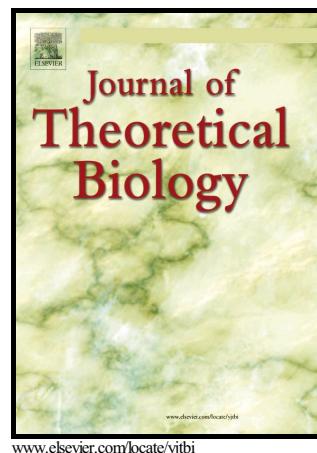


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Effects of initial telomere length distribution on senescence onset and heterogeneity

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1 Effects of initial telomere length distribution on
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12 **Abstract.** Replicative senescence, induced by telomere shortening, exhibits
 13 considerable asynchrony and heterogeneity, the origins of which remain unclear.
 14 Here, we formally study how telomere shortening mechanisms impact on senes-
 15 cence kinetics and define two regimes of senescence, depending on the initial
 16 telomere length variance. We provide analytical solutions to the model, high-
 17 lighting a non-linear relationship between senescence onset and initial telomere
 18 length distribution. This study reveals the complexity of the collective behavior
 19 of telomeres as they shorten, leading to senescence heterogeneity.

20 **Keywords:** stochastic model, telomere, telomerase, replicative senescence,
 21 yeast

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