The nobel prize in physiology or medicine 2014

The Nobel Prize in Physiology or Medicine 2014 was divided; one-half awarded to John O'Keefe, the other half jointly to May-Britt Moser and Edvard I Moser "For their discoveries of cells that constitute a positioning system in the brain." Their work, which collectively spans four decades, revealed the existence of nerve cells that build up a map of the space around us and then track our progress as we move around. The groundbreaking research transformed neuroscientists' understanding of the brain's ability to navigate and answered a question that had stumped scientists and philosophers for 100s of years: How do we know our place in the world?

May-Britt Moser and Edvard I Moser are the first married couple to win Noble Prize in 21st century; however, they join the other four married couples who won the Noble Prize in the last century viz. Marie Curie and Pierre Curie (1911), Frederic Joliot and Irene Joliot (1935), Carl Cori and Gerty Cori (1947) and Gunnar Myrdal and Alva Myrdal (1974, 1982).

O'Keefe, 75, a US-British citizen, studied classics, philosophy and engineering before finally settling on a career in neuroscience made his discovery >40 years ago. John O'Keefe was born in 1939 in New York City, USA, and holds both American and British citizenships. He received his doctoral degree in physiological psychology from McGill University, Canada in 1967. After that, he moved to England for postdoctoral training at University College London. He has remained at University College and was appointed Professor of Cognitive Neuroscience in 1987. In his research he found that individual cells in the hippocampus activate based on where we are in the world. Move to a different place, and a new cell will activate. But move back and the original cell will come to life. "This system allows us to move flexibly," he said. "When one plan to go through a specific route this part of the brain lights up and stays active. But when they have to follow a simple route you don't need this part of the brain".

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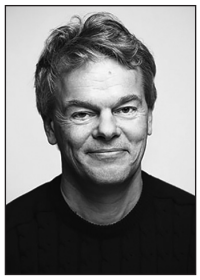
John OæKeefe

May-Britt Moser



Edvard I. Moser

Moser couple, both from Norway, who trained in O'Keefe's laboratory while recording brain signals from rats as they moved around noticed an extraordinary pattern of activity in a neighboring part of the brain called the entorhinal cortex. Specific nerve cells sprang into action when the rats passed through different locations. They called them "grid cells" that provided the brain with the equivalent of latitude and longitude, and together with place cells formed an inner GPS in the brain.

May-Britt Moser was born in Fosnavag, Norway in 1963 and was a Norwegian citizen. She studied psychology at the University of Oslo together with her future husband and co-Laureate Edvard Moser. She received her Ph.D. in neurophysiology in 1995. She was a postdoctoral fellow at the University of Edinburgh and subsequently a visiting scientist at University College London before moving to the Norwegian University of Science and Technology in Trondheim in 1996. May-Britt Moser was appointed Professor of Neuroscience in 2000 and is currently Director of the Center for Neural Computation in Trondheim.

Edvard I. Moser was born in born 1962 in Alesund, Norway and had Norwegian citizenship. He obtained his Ph.D. in neurophysiology from the University of

Oslo in 1995. He was a postdoctoral fellow together with his wife and co Laureate May Britt Moser, first at the University of Edinburgh and later a visiting scientist in John O´Keefe´s laboratory in London. In 1996, they moved to the Norwegian University of Science and Technology in Trondheim, where Edvard Moser became Professor in 1998. He is currently Director of the Kavli Institute for Systems Neuroscience in Trondheim.

The damage to these areas of the brain may explain symptoms of dementia and other brain diseases. The early stages of Alzheimer's can affect the hippocampus and entorhinal cortex, causing people to lose their way and forget about their environment. Knowledge about the brain´s positioning system may, therefore, help us understand the mechanism underpinning the devastating spatial memory loss that affects people with this disease. The discovery of the brain's positioning system represents a paradigm shift in our understanding of how ensembles of specialized cells work together to execute higher cognitive functions. It has opened new avenues for understanding other cognitive processes, such as memory, thinking and planning.

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