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**Expression of brain-specific angiogenesis inhibitor-1 is decreased and regulated by the AMPK pathway in Parkinson's disease**Jae-Sun Choi<sup>1</sup>, Seungyeon Nam<sup>2</sup> and Joo-Won Jeong<sup>1</sup><sup>1</sup>Kyung Hee University, South Korea<sup>2</sup>Gachon University, South Korea

**Background & Aims:** Progressive dopaminergic neurodegeneration is responsible for the cardinal motor defects in Parkinson's disease (PD). PD researchers still have limited understanding of the key molecular events that provoke the selective dopaminergic neurodefects in this disease. The present study examined whether brain-specific angiogenesis inhibitor (BAI1) participates in the pathway of dopaminergic neuronal loss in a 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) mouse model of PD.

**Method:** We constructed a PD model to evaluate the role of BAI1 on neuronal cell survival. Eight-week-old male C57BL/6 mice were randomly assigned to a saline group and MPTP (20mg/kg×4/day, 2 hours intervals). Moreover, mouse mesencephalic neurons and SH-SY5Y cells were treated with 10  $\mu$ M and 300  $\mu$ M (or 500  $\mu$ M) of MPP<sup>+</sup> for 24 hours, respectively.

**Result:** BAI1 immunostaining of brain sections from MPTP-treated mice showed that BAI1 was significantly decreased. Moreover, BAI1 level was specifically decreased in dopaminergic neurons in the substantia nigra of MPTP-toxicated mice. In primary mouse mesencephalic neurons and human neuroblastoma cell lines, 1-methyl-4-phenylpyridinium (MPP<sup>+</sup>) which is a toxic metabolite of MPTP also suppressed the expression of BAI1. We applied a bioinformatics tool to extend upstream regulatory pathway of BAI1 expression. AMP-activated protein kinase (AMPK) was predicted as a regulator and consequently AICAR, a specific activator of AMPK, reduced the BAI1 protein level. BAI1 overexpression decreased nuclear condensation induced by MPP<sup>+</sup> treatment.

**Conclusion:** Down-regulated BAI1 by AMPK $\alpha$  induces neuronal cell death in PD model and BAI1 could play a crucial role as cell survival factor in neurodegenerative pathway of PD.

**Biography**

Jae-Sun Choi has received her BS at Pusan National University and her PhD in Biomedical Science in 2011 at Kyung Hee University, South Korea. She was a Post-doctorate at Kyung Hee University, where she worked in projects about tumor angiogenesis between 2011 and 2016. Since 2016, she is a Research Fellow at Kyung Hee University. She has eight years of experience in basic research with expertise in both Parkinson's disease and tumor angiogenesis. Her research interests focus on the effect of natural compound on Parkinson's disease and the novel mechanism mediated by HIF-1 $\alpha$  of tumor angiogenesis.

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