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7.0T MRI Super Resolution MR Tractography and its applications

Newly obtained super-resolution tractography (SRT) with 7.0T MRI began to allow us to reliably hypothesize some of the neural circuitry too complex to be studied earlier by the conventional connectivity imaging due to the resolution limits. For the first time, with Super Resolution Tractography (SRT), we can now reliably hypothesize one of the most complex and much discussed yet unclear functional circuit, such as the sensory- memory- language- cognition- decision- action (SM-LCDA) circuitry. First, based on SRT, we have identified the dorsal language pathways, in conjunction with Geschwind's territory or the inferior parietal lobe, and proposed Langram hypothesis. In the second, to perform the language translation and subsequent production of the Langram, it is necessary to equip with some form of memory system, therefore, we proposed "Lexicon" hypothesis. The latter, Lexicon, is learning dependent, a nature uniquely human. Thirdly, further downstream, it is assumed that the Langram is utilized in the cognition and decision processes, mostly assumed it is performed in the prefrontal and inferior frontal cortices.

Biography

Prof. Zang-Hee Cho received Ph.D. from Uppsala University (Sweden) in 1966 and has been faculty at the University of Stockholm and University of California-Los Angeles. In 1979, Dr. Cho moved to Columbia University as a Professor of Radiology (Physics). Since 1985, Dr. Cho was the Professor of Radiological Science as well as professor of Psychiatry and Human Behavior at University of California at Irvine. From 2005, Prof. Cho served as University Professor and Director of the Neuroscience Research Institute, Gachon University of Medicine & Science, Incheon, till he joined as a Distinguished Research Fellow at the Advanced Institute of Convergence Technology (AICT), Seoul National University, Seoul, Korea. Professor Cho has been a pioneer in Positron Emission Tomography (PET) and Magnetic Resonance Imaging since the inception of the computerized tomography (CT) in 1972. He was the first one who pioneered world's first "Ring PET", the first molecular imaging device, in 1975. Professor Cho has also been pioneer in the field of MRI. Since 1980 he developed one of the world's first 0.1T MRI in Korea and subsequently 2.0T in 1985. He then continued one of the world's first 7.0T MRI coupling with super resolution PET (HRRT) for the world's first PET-MRI fusion system in 2008. Among the many honors and awards, Professor Cho was elected as a member of us National Academy of Science, institute of medicine in 1997.

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