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How a Dominant Eigenvalue and Two Differentials Revolutionized Aging Research

The problem of aging has been transformed by the application of evolutionary theory. In age-structured populations, Darwinian fitness is approximated by the dominant eigenvalue of the demographer's Leslie Matrix, also known as the Malthusian parameter. In Taylor expansions for the effects of age-specific changes in survival or fecundity, the first-order terms are known as Hamilton's Forces of Natural Selection. Hamilton's Forces tend to decline with adult age, leading to the evolution of aging. Manipulating these first-order Forces has allowed biologists to control the onset, rate, and cessation of aging using experimental evolution.