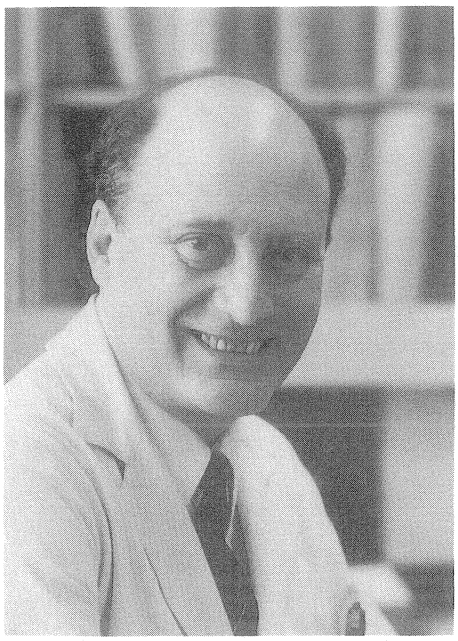
Professor Seymour Benzer



Date of Birth: October 15, 1921

Nationality: USA

Position: James Griffin Boswell Professor of Neuroscience, California Institute of Technology

Address: Division of Biology, California Institute of Technology
1200 East California Boulevard,
Pasadena, California 91125, USA

Education and Career:

1942	B. A. from Brooklyn College
1943	M. S. from Purdue University
1947	Ph. D. from Purdue University
1947-53	Assistant Professor, Purdue University
1953-58	Associate Professor, Purdue University
1958-61	Professor, Purdue University
1961-67	Stuart Distinguished Professor of Biophysics, Purdue University
1967-75	Professor of Biology, California Institute of Technology
1975-	James Griffin Boswell Professor of Neuroscience, California Institute of Technology

Awards and Distinctions:

1971	Lasker Award
1977	Harvey Prize, Israel
1983	National Medal of Science (USA)
1986	Thomas Hunt Morgan Medal, Genetics Society of America
1993	Crafoord Prize of the Royal Swedish Academy of Science
1994	Mendel Award, Genetical Society of Great Britain

Member, National Academy of Science (USA)
Foreign Member, Royal Society (London)

Academic Achievements:

Over the past 30 years, Dr. Seymour Benzer has led pioneering research utilizing the *Drosophila melanogaster* as a model, demonstrating basic genetic functions in the brain and mechanisms of development and differentiation in the nervous system. Using methods of drug application, he isolated behavior defective mutants induced by point mutation in the gene and conducted studies of "genetic dissection" of the mutants with defects in their sensory systems, synapses, and muscular and motor systems. His discoveries have been of immense contribution to progress in developmental genetic research on nervous systems.

Dr. Benzer had already made various remarkable achievements in the field of classic molecular genetics, especially in the genetic microstructure of bacteriophage. In the 1960s, Dr. Benzer and his coworkers began research that eventually led to the isolation of behavior defective mutants of the fruit fly, *Drosophila.*

Among Dr. Benzer's early achievements were the discovery of three species of *Drosophila* mutants with defects in their biological clocks. The analytic studies of these three mutants, each with a different biological clock, demonstrated the genetic control of circadian rhythm. The identification of the *per (period)* gene that controls the periodicity of daily behavior has opened the path to basic genetic studies of biological rhythm and led to significant subsequent discoveries.

Through research they carried out on isolating mutants with visual defects and applying electrophysiological techniques, Dr. Benzer and Dr. Yoshiki Hotta found that visual defects are caused by genes in the process of development and differentiation of photoreceptor cells. This significant discovery was made by a combination of applications of a comparatively simple behavioral technique and electrophysiological methods, offered an analytical methodology for genetic studies while establishing the study of molecular ethology as a new field of behavioral research. Using as a model the mutants they obtained through their mutant screening method, Dr. Benzer and Dr. Hotta developed a technique for genetic mosaic mapping that localizes the focus of a behavioral mutation to the primary responsible structure. Their analytic studies of

the gene involved in sensory systems, synapses and muscular systems led to numerous discoveries that have greatly influenced developmental genetic research on the nervous system of the *Drosophila,* thus contributing immensely to basic studies on nerve developmental mechanisms in general.

In more recent years, Dr. Benzer and his coworkers have led various research initiatives on mutants of the nervous systems, muscular systems, and neuro-muscular junctions, and succeeded in isolating mutants with unique defects in specific regions of the central nervous system that can be used as models for neurological diseases in humans. Recent spin-off discoveries show that not only a molecular mechanism homologous to that of vertebrates and humans are found in the *Drosophila,* but cell biological functions of early neurogenesis are also preserved in it. Thus, the *Drosophila* provides useful clues to human therapeutics.

In his most recent research, Dr. Benzer and his coworkers have isolated behavior defective mutants and made analytical studies to demonstrate a number of early development factors, including visual cells in the ommatidium of a compound eye, signal transduction in cell-cell interactions within visual cells, and apoptosis. Furthermore, Dr. Benzer and his group are currently doing work on the frontier of molecular ethological research in aging, memory and learning.

The achievements of Dr. Benzer on behavior defective mutants of the *Drosophila* have opened the pathway to developmental studies of molecular mechanisms of vertebrates and humans. Dr. Benzer has established new fields of study in genetics, ethology and neurobiology, and his contribution to the progress of developmental biology has been immeasurable.