

## EMERGENCE OF CELLULAR AGING FROM A GENE NETWORK MODEL

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Why would a genotypically homozygous population of cells live to different ages? To address this question, I propose a mathematical model of cellular aging based on gene interaction network. This model network is made of only non-aging components, and interactions among genes are inherently stochastic. Death of a cell occurs in the model when an essential gene loses all of its interactions. The key characteristic of aging, the exponential increase of mortality rate over time, can arise from this model network with non-aging components. Hence, cellular aging is an emergent property of this model network. The model predicts that the rate of aging, defined by the Gompertz coefficient, is proportional to the average number of interactions per gene and that stochastic heterogeneity is an important factor in shaping the dynamics of the aging process. Preliminary experimental results to test the model predictions will then be presented.