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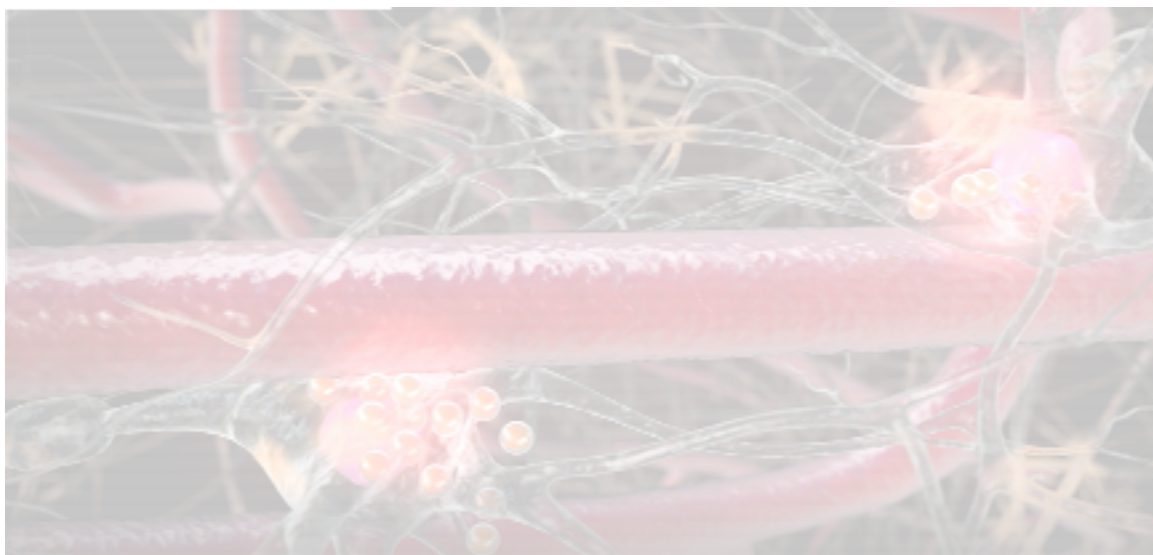
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Professor Jungwon Yoon selected for the Human Plus Convergence Research and Development Challenge Project

- GIST (President Kiseon Kim) – Professor Jungwon Yoon's team was selected as a finalist for its "Next Generation Brain Function Controller (Nano-Brainstim) Development Project" for the Human Plus Convergence Research and Development Challenge Project sponsored by the National Research Foundation of Korea (NRF).
 - The NRF selected three research teams for the first time among four categories: intelligence enhancement, physical enhancement, five-senses enhancement, and a free category. The team led by Professor Jungwon Yoon was selected for the physical enhancement category on April 19. Professor Yoon plans to identify the function of improving motor functions through targeted brain stimulation.
- Neuromodulation technology is a technique to normalize or regulate neural tissue functions by transmitting stimuli to specific nerve areas. It is possible to treat brain diseases of a rapidly aging society, improve mental disorder, and create interface with wireless brain-computer interaction. It is urgently needed to create new industries and develop new markets through the development of brain control technology.

- The global market for neural control is expected to expand to more than 10 trillion by 2024, and the noninvasive target brain magnetic poles that will be developed in this research will help improve motor skills weakened by aging and brain diseases.
- Current noninvasive brain stimulation techniques have limited ability to perform comprehensive brain activation at the surface of the brain due to low cranial conductivity and the difficulty to stimulate specific areas of the brain. In addition, the risk of side effects from stimulating unintended areas of the brain was the biggest obstacle to the application of brain treatments.
- The next-generation brain control technology using biocompatible nanoparticles developed in this project can be used to precisely control cell-level neural stimulation through non-invasive wireless driving, and a breakthrough is expected for the realization of precise target stimulation technology of the brain.
- Professor Jungwon Yoon, an expert in the field of nanoparticles, plans to develop original technologies for noninvasive brain stimulation through convergence research between researchers who specialize in neurosurgery and researchers who specialize in brain science in order to successfully develop this new concept of a brain stimulation platform.
- To provide the brain interface platform necessary for user-specified/real-time brain control for human enhancement through this project, it will develop original technology applicable to virtual reality and exoskeleton robots. It is also expected to contribute to reducing the national social burden caused by disability in patients with degenerative brain disease and to develop new medical devices.
- Professor Jungwon Yoon said, "If noninvasive brain stimulation platform technology is developed that enables cell-level targeted brain stimulation without side effects in deep brain regions, it will enable

the treatment of various brain diseases that were previously difficult to treat, and it will be convenient for brain stimulation exercises that stimulates the brain. Because simultaneous brain stimulation is possible in various parts of the brain, if the new concept of brain stimulation technology is introduced as a medical device, it will have a very high effect on the treatment of brain diseases and brain interfaces."



Activation of nerve cell through nanoparticle thermal stimulation