# Longevity by Design

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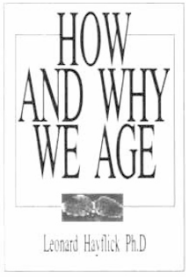
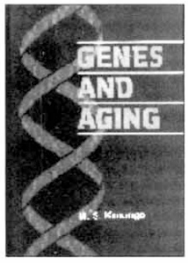



How and Why We Age, *Leonard Hayflick, Ballantine, New York, 1994, $24.00.*




Genes and Aging, *M. S. Kanungo, Cambridge University Press, New York, 1994, $69.95.*

Perhaps because of the dubious history of aging "research" throughout the centuries, modern medical research as applied to the aging process remains a truly understudied and underfunded endeavor. As in many other biological systems, human resource allocations for early survival and reproduction are strongly selected for during evolution, whereas traits that use resources to increase longevity are not selected so strongly since, by virtue of death due to predators, accidents, infection, starvation and the like, there are fewer reproducing organisms at later ages. We are now living at a time when the evolution of our intelligence, and consequent greater control over these environmental hazards, has vastly outstripped the evolution of our longevity. Clearly then, further extension of human life expectation will be engineered, rather than selected for, by Darwinian evolution.

That humanity may soon have to address "longevity engineering" is put forth in *How and Why We Age* by Leonard Hayflick, and, to a lesser extent, in *Genes and Aging* by M. S. Kanungo. The reader has only to reach each preface to be informed of the enormous (and quite recent) advances that the molecular biological revolution has brought about in our understanding of the aging process. These timely works not only provide the wealth of empirical observations and associated theories that form the core of contemporary aging research, they also provide a solid foundation for those interested in using this knowledge to impact the future of biogerontology.

One of the most respected gerontologists of our times, Hayflick has departed from his more usual channels in producing a highly affordable book aimed at an audience of much greater breadth than the biological sciences community. "The intelligent reader of any age" will find *How and Why We Age* as entertaining as a good novel. The book's readability is exemplified by the liberal use of quotations on the subject of aging from such diverse experts as William Shakespeare, Niels Bohr, and George Burns. More importantly though, and despite Hayflick's protestations to the contrary, this book is a virtual encyclopedia of data on human aging that could have only been selected and compiled by such a longstanding expert in the field. Definitions of aging, and the treatment of the statistics of the available data, are addressed with great clarity. Surprisingly though, the author gives, in his critiques of the numerous theories of aging, almost equal attention to each, despite the fall from favor of some of these theories. That these theories are not all mutually exclusive, and why this should be so, is also given relatively cursory attention. Perhaps an explanation of this complex subject, which is linked inextricably to the evolutionary biology of aging, was beyond the scope of this volume, which has been aimed at a wide readership.

The target readership for *Genes and Aging* is much narrower. In it, Kanungo has also compiled a tremendous reference resource, mostly pertaining to the proximate explanations of aging. Since proximate explanations of aging also involve proteins (among other cellular components), perhaps a more appropriate title for the book would have been *Genes and Gene Products and Aging*. In any event, this work represents a greatly expanded and updated version of earlier reviews on the subject, including, most notably the 1985 review on *Theories of Biological Aging* by Hayflick himself. Kanungo also critiques theories of aging, with more emphasis on the genetics and molecular biology of the subject. Again, the evolutionary biology of aging is not addressed forcefully, although the author is clearly cognizant of this constraint, particularly in dealing with such difficult areas as programmed cell death and aging. Given the book's comprehensive nature, it is also somewhat surprising that recent *Drosophila* results are not included.

Despite vast differences in style, each book gives the reader a good sense of the current state of knowledge of the field. Hayflick uses his forum as a vehicle to provoke thought on the consequences of our impending ability to manipulate the aging process. This is important, as the baby boom generation is likely to arrive at a powerful self-centered interest in its age-related medical problems soon. The financial and political wherewithal of this generation portends a golden era in biogerontology research, and for the first time in human history, biomolecular advances will be capable of truly impacting the treatment of diseases of aging and the aging process itself. These new works provide a rich view of how and why we age, and perhaps more importantly, teach us that now is the time to start thinking about what we can and should do about it. ///

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