

Documents

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Mitochondria and telomeres: hand in glove
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Abstract
Born as an endosymbiont, the bacteria engulfed by the proto-eukaryotic cell more than 1.45 billion years ago progressively evolved as an important organelle with multiple interactions with the host cell. In particular, strong connections between mitochondria and the chromosome ends, the telomeres, led to propose a new theory of ageing in which dysfunctional telomeres and mitochondria are the main actors of a vicious circle reducing cell fitness and promoting cellular ageing. We review the evidences that oxidative stress and dysfunctional mitochondria damage telomeres and further discuss the interrelationship between telomere biology and mitochondria through the lens of telomerase which shuttles between the nucleus and mitochondria. Finally, we elaborate on the possible role of the mitochondrial genome on the inheritance of human telomere length through the expression of mitochondrial gene variants. © The Author(s), under exclusive licence to Springer Nature B.V. 2023.

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Mitochondria; Oxidative stress; Telomerase; Telomere

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