



Progress in Longevity Medicine Seminar Series

Genetic and Epigenetic Contributions to Intraspecific & Interspecific Variations in Longevity

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Date/Time: Friday, January 12, 2007; 5:30 pm (dinner included)

Location: The Arizona Club, 201 N. Central Ave., 37th Floor

Cost: Free

Abstract: The author embraces the classical evolutionary biological theory of why we age despite a series of interesting recent challenges, several of which will be addressed. That theory sets the stage for an analysis of various classes of gene action that modulate the rates and types of senescent phenotypes and life span. Constitutional variations in the genome must explain the bulk of the remarkable variations in ranges of life span observed among populations of various species, including the circa thirty fold variations in maximum life span found among mammalian species.

Given the striking conservation of amino acid sequences and enzymatic functions among different mammals, a reasonable inference is that alterations in gene regulation rather than gene structure are the likely mechanisms that accompanied the emergence of enhanced longevities – for example, during the evolution of hominids. The variance in life span within members of any given population of a species is much more restricted, but still highly variable. Even in long lived mutants of *C. elegans*, one can observe overlaps in life spans among wild type and mutant worms.

The author suggests that epigenetic shifts in gene expression and not constitutional variations in the genome are largely responsible for such variations. Moreover, it is also suggested that stochastic epigenetic drifts in gene expression evolved as an adaptive response to substantial stochastic variations in the environment. Alternatively, the background “noise” in transcription and translation might be merely inevitable biophysical consequences of complex systems and that these lack clear associations with variations in longevity.

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Objectives:

- To understand why the evolutionary biological theory of aging remains the best explanation for why most animal species age.
- Discover how the evolutionary biological theory of aging leads to a classification of gene actions capable of modulating aging, thus providing a basis for a deeper understanding of how we age.
- Learn how constitutional genomes play dominant roles in the variations in longevity between species, while stochastic mechanisms play dominant roles in explaining variations of longevity among individuals within a species.

Biography: Dr. Martin is professor of pathology emeritus, director emeritus of the Alzheimer's Disease Research Center, and a retired adjunct professor of genome sciences at the University of Washington. He serves as a senior member for the National Academy of Sciences and as a scientific director for the American Federation for Aging Research. He is also a part of the Scientific Advisory Boards for the Benaroya Research Institute and the Ellison Medical Foundation, as well as founding editor-in-chief of an American Association for the Advancement of Science (AAAS) website focusing on the biology of aging research.

Dr. Martin's current research interests include the aging of post-replicative cells using genetic approaches and the development of genetic approaches in the study of aging and age-related diseases in mammals. Honors for his research include the American Aging Association Research Medal and Distinguished Scientists Award, World Alzheimer Congress Lifetime Achievement Award and Outstanding Alumnus Award from the University of Washington School of Medicine.

Dr. Martin earned his BS and MD degrees from the University of Washington and completed his residency in anatomic pathology at the University of Chicago. He went onto to pursue his postdoctoral research in somatic cell genetics at Glasgow University and also explored experimental embryology at Oxford University. Dr. Martin is certified by the American Board of Medical Genetics and the American Board of Pathology.

To RSVP or for additional information, please contact Diana Vuong at (602) 778-7492 or via email at Diana.Vuong@kronosinstitute.org.

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