists from the Friedrich Miescher Institute for Biomedical Research could show that telomere localization is influenced by post-translational modifications of telomeric proteins. In the absence of these modifications the telomeres moved away from the periphery of

the nucleus and in turn became longer.

Telomeres are specialised structures at the ends of chromosomes and protect these from damage much like the plastic caps on a shoelace protect it from fraying. And as anyone who has threaded a shoelace will tell you, it's important that shoelace ends are neither too short nor too long.

A recent paper in Nature Cell Biology from the laboratory of Susan Gasser from the Friedrich Miescher Institute for Biomedical Research has shown that the position of telomeres within the nucleus can influence how long they become. Using the budding yeast, Saccharomyces cerevisiae, the authors showed that telomere localization is influenced by the post-translational modification of telomeric proteins by SUMO. In cells where these proteins were not SUMO modified, because the SUMO-ligase Siz2 was deleted, telomeres detached from their usual location at the nuclear periphery and move to the interior of the nucleus. Subsequently, telomeres became longer.

In addition, the researchers were able to show that cells can use nuclear localisation to promote the restoration of normal telomere length when these telomeres became too short. This study helps to understand how cells organise the location of their genetic material within the nucleus and the significance of such a nuclear compartmentalization.

More information: Ferreira HC, et al. (2011) The PIAS homologue Siz2 regulates perinuclear telomere position and telomerase activity in budding yeast. *Nat Cell Biol* 13,867-874

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