

<Research overviews>

Neurohypophysial Oxytocin (OXT) is a peptide hormone synthesized in the hypothalamus of the brain, and is delivered to neurons expressing oxytocin receptor (OXTR), by axonal projection or by paracrine system. Oxtr is expressed in multiple types of neurons, with exerting various cellular and physiological functions in animals. We generated mice lacking Oxtr gene and found that OXT/OXTR system was essential to control various social behaviors, such as maternal behavior, mother-infant relationship, social memory and so on.

On the other hand, genetic mutations in oxtr gene were found with a portion of familial autistic spectrum disorder (ASD) patients. Furthermore, a couple of reports demonstrated that nasal administration of OXT to ASD patients improved normally their social behaviors.

After generation of oxtr-venus knockin mice to visualize neurons expressing OXTR, we analyzed various types of neurons, which expressed OXTR. For example, OXTR was highly expressed in a large portion of serotonergic neurons in median raphe and dorsal raphe, suggesting that OXT may exert its function in controlling socio-sexual behaviors via 5-HT secretion. The others further reported that OXT exerted a curing effect for melancholic or schizophrenic patients.

<Possible University-industry research collaboration>

We've already reported that the usability of Oxtr^{-/-} mice for pharmaceutical analysis of synthetic OXTR agonists, and we are proceeding to utilize our mice as a suited tool to develop/analyze new drugs applicable to ASD patients, whose incidence rate may be close to 1 % of the total population.