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Reverse translational neuroscience research to unravel the causes of intractable diseases

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Recent technological innovations have led to the discovery of induced pluripotent stem (iPS) cells, and it has become possible to analyze the mechanisms of disease onset. In addition, DNA recombination systems such as the Cre/loxP system are used to specifically control target gene expression in the rodent brain. In the present study, by combining human disease-specific iPS cell research and *in vivo* neuroscience research, we tried to investigate the mechanism by which dopaminergic neurons are selectively affected in Parkinson's disease. In a study with human iPS cells, we found a significant increase in catechol-O-methyltransferase (COMT) expression in dopaminergic neurons along with epigenetic modifications including DNA hypomethylation. Furthermore, in an *in vivo* Cre/loxP-transgenic study, overexpression of COMT in dopaminergic neurons of the substantia nigra of mice induced cataleptic behaviors. These approaches are useful techniques for applying a patient's information to basic neuroscience research. In this symposium, we will outline and discuss the practice of "reverse translational neuroscience research".