The expression analysis of Tsukushi during the chick somitogenesis
(ニワトリ胚体節形成時におけるTsukushiの発現解析)

Background and purpose:

Recent studies showed that molecular control of somitogenesis is achieved only by the invention of molecular oscillator and signaling molecules. We have previously reported that TSK involved in a diverse biological cascades in vertebrate embryos including regulatory functions in modulating BMP and Wnt signaling pathways and act as a signaling mediator. However, the involvement of TSK in somitogenesis and oscillation remains unknown. In this study, we investigate detailed expression pattern of TSK at different developmental stages of chick embryo.

Methods:

We did in situ hybridization and examined the expression pattern of C-TSK in the PSM of different developmental stages of chick embryos. To examine whether Notch signaling is essential for the normal expression of C-TSK, we did pharmacological approach using Notch inhibitor DAPT (a dipeptidic γ-secretase inhibitor). To determine whether the expression of C-TSK is intrinsically controlled inside the PSM, we performed explant culture assay and in situ hybridization experiment.

Results:

During early development, we found the expression pattern of C-TSK in the PSM of different developmental stages of chick embryos. Interestingly, C-TSK expression along the PSM shows dynamic oscillation like c-hairy 1, and c-Notch1, but not c-Delta1. We found Notch signaling is essential for the normal expression of C-TSK in the chick PSM. Next we found, expression of C-TSK autonomously regulated by un-segmented mesoderm or PSM.

Conclusion:

Our result suggests, TSK expression in different developmental stages in chick embryo. This expression is dependent on Notch signaling and oscillated in the presomitic mesoderm during chick somitogenesis.