Editorial

Int Neurourol J 2022;26(Suppl 2):S83-84
https://doi.org/10.5213/inj.2222edi04
pISSN 2093-4777 · eISSN 2093-6931

INTERNATIONAL NEUROUROLOGY JOURNAL
INJ
OPEN ACCESS

Epigenetic Dysfunction of Neurodegenerative Diseases, MeCP2 and More

Heh-In Im[1,2] https://orcid.org/0000-0002-4763-5009

[1]Center for Brain Function, Brain Science Institute, Korea Institute of Science and Technology (KIST), Seoul, Korea
[2]Division of Bio-Medical Science & Technology, KIST School, Korea University of Science and Technology, Seoul, Korea

Email: him@kist.re.kr

This quarter's *International Neurourology Journal* special issue is "Epigenetic Dysfunction of Neurodegenerative Diseases, MeCP2 and More." The current issue consists of 3 basic research papers specifically dealing with animal experiments, one on clinical trials, and another utilizing clinical databases. A large part of these papers covers the effects of epigenetic regulation on gene expression and the functional changes of specific brain regions that arise from the pathogenesis of neurodegenerative diseases including Alzheimer disease (AD) and Parkinson disease (PD).

In this issue, Lee et al. [1] report that epigenetic changes by MeCP2 may alter ZBTB16 expression in the striatum, and that ZBTB16 function as a transcription factor may influence cognitive decline during AD pathogenesis. Kim et al. [2] performed quantitative sequencing of the early and late-stage AD mouse model striatum and compared the resulting changes in the transcriptome with the dataset from MeCP2 ChIP-Seq. The comparative analysis indicates that certain genes of the transcriptional regulatory pathway could be altered by epigenetic regulators in the course of AD pathogenesis. As a research result highly related to this, Kim et al. [3] shows that neuronal dysfunction in the striatum may lead to structural changes in the hippocampus, suggesting that the functional changes of the striatum in AD and PD are associated with the cognitive decline in neurodegenerative diseases. As an epigenetic mechanism that may affect PD onset, Guhathakurta et al. [4] report the deregulation of the repression mechanism by CpG binding protein TET1 and its downstream effect on SNCA gene expression, implicating SNCA repression as a novel therapeutic strategy for PD. Another posttranscriptional regulation of interest is the alternative splicing of AD-risk genes analyzed by Kim et al. [5]. Here, they identify several novel exon skipping sites according to the frontal and temporal brain regions and proposed them as a treatment target and region-specific biomarker of AD.

The epigenetic regulation of gene expression for the maintenance and regulation of brain function is a research field that has recently attracted attention. At the same time, the role of epigenetics in normal aging and neurodegenerative diseases, specifically the functional role of MeCP2 as a brain-enriched epigenetic regulator and the methylation status of the genome have been reported by numerous studies. However, the overarching mechanisms that lead from epigenetic regulation to changes in brain executive function have not yet been fully understood. Thus, in this special issue, we focus on papers that have elucidated the role of epigenetic regulation in the pathogenesis of AD and PD in the context of striatal function.

• **Conflict of Interest:** No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Lee S, Kim TK, Choi JE, Kim HS, Im HE. Striatal ZBTB16 is associated with cognitive deficits in Alzheimer disease mice. Int Neurourol J 2022;26(Suppl 2):S106-16.
2. Kim TK, Lee SJ, Im HE. Quantitative sequencing analysis of the

striatal transcriptome in a mouse model of Alzheimer disease. Int Neurourol J 2022;26(Suppl 2):S117-25.
3. Kim B, Weerasinghe-Mudiyanselage PDE, Ang MJ, Lee J, Kang S, Kim JC, et al. Changes in the neuronal architecture of the hippocampus in a 6-hydroxydopamine-lesioned rat model of Parkinson disease. Int Neurourol J 2022;26(Suppl 2):S94-105.
4. Guhathakurta S, Song MK, Basu S, Je G, Cristovao AC, Kim YS. Regulation of αlpha-synuclein gene (SNCA) by epigenetic modifier TET1 in Parkinson disease. Int Neurourol J 2022;26(Suppl 2):85-93.
5. Kim S, Han S, Cho SA, Nho K, Koh I, Lee Y. Brain region-dependent alternative splicing of Alzheimer disease (AD)-risk genes is associated with neuropathological features in AD. Int Neurourol J 2022;26(Suppl 2):126-36.