

Telomere History

Year	Event	Discoverer	Article link	Published Journal/Page
1930s	Geneticists from USA found the structures at the ends of the chromosomes, the so-called telomeres, seemed to prevent the chromosomes from attaching to each other. They suspected that the telomeres could have a protective role, but how they operate remained an enigma.	Hermann Joseph Muller, American geneticist, Laureate of the Nobel Prize in Physiology or Medicine 1946; Barbara McClintock, American cytogeneticist, Laureate of the Nobel Prize in Physiology or Medicine 1983	A Correlation of Cytological and Genetical Crossing-Over in Zea Mays	Proc Natl Acad Sci USA, 1931 Aug; 17(8): 492–497, Harriet B. Creighton and Barbara McClintock
			The remaking of chromosomes	Collecting Net 8, 182–198. Muller, H. (1938)
			The stability of broken ends of chromosomes in Zea mays	Genetics. 1941 Mar; 26(2): 234–282. Barbara McClintock
1960s	Famous Hayflick limit theory explained that normal cells are not immortal and can only divide 40-60 times, and the shortening of telomeres will make cell division impossible.	Leonard Hayflick, Professor of Anatomy, UCSF School of Medicine and of Medical Microbiology, Stanford University School of Medicine	The serial cultivation of human diploid cell strains	Experimental Cell Research, Volume 25, Issue 3, December 1961, Pages 585-621, L.Hayflick, P.S.Moorhead
			The limited in vitro lifetime of human diploid cell strains	Experimental Cell Research, Volume 37, Issue 3, March 1965, Pages 614-636, L.Hayflick
1970s	Scientists proposed "Terminal Duplication" , understood how telomere shortening, predicted the existence of telomerase, and proposed "Hypothesis of Telomere Aging".	Alexey Matveyevich Olovnikov, Russian biologist; James Dewey Watson, American molecular biologist, the originator of the double helix structure of DNA in 1953, and Laureate of the Nobel Prize in Physiology or Medicine 1962	Principle of marginotomy in the synthesis of polynucleotides at a template	Doklady Akademii nauk SSSR, 201(6):394-397, January 1971, Alexey Olovnikov
			Origin of concatemeric T7 DNA	Nature New Biology, Volume 239, pages 197–201 (1972), J. D. WATSON
			A theory of marginotomy: The incomplete copying of template margin in enzymic synthesis of polynucleotides and biological significance of the phenomenon	Journal of Theoretical Biology, Volume 41, Issue 1, 14 September 1973, Pages 181-190, A.M.Olovnikov
1978-1985	Scientists completed the telomere sequencing of Tetrahymena and discovered telomerase from Tetrahymena.	Elizabeth H. Blackburn, Molecular Biologist, Professor of Department of Biochemistry and Biophysics, University of California, San Francisco; Carol W. Greider, Molecular biologist, Professor of Department of molecular biology and genetics, Johns Hopkins University	A tandemly repeated sequence at the termini of the extrachromosomal ribosomal RNA genes in Tetrahymena	Journal of Molecular Biology, Volume 120, Issue 1, 25 March 1978, Pages 33-53, Elizabeth H.Blackburn, Joseph G.Gall
			Identification of a specific telomere terminal transferase activity in tetrahymena extracts	Cell, Volume 43, Issue 2, Part 1, December 1985, Pages 405-413, Carol W.Greider, Elizabeth H.Blackburn
2009	Three American scientists awarded Nobel Prize in Physiology or Medicine for discovering how telomeres and telomerase protect chromosomes .	Elizabeth H. Blackburn, Carol W. Greider, Jack W. Szostak, Laureates of the Nobel Prize in Physiology or Medicine 2009	https://www.nobelprize.org/prizes/medicine/2009/summary/	