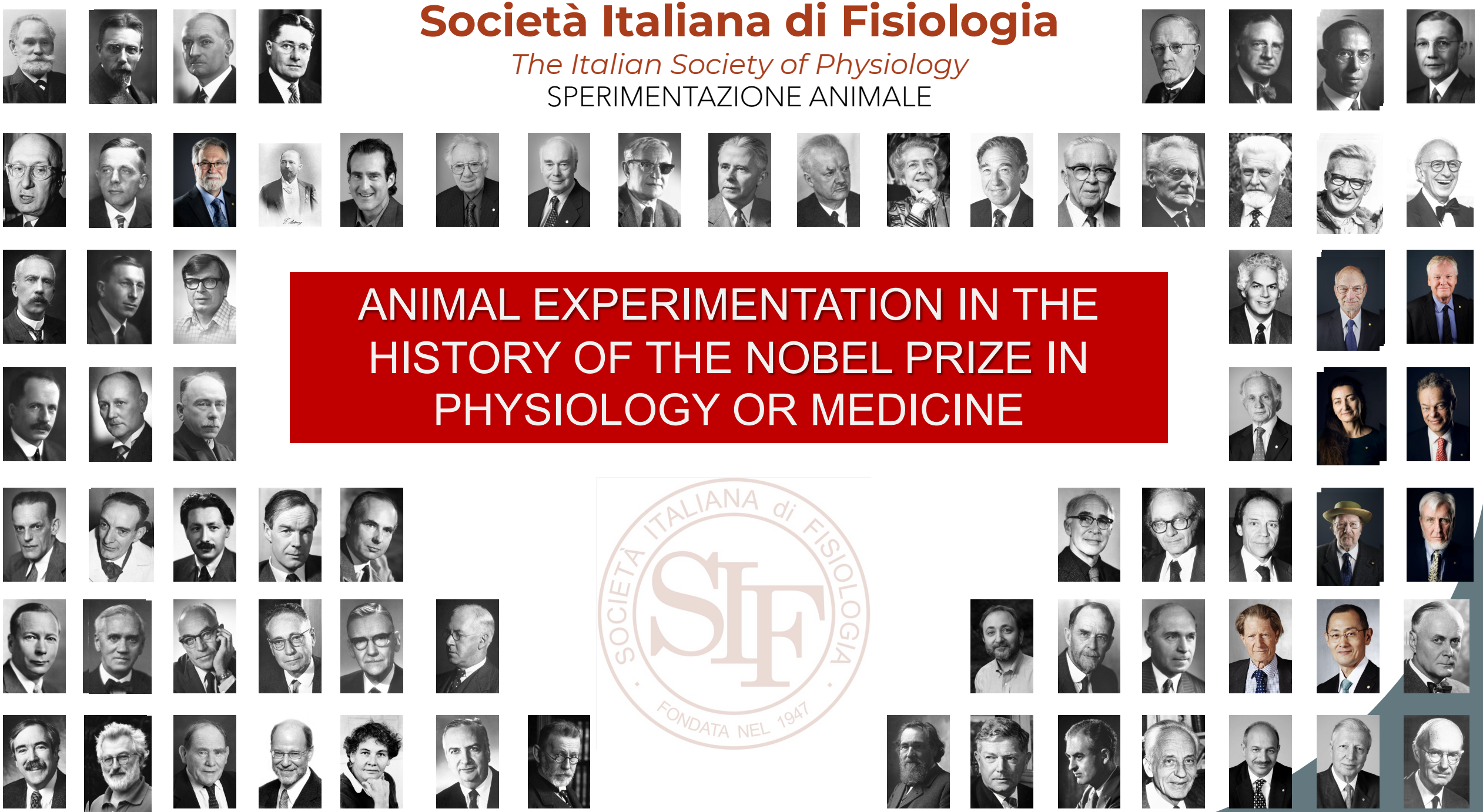
Società Italiana di Fisiologia

The Italian Society of Physiology

SPERIMENTAZIONE ANIMALE



ANIMAL EXPERIMENTATION IN THE HISTORY OF THE NOBEL PRIZE IN PHYSIOLOGY OR MEDICINE

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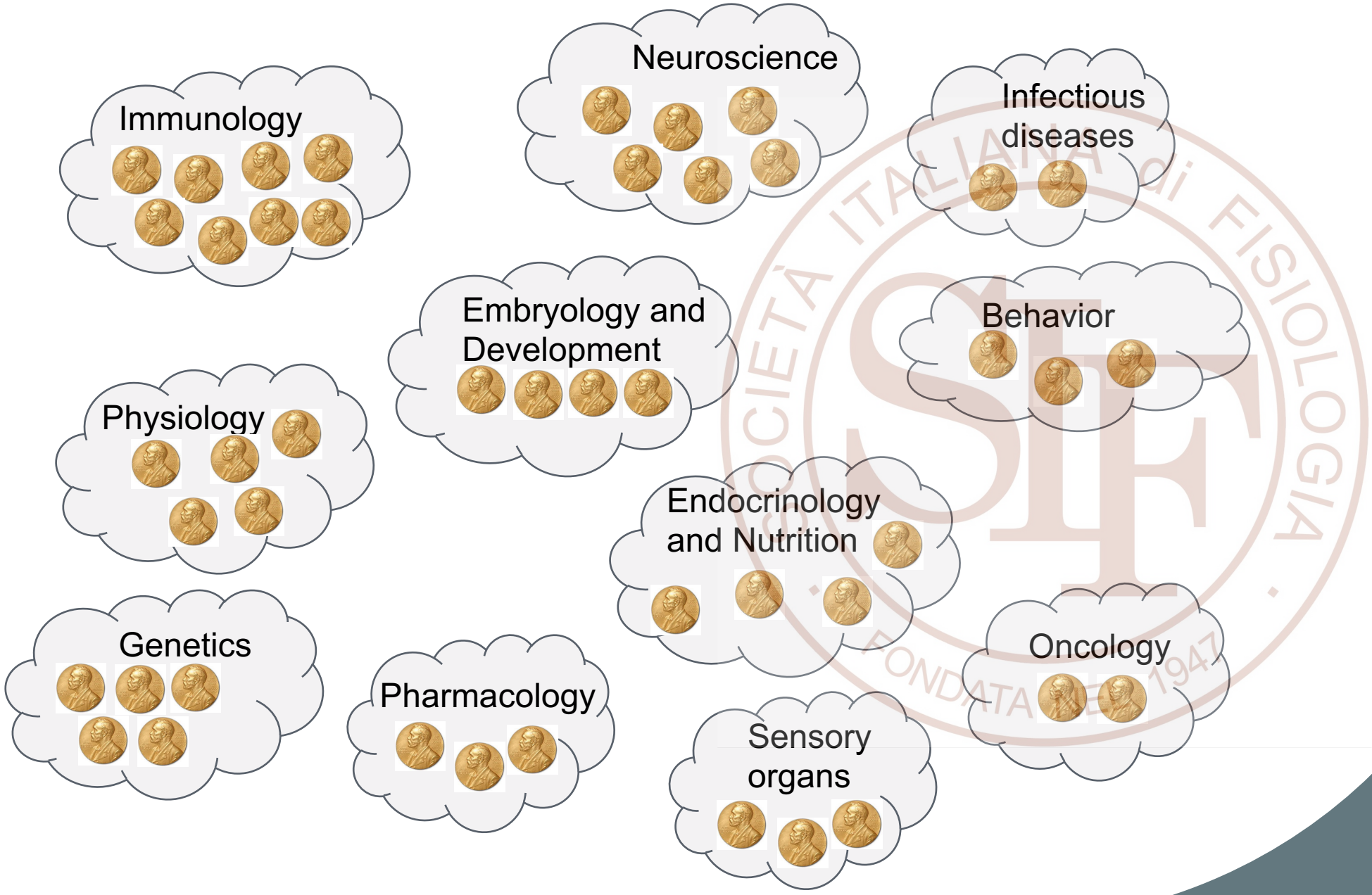
SPERIMENTAZIONE ANIMALE

ANIMAL EXPERIMENTATION IN THE HISTORY OF THE NOBEL PRIZE IN PHYSIOLOGY OR MEDICINE

the Nobel Prize in Physiology or Medicine has been awarded 112 times from 1901 to 2021: the results of research conducted on animals have been awarded on 47 occasions

The awarded studies cover multiple areas of biomedical research



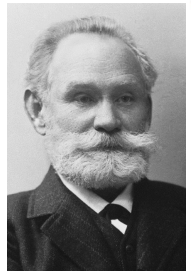
Different animal species have been studied

From the beginning of the last century to today, continuous scientific and technological advances have made it possible to progressively switch to the use of animal species with progressively lower neurological development

Year	Animal species	Year	Animal species
1901	Horse	1961	Guinea pig
1904	Dog	1963	Squid
1908	Starfish, rabbit, horse	1966	Chicken, dog
1913	Dog	1967	Frog, cat, monkey
1919	Different animals	1970	Frog, rat, rabbit
1920	Different animals	1973	Bees, birds
1922	Frog	1976	Monkey
1923	Dog	1977	Pig, lamb
1929	Rat	1980	Guinea pig, mouse
1931	Sea urchin and other animals	1981	Cat
1932	Cat, dog, monkey	1986	Mouse, chicken
1933	Fruit fly	1995	Fruit fly
1935	Frog	1997	Mouse, goat
1936	Cat, dog, frog	2000	Aplysia
1938	Dog	2002	Caenorhabditis elegans
1939	Mouse	2006	Caenorhabditis elegans
1943	Chicken	2007	Mouse
1944	Different animals	2011	Mouse, fruit fly
1945	Different animals	2012	Frog, mouse
1946	Fruit fly	2014	Rat
1949	Cat	2017	Fruit fly
1951	Mouse, monkey	2018	Mouse
1957	Guinea pig	2019	Mouse
1960	Mouse		

The research carried out on animals has made it possible to study and understand the physiology of organs and systems

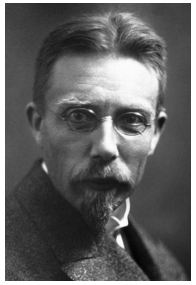
1904



Ivan Petrovich Pavlov

"in recognition of his work on the physiology of digestion"

1920



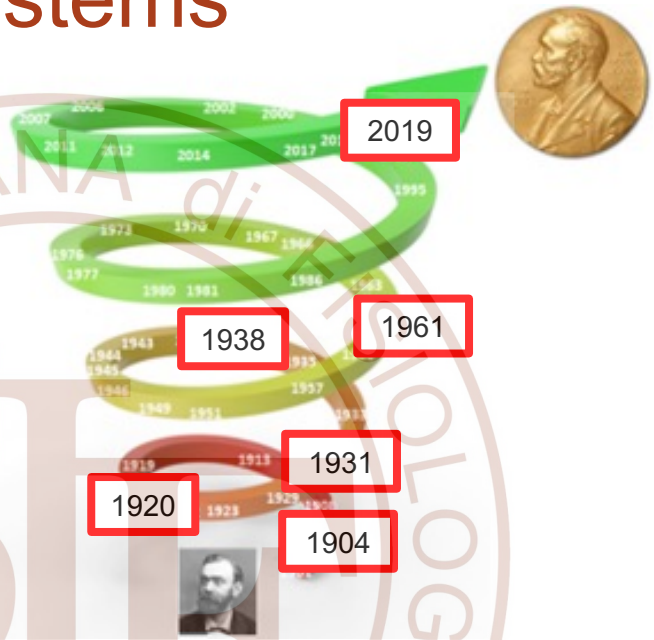
August Krogh

"for his discovery of the capillary motor regulating mechanism"

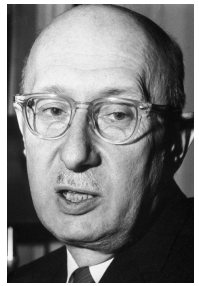
1938

Corneille Heymans

"for the discovery of the role played by the sinus and aortic mechanisms in the regulation of respiration"



1961



Georg von Békésy

"for his discoveries of the physical mechanism of stimulation within the cochlea"

1931

Otto Warburg

"for his discovery of the nature and mode of action of the respiratory enzyme"

2019

Gregg L. Semenza

"for their discoveries of how cells sense and adapt to oxygen availability"

Knowledge of the physiology of systems is essential for the prevention and treatment of their disorders

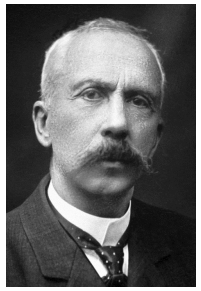
Pharmacological therapies for various pathologies have been developed thanks to studies carried out on animals

1901

"for his work on serum therapy, especially its application against diphtheria"

Emil Adolf von Behring

1913



"in recognition of his work on anaphylaxis"

Charles Richet

1923

"for the discovery of insulin"

Frederick G. Banting

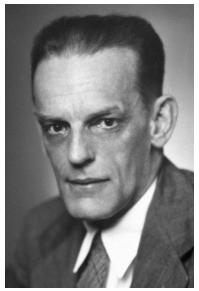
John Macleod

1943

"for his discovery of vitamin K"

Henrik Dam

1951



"for his discoveries concerning yellow fever and how to combat it"

Max Theiler

"for the discovery of the antibacterial effects of prontosil"

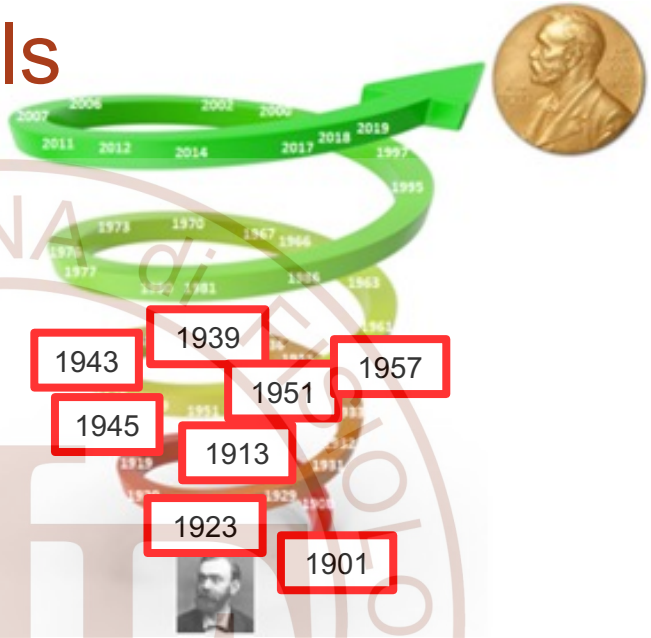
1939

Gerhard Domagk

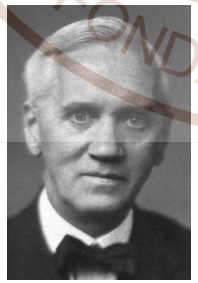
1957

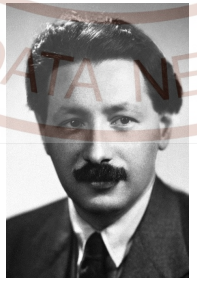
"for his discoveries relating to synthetic compounds that inhibit the action of certain body substances (antihistamine),…"

Daniel Bovet



1945





"for the discovery of penicillin and its curative effect in various infectious diseases"

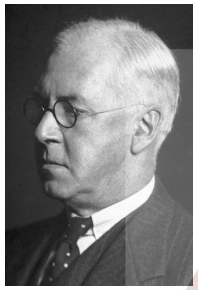
Sir Fleming

Ernst B. Chain

Sir Florey

The development of Neuroscience was based on research carried out on animals

1936

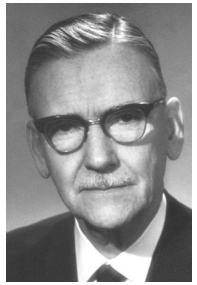


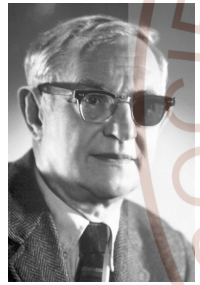
"for their discoveries relating to chemical transmission of nerve impulses"

Sir Henry Dale Otto Loewi

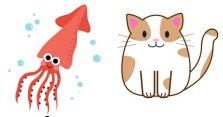
"for their discoveries concerning the humoral transmitters in the nerve terminals and the mechanism for their storage, release and inactivation"

1970



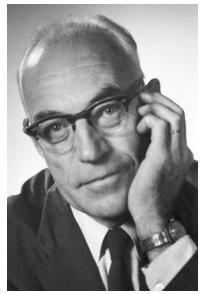


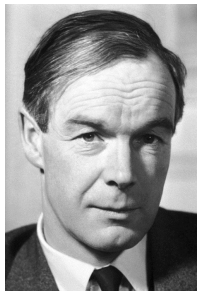
Sir Bernard Katz Ulf von Euler Julius Axelrod

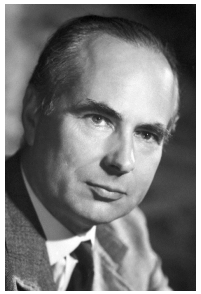


"for their discoveries concerning the ionic mechanisms involved in excitation and inhibition in the peripheral and central portions of the nerve cell membrane"

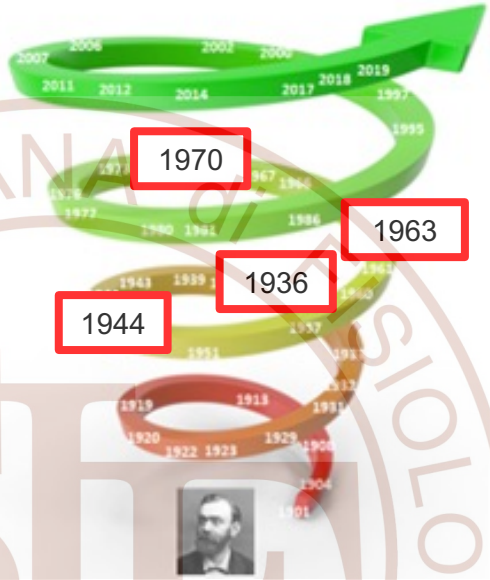
1963







Sir John Eccles Alan Hodgkin Andrew Huxley



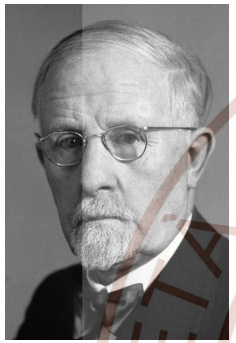
1944

"for their discoveries relating to the highly differentiated functions of single nerve fibres"

Joseph Erlanger Herbert S. Gasser

Animal experimentation has also made it possible to identify the neurobiological basis of complex behaviors 1/2

1949

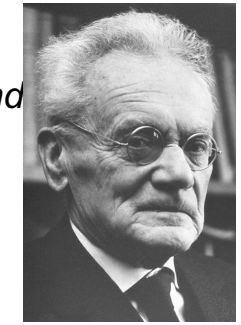


Walter Rudolf Hess

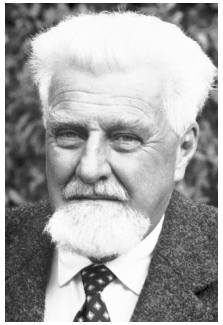
"for his discovery of the functional organization of the interbrain as a coordinator of the activities of the internal organs"

1973

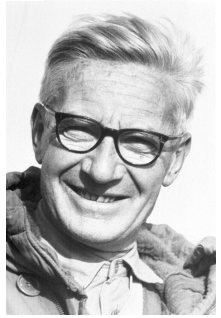
"for their discoveries concerning organization and elicitation of individual and social behaviour patterns"



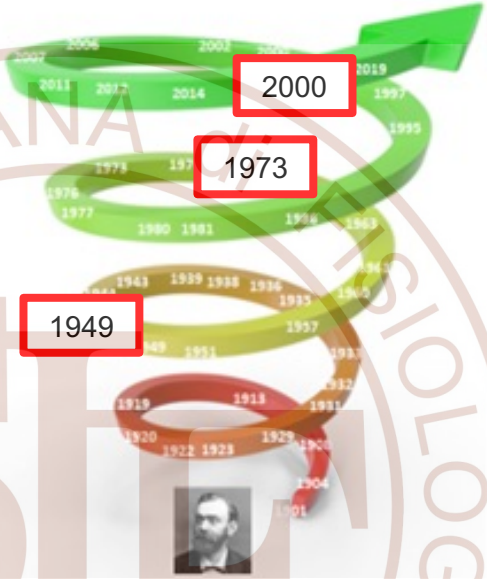
Karl von Frisch



Konrad Lorenz



Nikolaas Tinbergen



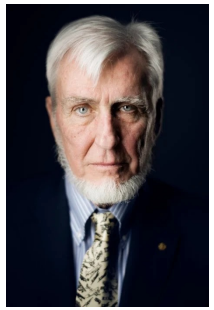
2000

Eric Kandel

"for the discoveries concerning signal transduction in the nervous system". He found that during learning, chemical signals changed the structure of synapses

Animal experimentation has also made it possible to identify the neurobiological basis of complex behaviors 2/2

2014

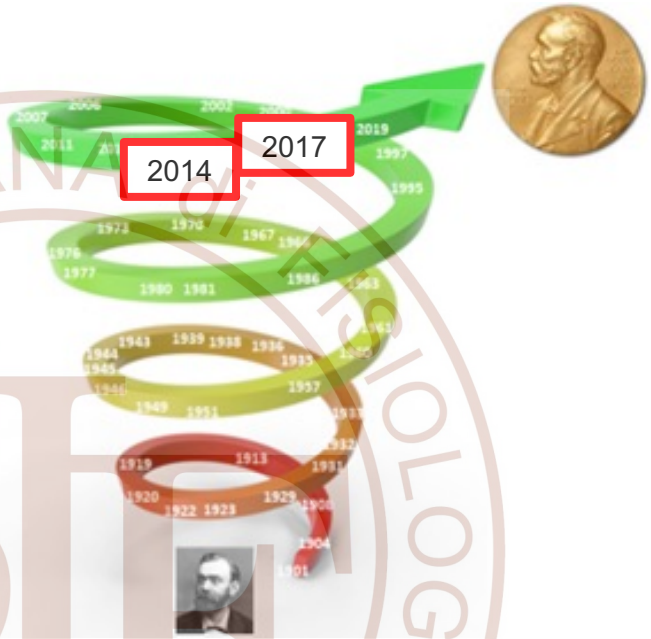


John O'Keefe

May-Britt Moser

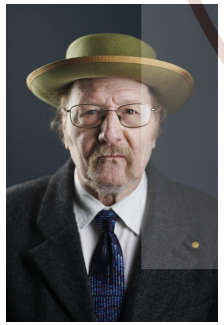
Edvard I. Moser

"for their discoveries of cells that constitute a positioning system in the brain"

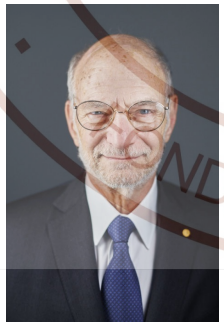


2017

"for their discoveries of molecular mechanisms controlling the circadian rhythm."



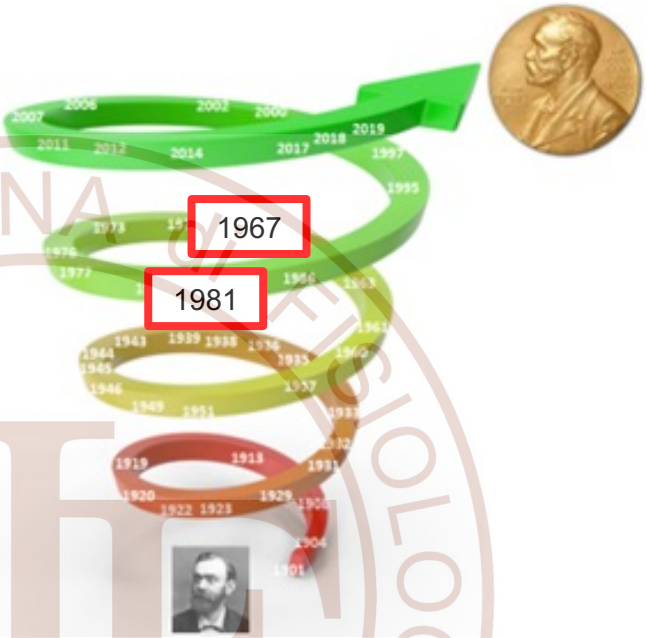
Jeffrey C. Hall



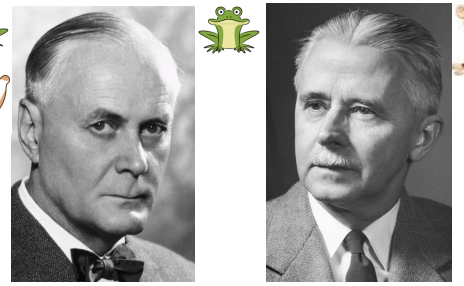
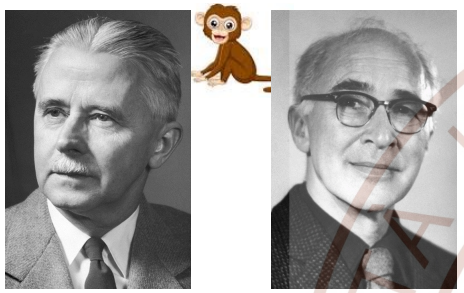
Michael Rosbash

Michael W. Young

The physiology of vision has also been studied in several animal species



1967

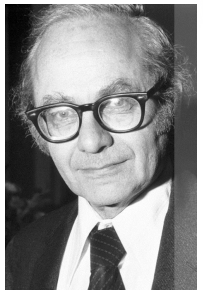
"for their discoveries concerning the primary physiological and chemical visual processes in the eye"

Ragnar Granit

Keffer Hartline

George Wald

1981

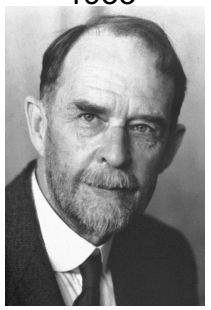

"for their discoveries concerning information processing in the visual system"

David H. Hubel

Torsten N. Wiesel

The study of different animal species has allowed to clarify the mechanisms of genetic transmission, and to develop methods for genetic manipulation

1933



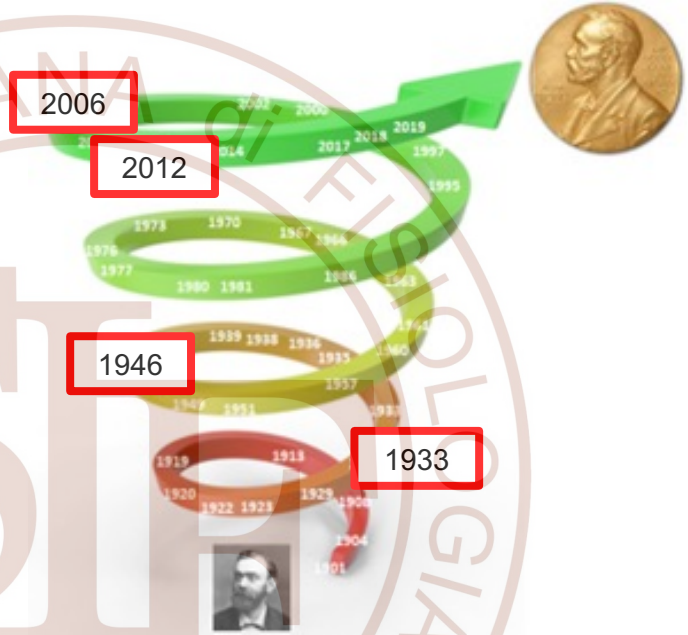
Thomas H. Morgan

"for his discoveries concerning the role played by the chromosome in heredity"

1946

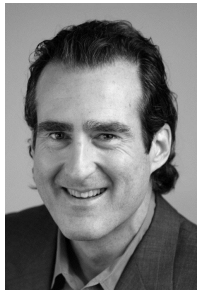
Hermann J. Muller

"for the discovery of the production of mutations by means of X-ray irradiation"



2006

Andrew Z. Fire



Craig C. Mello

"for their discovery of RNA interference - gene silencing by double-stranded RNA"

2012

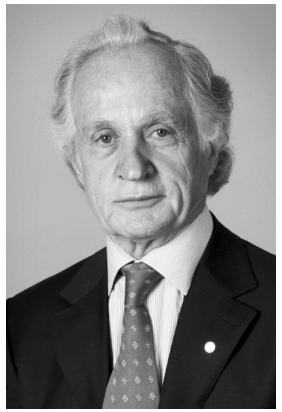
Sir John B. Gurdon

Shinya Yamanaka

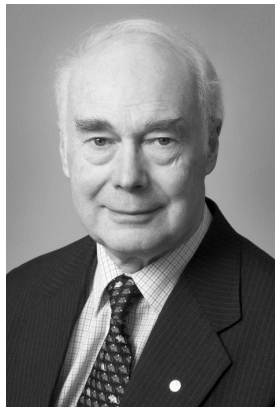
"for the discovery that mature cells can be reprogrammed to become pluripotent"

In 2007 the prize was awarded for studies that allowed the creation of genetically modified mice

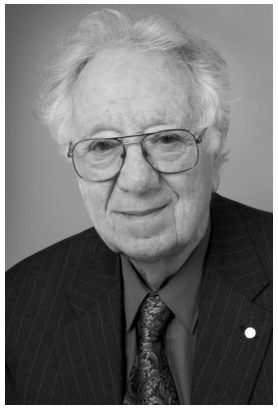
2007



Mario R. Capecchi

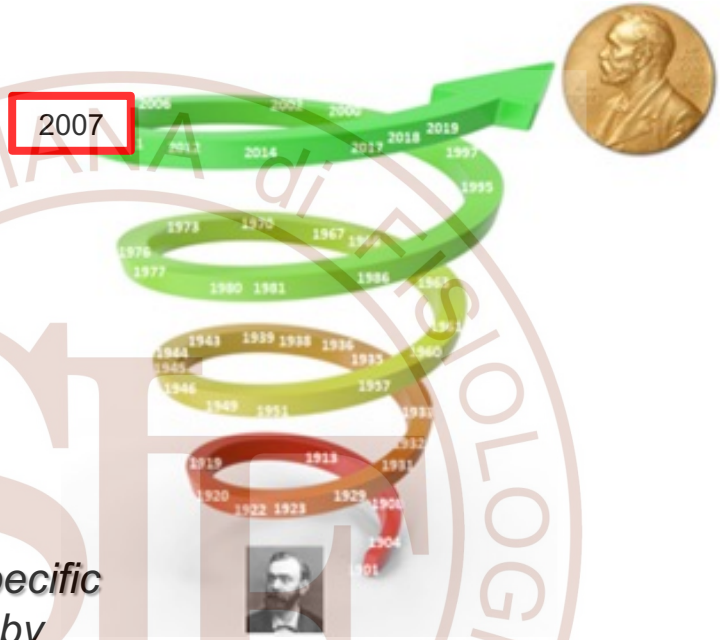


Sir Martin J. Evans



Oliver Smithies

"for their discoveries of principles for introducing specific gene modifications in mice by the use of embryonic stem cells"

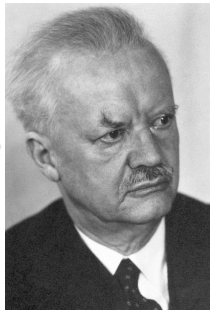


These represent today the most used and most effective model for studying genetically transmitted diseases

Research conducted on animals has made it possible to understand the processes of embryonic development

1935

"for his discovery of the organizer effect in embryonic development"



Hans Spemann

1986

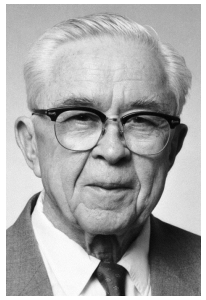
"for their discoveries of growth factors"

Stanley Cohen

Rita Levi-Montalcini

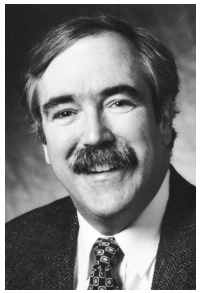
1995

"for their discoveries concerning the genetic control of early embryonic development"

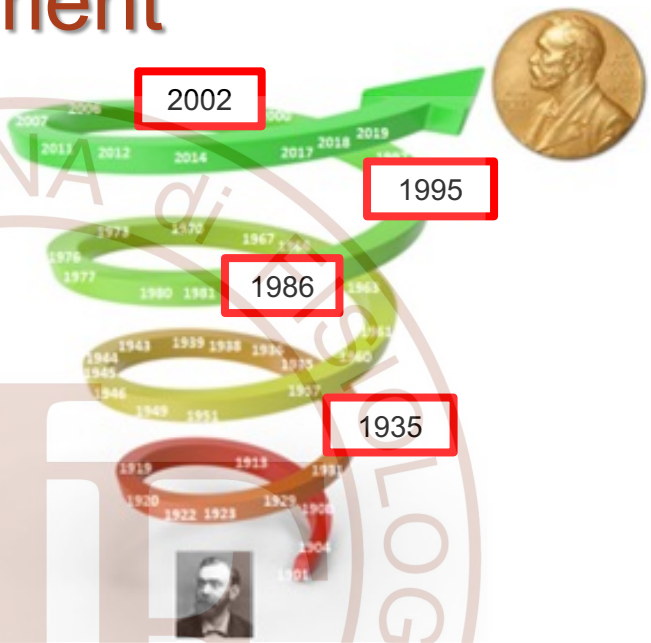


Edward B. Lewis

Christiane Nüsslein-Volhard

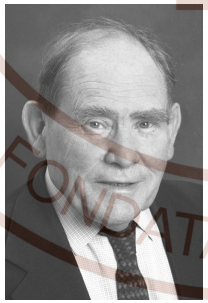


Eric F. Wieschaus

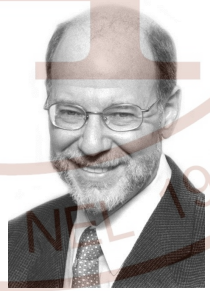


2002

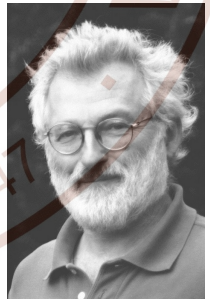
"for their discoveries concerning genetic regulation of organ development and programmed cell death"



Sydney Brenner



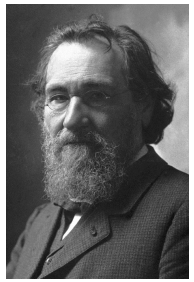
H. Robert Horvitz



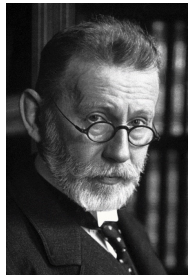
John E. Sulston

Functions and mode of action of the immune system have been identified thanks to research conducted on animals

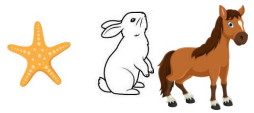
1908



Ilya Ilyich Mechnikov

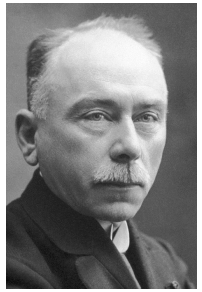


Paul Ehrlich



"in recognition of their work on immunity"

1919

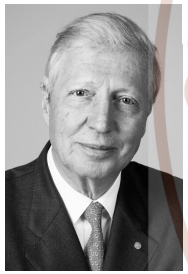


Jules Bordet

"for his discoveries relating to immunity"

2011

Bruce A. Beutler

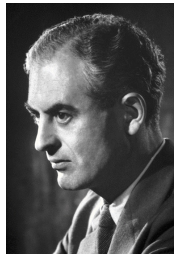


Jules A. Hoffmann

"for their discoveries concerning the activation of innate immunity"

1960

Sir F Macfarlane Burnet



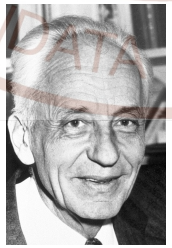
Peter Medawar

"for discovery of acquired immunological tolerance"

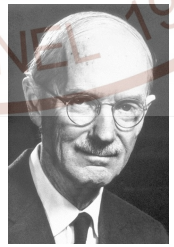
"for their discoveries concerning genetically determined structures on the cell surface that regulate immunological reactions"

1980

Baruj Benacerraf



Jean Dausset



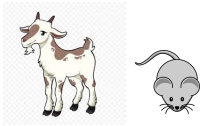
G. D. Snell

Animal experiments have led to the identification of a new type of pathogen, Prions

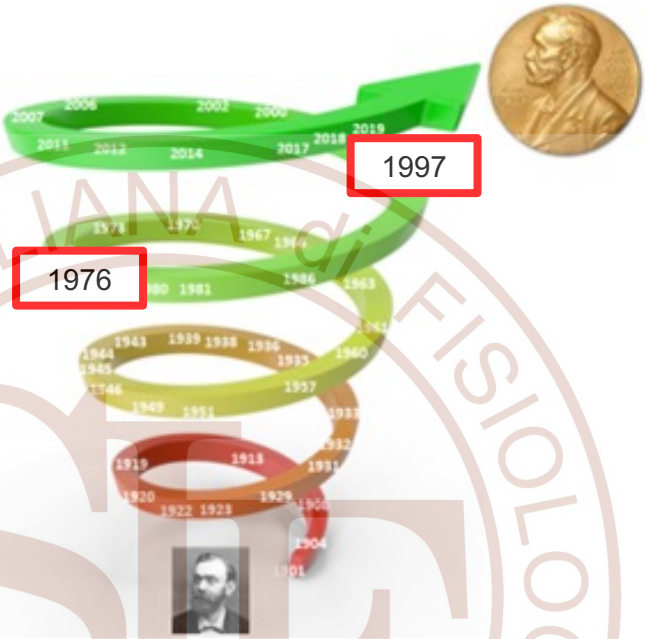
1976

"for his discoveries concerning new mechanisms for the origin and dissemination of infectious diseases"

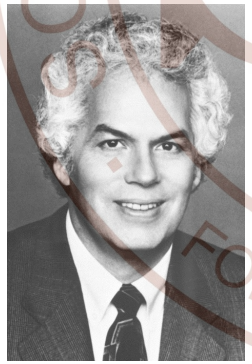
D. Carleton Gajdusek



"for his discovery of Prions - a new biological principle of infection"



1997



Stanley B. Prusiner

Prion diseases recognized today include Creutzfeldt-Jakob disease, fatal familial insomnia and some forms of amyloidosis