

Quality control of mitochondria during aging: is there a good and a bad side of mitochondrial dynamics?

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Abstract

Maintenance of functional mitochondria is essential in order to prevent degenerative processes leading to disease and aging. Mitochondrial dynamics plays a crucial role in ensuring mitochondrial quality but may also generate and spread molecular damage through a population of mitochondria. Computational simulations suggest that this dynamics is advantageous when mitochondria are not or only marginally damaged. In contrast, at a higher degree of damage, mitochondrial dynamics may be disadvantageous. Deceleration of fusion-fission cycles could be one way to adapt to this situation and to delay a further decline in mitochondrial quality. However, this adaptive response makes the mitochondrial network more vulnerable to additional molecular damage. The

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