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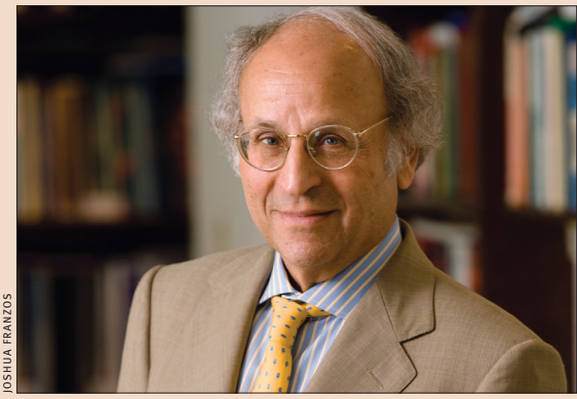
The more sand that has escaped from the hourglass of our life, the clearer we should see through it.
—Jean-Paul Sartre


JOSHUA FRANZOS

It's true, old age ain't for sissies. Unless we are lucky, we may have cataracts, cancer, Alzheimer's disease, calcium in our coronary arteries. Our spines shrink, prostates enlarge, menopause takes its toll. Then, in our 70s, most of us die. It may be cold comfort, but we are learning more about the cellular-molecular biology of the limits on the life span.

Plenty of it is genetics, as we see in the animal kingdom. A field mouse, for example, lives about two years, whereas a gray squirrel, so similar in its environment, diet, and metabolism, might see 20. If you'd like to make it to 100, you're most likely to get there if you have long-lived relatives on your mother's and father's sides. While surviving to your 70s is not very heritable, getting into the centenarian club is. For example, a variant of the gene *FOXO3* is found in most centenarians.

And then there's the passage of time and the damage it brings—free radicals ravaging our DNA, RNA, proteins, telomeres. The latter—protective "shoelace caps" that keep our DNA from unraveling—vary in length from one person to another, and the length of these caps is tied to longevity. As telomeres shorten over time, they become less protective, thus our immune cells become compromised, our risk of cancer increases, cardiovascular disease occurs, etc.

But perhaps there's good news here. There is evidence that stress can influence telomere length, so to the degree that our environment can affect longevity, sometimes it's ours to influence.

Humans number among a very short list of nonsissy species that live decades past the ability to reproduce (in good company with certain whales and Asian elephants), and you have to wonder why. One answer is that age confers a lifetime of experience, judgment, and wisdom that is our charge to pass on to younger people—certainly an evolutionary plus for our juniors. An older brain, though often not as fast in cognitive processing, is not only more knowledgeable, but also more adept at certain experience-dependent cognitive tasks and more skilled at reading emotions in others.

Once you've lived long enough, you're done fighting the good fight, competing in your career and, yes, in reproduction—your very reason for being, from one evolutionary standpoint. But from another, this age of battles long ago fought and, hopefully, of equanimity, is ripe with promise. One variant of the gene *CD33* that in older people suppresses the buildup of beta amyloid, either a cause or a biomarker of Alzheimer's disease, is thought to have emerged at the point in primate evolution when intact and wise brains became an evolutionary advantage. Our closest living cousins—chimps, bonobos, and gorillas—who do not outlive their fertility, largely lack this gene variant. These findings, published in *PNAS* this January, give new clout to the debated "grandmother hypothesis"—the nana as crucial caregiver. The elders, invested in babes' success and experienced at ensuring it, are so important that we evolved genes to protect their minds, the researchers suggest. There's certainly room for more investigation here, yet it seems that our longevity and transmissible wisdom are not independent of each other.

Arthur S. Levine, MD
Senior Vice Chancellor for the Health Sciences
John and Gertrude Petersen Dean, School of Medicine