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Special Article

The Nobel Prize

The Nobel Prize is an international award administered by the Nobel Foundation in Stockholm, Sweden. In 1968, Sveriges Riksbank established The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, founder of the Nobel Prize. Each prize consists of a medal, personal diploma, and a cash award. Every year since 1901, the Nobel Prize has been awarded for achievements in physics, chemistry, physiology or medicine, literature and for peace.

All Nobel Laureates in Medicine

The Nobel Prize in Physiology or Medicine has been awarded 100 times to 195 Nobel Laureates between 1901 and 2009.

- 2009 - Elizabeth H. Blackburn, Carol W. Greider, Jack W. Szostak
- 2008 - Harald zur Hausen, Françoise Barré-Sinoussi, Luc Montagnier
- 2007 - Mario R. Capecchi, Sir Martin J. Evans, Oliver Smithies
- 2006 - Andrew Z. Fire, Craig C. Mello
- 2005 - Barry J. Marshall, J. Robin Warren
- 2004 - Richard Axel, Linda B. Buck
- 2003 - Paul C. Lauterbur, Sir Peter Mansfield
- 2002 - Sydney Brenner, H. Robert Horvitz, John E. Sulston
- 2001 - Leland H. Hartwell, Tim Hunt, Sir Paul Nurse
- 2000 - Arvid Carlsson, Paul Greengard, Eric R. Kandel
- 1999 - Günter Blobel
- 1998 - Robert F. Furchgott, Louis J. Ignarro, Ferid Murad
- 1997 - Stanley B. Prusiner
- 1996 - Peter C. Doherty, Rolf M. Zinkernagel
- 1995 - Edward B. Lewis, Christiane Nüsslein-Volhard, Eric F. Wieschaus
- 1994 - Alfred G. Gilman, Martin Rodbell
- 1993 - Richard J. Roberts, Phillip A. Sharp
- 1992 - Edmond H. Fischer, Edwin G. Krebs
- 1991 - Erwin Neher, Bert Sakmann
- 1990 - Joseph E. Murray, E. Donnall Thomas
- 1989 - J. Michael Bishop, Harold E. Varmus
- 1988 - Sir James W. Black, Gertrude B. Elion, George H. Hitchings
- 1987 - Susumu Tonegawa
- 1986 - Stanley Cohen, Rita Levi-Montalcini
- 1985 - Michael S. Brown, Joseph L. Goldstein
- 1984 - Niels K. Jerne, Georges J.F. Köhler, César Milstein
- 1983 - Barbara McClintock
- 198 - Sune K. Bergström, Bengt I. Samuelsson, John R. Vane
- 1981 - Roger W. Sperry, David H. Hubel, Torsten N. Wiesel
- 1980 - Baruj Benacerraf, Jean Dausset, George D. Snell
- 1979 - Allan M. Cormack, Godfrey N. Hounsfield
- 1978 - Werner Arber, Daniel Nathans, Hamilton O. Smith
- 1977 - Roger Guillemin, Andrew V. Schally, Rosalyn Yalow
- 1976 - Baruch S. Blumberg, D. Carleton Gajdusek
- 1975 - David Baltimore, Renato Dulbecco, Howard M. Temin
- 1974 - Albert Claude, Christian de Duve, George E. Palade
- 1973 - Karl von Frisch, Konrad Lorenz, Nikolaas Tinbergen
- 1972 - Gerald M. Edelman, Rodney R. Porter
- 1971 - Earl W. Sutherland, Jr.
- 1970 - Sir Bernard Katz, Ulf von Euler, Julius Axelrod
- 1969 - Max Delbrück, Alfred D. Hershey, Salvador E. Luria
- 1968 - Robert W. Holley, H. Gobind Khorana, Marshall W. Nirenberg
- 1967 - Ragnar Granit, Haldan K. Hartline, George Wald
- 1966 - Peyton Rous, Charles B. Huggins
- 1965 - François Jacob, André Lwoff, Jacques Monod
- 1964 - Konrad Bloch, Feodor Lynen
- 1963 - Sir John Eccles, Alan L. Hodgkin, Andrew F. Huxley
- 1962 - Francis Crick, James Watson, Maurice Wilkins
- 1961 - Georg von Békésy
- 1960 - Sir Frank Macfarlane Burnet, Peter Medawar
- 195 - Severo Ochoa, Arthur Kornberg
- 1958 - George Beadle, Edward Tatum, Joshua Lederberg

- 1957 - Daniel Bovet
- 1956 - André F. Cournand, Werner Forssmann, Dickinson W. Richards
- 1955 - Hugo Theorell
- 1954 - John F. Enders, Thomas H. Weller, Frederick C. Robbins
- 1953 - Hans Krebs, Fritz Lipmann
- 1952 - Selman A. Waksman
- 1951 - Max Theiler
- 1950 - Edward C. Kendall, Tadeus Reichstein, Philip S. Hench
- 1949 - Walter Hess, Egas Moniz
- 1948 - Paul Müller
- 1947 - Carl Cori, Gerty Cori, Bernardo Houssay
- 1946 - Hermann J. Muller
- 1945 - Sir Alexander Fleming, Ernst B. Chain, Sir Howard Florey
- 1944 - Joseph Erlanger, Herbert S. Gasser
- 1943 - Henrik Dam, Edward A. Doisy
- 1942 - The prize money was with 1/3 allocated to the Main Fund and with 2/3 to the Special Fund of this prize section
- 1941 - The prize money was with 1/3 allocated to the Main Fund and with 2/3 to the Special Fund of this prize section
- 1940 - The prize money was with 1/3 allocated to the Main Fund and with 2/3 to the Special Fund of this prize section
- 1939 - Gerhard Domagk
- 1938 - Corneille Heymans
- 1937 - Albert Szent-Györgyi
- 1936 - Sir Henry Dale, Otto Loewi
- 1935 - Hans Spemann
- 1934 - George H. Whipple, George R. Minot, William P. Murphy
- 1933 - Thomas H. Morgan
- 1932 - Sir Charles Sherrington, Edgar Adrian
- 1931 - Otto Warburg
- 1930 - Karl Landsteiner
- 1929 - Christiaan Eijkman, Sir Frederick Hopkins
- 1928 - Charles Nicolle
- 1927 - Julius Wagner-Jauregg
- 1926 - Johannes Fibiger
- 1925 - The prize money was allocated to the Special Fund of this prize section
- 1924 - Willem Einthoven
- 1923 - Frederick G. Banting, John Macleod
- 1922 - Archibald V. Hill, Otto Meyerhof
- 1921 - The prize money was allocated to the Special Fund of this prize section
- 1920 - August Krogh
- 1919 - Jules Bordet
- 1918 - The prize money was allocated to the Special Fund of this prize section
- 1917 - The prize money was allocated to the Special Fund of this prize section
- 1916 - The prize money was allocated to the Special Fund of this prize section
- 1915 - The prize money was allocated to the Special Fund of this prize section
- 1914 - Robert Bárány
- 1913 - Charles Richet
- 1912 - Alexis Carrel
- 1911 - Allvar Gullstrand
- 1910 - Albrecht Kossel
- 1909 - Theodor Kocher
- 1908 - Ilya Mechnikov, Paul Ehrlich
- 1907 - Alphonse Laveran
- 1906 - Camillo Golgi, Santiago Ramón y Cajal
- 1905 - Robert Koch
- 1904 - Ivan Pavlov
- 1903 - Niels Ryberg Finsen
- 1902 - Ronald Ross
- 1901 - Emil von Behring

From this issue of the BMJ, the short biography the Nobel scholars with summary of their works will be published successively starting from the most recent ones.

The Nobel Prize in Physiology or Medicine 2009 is awarded to

Elizabeth H. Blackburn, Carol W. Greider and Jack W. Szostak of USA for the discovery of "how chromosomes are protected by telomeres and the enzyme telomerase".

Summary

Last year's Nobel Prize in Physiology or Medicine is awarded to three scientists who have solved a major problem in biology: how the chromosomes can be copied in a complete way during cell divisions and how they are protected against degradation. The Nobel Laureates have shown that the solution is to be found in the ends of the chromosomes - the telomeres - and in an enzyme that forms them - telomerase.

The long, thread-like DNA molecules that carry our genes are packed into chromosomes, the telomeres being the caps on their ends. Elizabeth Blackburn and Jack Szostak discovered that a unique DNA sequence in the telomeres protects the chromosomes from degradation. Carol Greider and Elizabeth Blackburn identified telomerase, the enzyme that makes telomere DNA. These discoveries explained how the ends of the chromosomes are protected by the telomeres and that they are built by telomerase.

If the telomeres are shortened, cells age. Conversely, if telomerase activity is high, telomere length is maintained, and cellular senescence is delayed. This is the case in cancer cells, which can be considered to have eternal life. Certain inherited diseases, in contrast, are characterized by a defective telomerase, resulting in damaged cells. The award of the Nobel Prize recognizes the discovery of a fundamental mechanism in the cell, a discovery that has stimulated the development of new therapeutic strategies.

The Laureates

Elizabeth H. Blackburn is a citizen of Australia and the United States. She was born in 1948 in Hobart, Tasmania, Australia. She studied at the University of Melbourne and received her PhD in 1975 from the

Elizabeth H. Blackburn

University of Cambridge, England, after which she worked at Yale University in New Haven, USA. In the 1980s she did research at the University of California, Berkeley, and since 1990 she has been Professor of Biology and Physiology at the University of California, San Francisco.

Jack W. Szostak is a United States citizen. He was born in 1952 in London, England and grew up in Canada. He studied at McGill University in Montreal and received his PhD from Cornell University in Ithaca, New York in 1977. Since 1979 he has worked at Harvard Medical School, where he is now Professor of Genetics at Massachusetts General Hospital in

Jack W. Szostak

Boston. He is also affiliated with the Howard Hughes Medical Institute.

Carol W. Greider is a United States citizen. She was born in 1961 in San Diego, California, USA and received her education at the University of California in Santa Barbara and Berkeley, where she received her PhD in 1987, with Blackburn as supervisor. After research work at Cold Spring Harbor Laboratory in New York, she became Professor in the Department of Molecular Biology and Genetics at Johns Hopkins University School of Medicine in Baltimore, in 1997.

Jack W. Szostak

The Nobel Prize in Physiology or Medicine 2008 is awarded with one half to Harald zur Hausen for his discovery of "human papilloma viruses causing cervical cancer" and the other half jointly to Françoise Barré-Sinoussi and Luc Montagnier for their discovery of "human immunodeficiency virus".

Source: *http://nobelprize.org/nobel_prizes/ medicine/laureates*