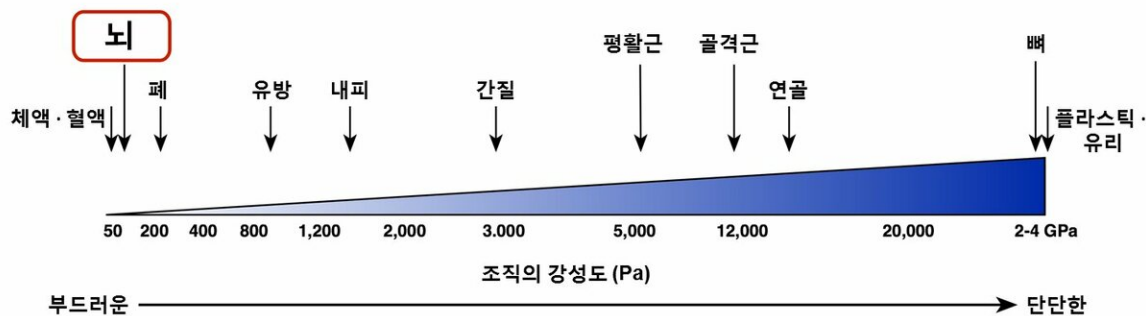


Development of a technology to produce dorsal cortical neurons

March 28 2019



The bigger the number, the harder it is. Credit: Butcher et al, Nat. Rev. Cancer, 2009

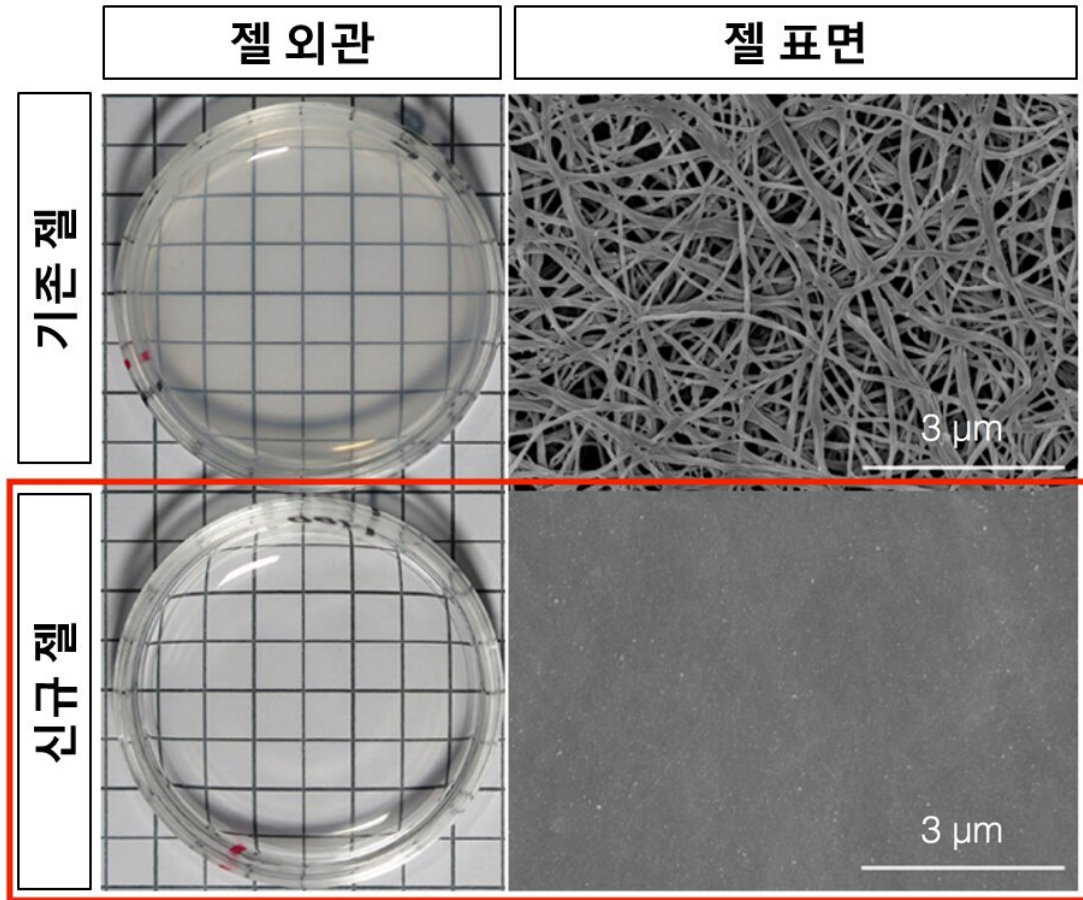
Korea Brain Research Institute (KBRI, President Pann Ghill Suh) announced on Mar. 4 that its research team led by principal researcher Yoichi Kosodo has developed a technology to mass produce cerebral cortex neurons utilizing Induced pluripotent Stem Cells (iPS). The research outcome will be published in the March issue of *Scientific Reports*.

Scientists expect that it will be possible to treat [brain](#) diseases by restoring damaged area in the brain by mass producing neurons utilizing stem cells even though cerebral neurons die if one suffers from [degenerative brain diseases](#) such as dementia and Parkinson's Disease.

In fact, a research team of Kyoto University in Japan conducted clinical test of transplanting neurons made of iPS into the brain of a patient with Parkinson's disease. In Parkinson's disease, neurons that generate the neurotransmitter dopamine die, resulting in symptoms such as [muscle stiffness](#) and tremor in hands and feet. Through the clinical test, the patient was treated with new neurons.

The research team cultivated iPS on a gel made of collagen from a fish called Tilapia, and successfully differentiated it into neurons.

In particular, the research team cultivated iPS after making collagen gel with the same stiffness as human brain tissue (1500Pa) and confirmed that cerebral cortex neurons were produced at a level 60 percent higher compared with existing methods.



Top: Collagen gel which has been in use. Collagen fabric is observed on the surface.- Bottom: Collagen gel produced for this research. It is transparent to the extent that the the area below the gel can be seen. Credit: KBRI

The stiffness of human brain tissue changes as people age. Recently, it was reported that the stiffness of brain tissue changes with the progression of neurodegenerative diseases such as Alzheimer's. The research team reproduced stiffness of brain tissues shown in various kinds of diseases in this research and expects that the cause and mechanism of [brain diseases](#) could be identified by cultivating neurons.

Dr. Kosodo said, "This research is meaningful in that the stiffness of brain is found to be an important factor in determining differentiation of neurons. We expect that we can mass produce certain [neurons](#) to be used for neuron regeneration treatment in the future."

More information: Brain-stiffness-mimicking tilapia collagen gel promotes the induction of dorsal cortical neurons from human pluripotent stem cells, *Scientific Reports* (2019). [DOI: 10.1038/s41598-018-38395-5](#) , www.nature.com/articles/s41598-018-38395-5

Provided by Korea Brain Research Institute

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