

techman / April 17, 2012 11:14AM

[\[Neuroscience\] 《Science》 Recently Published the Research Result of the Cooperation between National Taiwan University and Harvard University – Revealing the Myth of Brain Function: the MRI Technique](#)

[Neuroscience] 《Science》 Recently Published the Research Result of the Cooperation between National Taiwan University and Harvard University –

Revealing the Myth of Brain Function: the MRI Technique ([Chinese Version](#))

NTU Spotlight How to prevent the neuro-related mental diseases? How to solve the myth of brain function? These have always been the big challenges in the medical area. There are approximately 1,000 billion nerve cells in a human brain, and each neuron connects to on another by extending with its long neuro fibers. Thus, How these nerve cells connect to one another and how they deliver the accurate signals by the highly complicated network? Are there any cures for the neuro-related mental diseases by accessing the correct methods? Professor Wen-Yih TSENG of NTUCM-COEBM (Center for Optoelectronic Biomedicine, National Taiwan University College of Medicine) and Professor Van Jay WEDEEN of Harvard Medical School have just published their new research result in the latest scientific journal, Science, to present their discovery of the three-dimensional structure of the nero network in hopes they can solve the myths of brain function.

By using the innovative technique of MRI (magnetic resonance imaging), Professor TSENG and his research team from NTU Medical School have discovered that the nero fibers of a monkey's brain are constituted by a simple three-dimensional structure, which looks like a chessboard. This three-dimensional structure happens to be a balance in an organic object. It was a breakthrough and also a surprise to discover that the structure of nero fibers is the simple geometric structure, following the axial system in the human body, which is rare to be seen for scientists. The discovery also points out how the brain function tells the accurate sense of location in a certain space.

Such a simple three-dimensional structure has just been discovered for the very first time in human history because the conventional methods focused on the observation of partial neuro fibers, which are not sufficient for the complete structure. Professor TSENG and his research team developed the innovative technique, Diffusion Spectrum Imaging (DSI), to detect the direction and the length of each nero fiber in order to reconstruct the structure of nero fibers. Since the technology is not highly advanced to receive the accurate images from a human brain, the NTU research team operated the experiment on monkeys' brains instead to do the high-definition Diffusion Spectrum Imaging, and this is how they discovered the three-dimensional structure of brain function.

The research result shows that the three-dimensional structure exists among four different species of monkeys. And according to the subsequent research, the three-dimensional structure also can be found in human brain.

The discovery of the network structure of brain function helps understanding the development and the evolution of the brain network. First of all, it is very likely that neuro fibers develop their won chessboard network, following the extension of the body axial. And then, the nerve cells deliver the signals to the distant cells through this network. Therefore, the signals can be accurately delivered to the correspondent nerve cells in the distance for sure.

Currently, the scientists have been practicing this structure of brain network to analyze and to diagnose mental diseases in hopes they can solve the long-existing myths. The research result of neuro science has already shown that some of the mental diseases could be resulted from the malfunction or the disconnection of nerve cells; thus, the three-dimensional structure is very likely to be viewed as the biologic footnote of mental diseases. In other words, the doctors can diagnose the mental disease and to check the effect of medicine treatment by observing the changes of the three-dimensional structure before it is too late to go through any treatment.

Further Information:

[NTU Spotlight](#)

---

[National Science Council International Cooperation Sci-Tech Newsbrief](#)

---

Edited 1 time(s). Last edit at 04/17/2012 11:15AM by techman.

---