The State of Parental Mitochondria Influences the Replicative Lifespan of Zygotes of Saccharomyces cerevisiae

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Baker's yeast Saccharomyces cerevisiae is a common model organism of aging. The lifespan of S. cerevisiae is termed replicative lifespan (RLS), which is the total number of daughters being produced by a mother cell can produce throughout its life. In this research, we found that the two parent cells affected the lifespan of zygotes in a curious way: If the two parents are both young cells, the resulting young × young zygotes will also enjoy full lifespans; but if one of the parents is old, then the resulting old × young zygotes will have lifespan between that of the two parents. To further investigate this phenomenon, we substituted the young wild-type cells with young ρ0 cells, which lack the whole mitochondrial DNA, in the old × young zygotes. The resulting old wild-type × young ρ0 zygotes have lifespan similar to that of the old cells. This suggested that the health state of the parental mitochondria has a great influence on the lifespan of the zygotes. This study provides useful information regarding the relationship between the aging of mitochondrial factors and the longevity of eukaryotes.

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