Nobel for neuroscience research

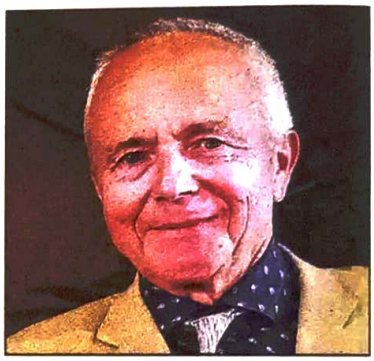
CAROLYN Y. JOHNSON AND LEO SANDS



Karl Deisseroth. (Reuters)



Peter Hegemann. (Reuters)



Georg Nagel. (Reuters)

London: Karl Deisseroth, Peter Hegemann and Georg Nagel were awarded the Nobel Prize in Physiology or Medicine on Monday for their discoveries in neuroscience.

The three scientists researched light-gated ion channels, a type of protein, to establish the field of optogenetics, a pioneering technique that uses pulses of light to activate or turn off discrete groups of neurons in the brain, said Abdel El Manira, a member of the Nobel Committee that awarded the prize.

Optogenetics is a powerful basic research tool in neuroscience. Researchers genetically manipulate brain cells and then use pulses of light to flip a switch in the brain and activate specific neurons. The technique provides clues for the treatment of conditions such as blindness, depression, addiction and dementia.

Who are the winners?

Dr Karl Deisseroth is a professor of bioengineering and psychiatry and behavioural sciences at Stanford University and an investigator at the Howard Hughes Medical Institute. Deisseroth is a psychiatrist whose work with patients led to frustration about a lack of precise explanations for what caused their suffering and symptoms. That helped motivate the development of a powerful tool to study the brain. He and a team inserted a light-sensitive gene into the brain cells of living mice and developed tiny optical fibers that activated those neurons and elicited specific behaviors for the first time, El Manira said.

Dr Peter Hegemann is a professor of experimental biophysics at Humboldt University in Berlin. He discovered a protein that converts light into an electrical signal, El Manira said.

Dr Georg Nagel is a professor of plant physiology at the University of Wurzburg in Germany. Alongside Hegemann, he discovered that the proteins contained a light-gated ion channel, which generates an electrical signal when exposed to light. El Manira described it as "the switch" that allows neuroscientists to activate the protein.

Why did the committee say they received the prize?

Professor Thomas Perlmann, the secretary-general of the Nobel Committee, described the field of optogenetics as a tool for research that would prove "immensely important" for the future understanding of many diseases. "It's really a new era in neuroscience," he said.

The discovery has enabled neuroscientists to link nerve cells in the brain to specific behaviours, said Anna Wedell a professor of clinical genetics at the Karolinska Institute in Stockholm and an adjunct member of the Nobel awarding committee.

"Before, we had an anatomical map of the brain," Wedell said. "Now we can generate functional maps, and we can also understand how different cells speak to each other across the brain." She described the discovery as heralding "a completely new dimension of understanding of the function of the brain".

What did the laureates say about winning the prize?

"It was very surprising," said Deisseroth, who was up past midnight in California, working on a paper and sending emails to students. He had just turned in and was starting to drift off when his phone started buzzing. Hours later, he was still awake, with just a few moments of quiet to reflect on winning the prize.

In an interview just before 4am Pacific time, Deisseroth said his children were still asleep, and he was planning to make their sandwiches for their school lunch in a few hours, as he did every morning. Other celebrations had yet to be planned.

Perlmann said he reached the newest Nobel laureates before the announcement. "All three were very surprised," he said. They also all said the same thing in response: "They thought it was absolutely wonderful to receive the prize with the other two."

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