

Auxin-mediated rapid degradation of target proteins in neurons

Risako Nakano¹, Naoki Ihara¹, Shota Morikawa¹, Ai Nakashima¹, Masato Kanemaki^{2,3}, Yuji Ikegaya¹, Haruki Takeuchi¹

¹Lab. Chem. Pharmacol., Grad. Sch. Pharmaceut. Sci., Univ. Tokyo, ²Mol. Cell Eng. Lab., National Inst. Genet., ROIS, ³Dept. Genet., Grad. Univ. Adv. Studies

Genetic manipulation of protein levels is a promising approach to identify the function of a specific protein in living organisms. Previous studies demonstrated that the auxin-inducible degron strategy provides rapid and reversible degradation of various proteins in fungi and mammalian mitotic cells. In this study, we employed this technology to postmitotic neurons to address whether the auxin-inducible degron system could be applied to the nervous system. Using adeno-associated viruses, we simultaneously introduced enhanced green fluorescent protein fused with an auxin-inducible degron tag and an F-box family protein, TIR1 from *Oryza sativa* (OsTIR1), into hippocampal neurons from mice. In dissociated hippocampal neurons, enhanced green fluorescent protein fluorescence signals rapidly decreased when adding a plant hormone, auxin. Furthermore, auxin-induced enhanced green fluorescent protein degradation was also observed in hippocampal acute slices. Taken together, these results open the door for neuroscientists.