Distinguished Visitor Programme

Prof Jerry Shay
Professor and Southland Corporation
Distinguished Chair in Geriatric Research, University of Texas Southwestern Medical Center

Biography

Prof. Jerry W. Shay is a Professor of Cell Biology and Neuroscience at the University of Texas Southwestern Medical Center in Dallas. A native of Dallas, Texas (he graduated from Hillcrest High School) he received his B.A. and M.A. from the University of Texas in Austin, and his Ph.D. from the University of Kansas. This was followed by postdoctoral research training with Keith Porter at the University of Colorado in Boulder. In 1975, he joined the faculty at the University of Texas Southwestern Medical Center. Dr. Shay has four children ranging in age from 10 to 24. His wife, Jennifer Cuthbert, is a physician and Professor of Internal Medicine, also at U.T. Southwestern

Prof. Shay's output in the literature is prodigious, with over 200 scientific articles published in refereed journals, some 50 book chapters written and some 10 books edited on this and other subjects. He was recently identified by the Institute for Scientific Research as one of the most highly cited researchers in the world. He serves on the editorial boards of several scientific journals (Cancer Research, J. Clin. Path., J. Nat. Cancer Inst., J. Antiaging Res., and Exp. Gerontology, etc.) and on the Editorial Academy of the Int. J. Molecular Med. and the Int. J. Oncology. He assists on the American Federation of Aging Research National Committee and is the Chairman of the Scientific Review Committee for the Mary Kay Ash Charitable Foundation. He is a member of the Scientific Advisory Board of Geron Corporation (a biotechnology company in California that focuses on aging and cancer research) and the Executive Committee of Southwestern/M.D. Anderson Lung Cancer Specialized Program of Research Excellence. Dr. Shay has served as a panel member of the NIH Mammalian Genetics Study Section, the National Executive Council of the Tissue Culture Association, and he was recently elected to a four year term on the Board of Directors, of the International Society of Differentiation.

Research: Role of telomeres and telomerase in human aging.

Telomere length appears to be critically involved in cellular senescence and in cellular immortality. Telomerase shortening results in cellular senescence, while stabilization of telomere length results in cellular immortality and cancer. Regulation of telomere length is usually, but not always, maintained by levels of the enzyme telomerase. Dr. Shay proposes to clarify alternative mechanisms to maintain telomeres, determine the mechanism by which shortening of telomeres induces cellular senescence, and investigate the genetic mechanism underlying the premature aging syndrome, Hutchinson-Gilford progeria.
Lecture Abstract

4 December 2003, 6.15 pm - 7.15 pm, Lecture Theatre 28 (next to carpark 9), National University of Singapore, Faculty of Medicine

"Aging and Cancer: Are Telomere and Telomerase the Connection?"

Normal human cells do not divide forever and eventually undergo a growth arrest known as replicative senescence. In contrast, most cancers cells can divide indefinitely. I will review evidence that the end of linear chromosomes called telomeres may connect both aging and cancer at the cellular level.

In humans, there are 46 chromosomes and thus 92 ends or telomeres per cell, and each telomere contains thousands of repeats of the six nucleotide sequence, TTAGGG. Due to the "end replication problem", telomeres are progressively lost with each cell division until senescence occurs. In contrast, cancer cells almost universally engage a mechanism to maintain telomeres so that they can divide indefinitely. This is accomplished by activating telomerase, a cellular ribonucleoprotein enzyme that adds telomere sequences back to the ends of chromosomes. Thus most human tumors have telomerase activity while most normal human cells do not. Since almost all tissues show progressive shortening of telomeres with increased age, in some instances, organ failure may occur in chronic diseases of high cellular turnover. Therefore, telomere manipulations in cells of regenerative tissues may have utility in treating certain chronic disorders, and inhibition of telomerase may be a novel approach to cancer therapy.

The aging process is complex and the challenge is to understand how telomere biology leads to increased aging vulnerability and to learn how to intervene in these processes so that we improve human healthspan.