UT SOUTHWESTERN MEDICAL CENTER NEWS

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Dr. Thomas Südhof wins Nobel Prize for two decades of work at UT Southwestern on how brain cells communicate

DALLAS – Oct. 7, 2013 – Dr. Thomas C. Südhof, adjunct professor of neuroscience and former chairman of the department at UT Southwestern Medical Center, was one of three scientists awarded the 2013 Nobel Prize in Physiology or Medicine for their discoveries of key information about how cellular transport systems work.

Dr. Südhof, now at Stanford University School of Medicine, was recognized for pioneering work performed at UT Southwestern on synaptic transmission, the process by which brain cells communicate with each other via chemical signals passed through the spaces, or synapses, between them. His studies on nerve-cell interaction and neurotransmitter release, a process that initiates communication between one neuron and another in the brain, has led to a better understanding of brain function under normal and pathologic conditions, such as Alzheimer's disease.

Dr. Südhof spent 25 years at UT Southwestern, starting as a postdoctoral fellow in 1983 in the laboratory of Dr. Michael Brown, director of the Erik Jonsson Center for Research in Molecular Genetics and Human Disease, and Dr. Joseph Goldstein, chairman of molecular genetics, who shared the 1985 Nobel Prize in Physiology or Medicine.

"We are immensely proud of Thomas Südhof. While a postdoctoral fellow in our laboratory, he solved an important problem concerning cholesterol. We were overjoyed that he remained on our faculty for more than two decades, where he performed all of the experiments that led to today's Nobel Prize," Dr. Brown said. "His discoveries explain how a batter can hit a 95 mph fastball that takes only four-tenths of a second to reach home plate. All Texans should share in our pride."

Dr. Goldstein said: "Thomas Südhof is a biomedical exceptionalist – like Babe Ruth was an exceptionalist in baseball, Leonard Bernstein in music, and Steve Jobs in computers. Having done his Nobel work at UT Southwestern in Dallas, Thomas is our sixth faculty member to win a Nobel Prize. This is quite a record for a relatively 'small' medical school – a record that exceeds the total number of Nobelists produced by premier and more established institutions, like the National Institutes of Health, Harvard Medical School, and even Stanford University School of Medicine, where Thomas has now enhanced Stanford's Nobel bragging rights!"

Dr. Daniel K. Podolsky, president of UT Southwestern, said, "It's another great day for UT Southwestern and all the faculty and staff who worked side-by-side with Dr. Südhof during his days of discovery here. UT Southwestern truly has been and continues to be an incubator for Nobel talent.

(MORE)

Nobel Prize – 2

Today's award makes the seventh Nobel [six faculty members and one graduate student] that has sprung from the rich loam of scientific inquiry that has been a hallmark of our medical center. But more importantly, the work that culminated in this Prize has the potential to change the way doctors treat disease and potentially save lives."

Dr. Südhof, who was recently honored with the Lasker Basic Medical Research Award, served on the UT Southwestern faculty from 1986 until 2008, when he was appointed professor of molecular and cellular physiology at Stanford University. Among his many accomplishments while at UT Southwestern were being named a Howard Hughes Medical Institute investigator in 1986 and election to the prestigious National Academy of Sciences in 2002 and its Institute of Medicine in 2007. At UT Southwestern, Dr. Südhof directed the C. Vincent Prothro Center for Research in Basic Neuroscience and held the Gill Distinguished Chair in Neuroscience Research and the Loyd B. Sands Distinguished Chair in Neuroscience. From 1997 to 2006, he directed the Center for Basic Neuroscience, and from 2007 to 2008, he served as first chairman of the Department of Neuroscience.

Dr. Südhof's work, which built upon independent discoveries by fellow Nobel winners James E. Rothman and Randy W. Schekman, with whom he shares today's Prize, solved the mystery of how the cell organizes its transport system, according to the Nobel Assembly at Karolinska Institutet.

Each cell is a factory that produces and exports molecules, the Nobel statement said. For instance, insulin is manufactured and released into the blood, and chemical signals called neurotransmitters are sent from one nerve cell to another. These molecules are transported around the cell in small packages called vesicles. The three Nobelists discovered the molecular principles that govern how this cargo is delivered to the right place at the right time in the cell.

Dr. Schekman, from the University of California, Berkeley, discovered a set of genes that are required for vesicle traffic. Dr. Rothman, from Yale University, unraveled protein machinery that allows vesicles to fuse with their targets to permit transfer of cargo. Dr. Südhof revealed how signals instruct vesicles to release their cargo with precision. Dr. Südhof was particularly interested in how nerve cells communicate with one another in the brain. The signaling molecules, called neurotransmitters, are released from vesicles that fuse with the outer membrane of nerve cells by using the machinery discovered by Dr. Rothman and Dr. Schekman, according to the Nobel statement.

But these vesicles are only allowed to release their contents when the nerve cell signals to its neighbors. Calcium ions were known to be involved in this process, and in the 1990s, Dr. Südhof searched for calcium-sensitive proteins in nerve cells. He identified molecular machinery that responds to an influx of calcium ions and directs neighbor proteins rapidly to bind vesicles to the outer

(MORE)

membrane of the nerve cell. The zipper opens up, and signal substances are released. Dr. Südhof's discovery explained how temporal precision is achieved and how vesicles' contents can be released on command.

Dr. Südhof was born in 1955 in Göttingen, Germany. Prior to joining UT Southwestern, he studied at the Max-Planck-Institut für Biophysikalische Chemie and at the Georg-August-Universität in Göttingen, where he received an M.D. in 1982 and a doctorate in neurochemistry.

UT Southwestern's Nobel history began when Dr. Brown and Dr. Goldstein received the 1985 Nobel Prize in Physiology or Medicine for their discovery of the basic mechanisms of cholesterol metabolism. Their findings led to the development of the cholesterol-lowering statin drugs.

Dr. Johann Deisenhofer received the Nobel Prize in Chemistry in 1988 for using X-ray crystallography to describe the 3-D structure of a protein molecule. This structure helped explain the process of photosynthesis.

In 1994 Dr. Alfred Gilman, chairman emeritus of pharmacology and former UT Southwestern provost, won the Nobel Prize in Physiology or Medicine for his discovery of G proteins, research that has led to a more complete understanding of how cells receive signals and respond to external stimuli.

In 2004 Dr. Linda Buck became the first alumnus of the UT Southwestern Graduate School of Biomedical Sciences to win a Nobel Prize. Now at the Fred Hutchinson Cancer Research Center in Seattle, Dr. Buck was recognized for her work in understanding the sense of smell.

In 2011 Dr. Bruce Beutler, director of the Center for the Genetics of Host Defense at UT Southwestern, won the Nobel Prize in Physiology or Medicine for his discoveries of how the immune system works.

About UT Southwestern Medical Center

UT Southwestern, one of the premier academic medical centers in the nation, integrates pioneering biomedical research with exceptional clinical care and education. The institution's faculty has many distinguished members, including five who have been awarded Nobel Prizes since 1985. Numbering more than 2,700, the faculty is responsible for groundbreaking medical advances and is committed to translating science-driven research quickly to new clinical treatments. UT Southwestern physicians provide medical care in 40 specialties to nearly 90,000 hospitalized patients and oversee more than 1.9 million outpatient visits a year.

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