



김 병 곤

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Neuroscience

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Glial cells have been traditionally regarded as playing only supportive roles in neural information processing. Recent studies provide growing evidence that glial cells actively participate in the modulation of neural transmission exerting influence on normal and abnormal physiology of nervous system more heavily than previously thought. More recent researches on glial cells have identified a kind of a brain sink, so called "glymphatic system", that functions to remove metabolic intermediates and toxic molecules generated from neural activity. Disruption of the glymphatic system is now thought to be at least one of the contributing factors to the progression of neurodegenerative diseases or to lingering dysfunction after neural injury. Further studies are expected to reveal complex heterogeneity of glial cells that might be responsible for spatially and temporally fine-tuned coding of neural information.

Repurposing the drugs already used in the market has proved to be a highly efficient way to develop new drugs for intractable diseases. Several approaches have been taken to screen novel therapeutic effects of existing drugs, and there are several candidate drugs for neurological diseases awaiting approval of which novel applications are identified by the drug repositioning approach. Ongoing clinical trial of induced pluripotent stem cells for retinal degeneration was halted for fear of developing cancerous mutations, being a blow for stem cell therapeutics. However, ever-refined gene-editing technologies (for example, Crispr/Cas-9) hold promise for correcting diseased genes in patients suffering from hereditary disorders and replacing damaged cells or tissues generated by stem cells with corrected genetic components. These technologies are also renewing hopes for gene therapies of which progress has been hampered by viral vector associated problems. This lecture will briefly introduce some of recent breakthroughs in glial cell biology and therapeutics in relations to intractable neurological disorders.

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