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**IGER Seminar/Topics in Advanced Biological Science**

# Functions of steroids in zebrafish early embryogenesis


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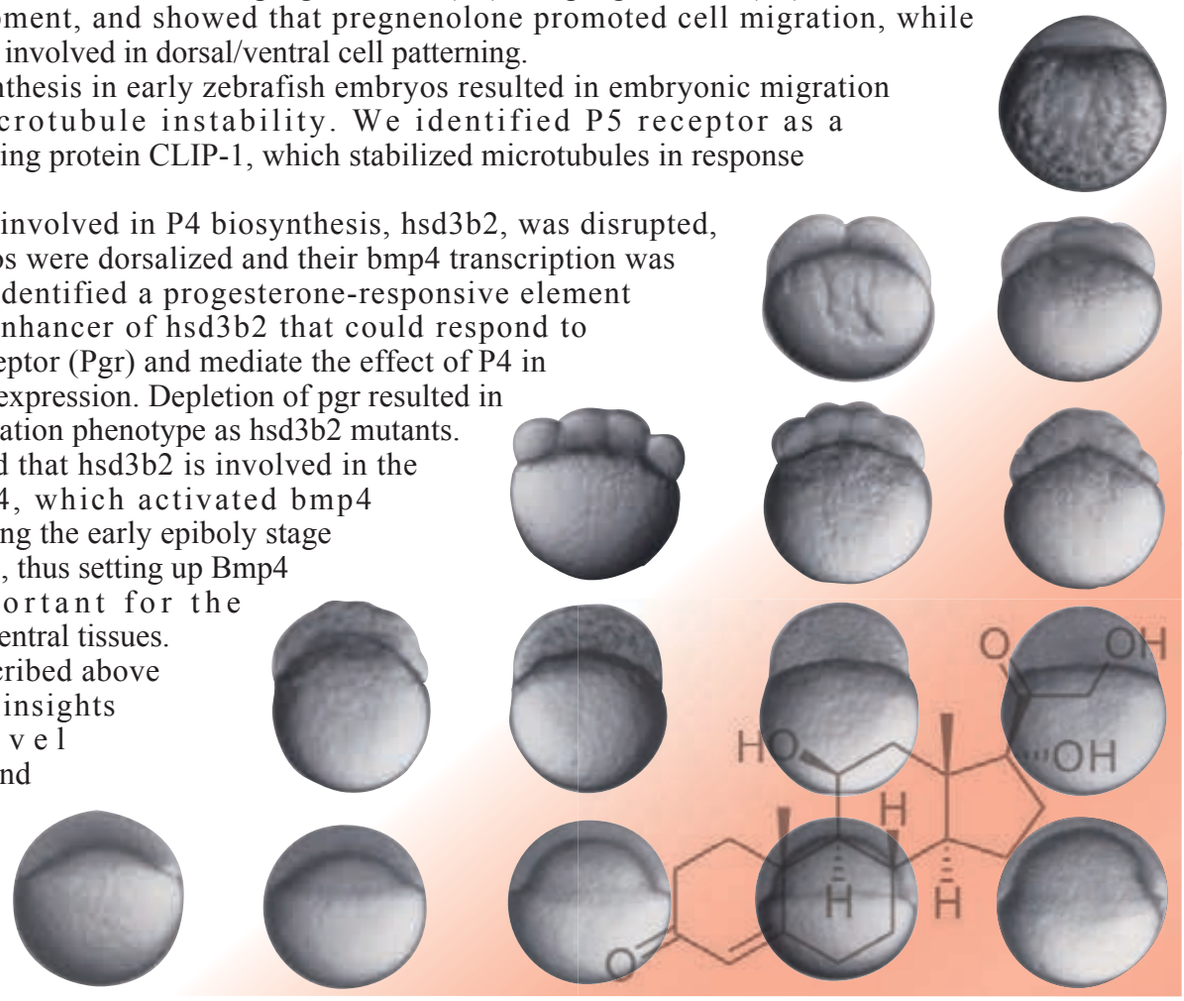
## E131 room in Bldg E (E館E131)


Steroids are commonly used as drugs for the treatment of inflammation and hormonal imbalance, but their roles during early embryo development have not been elucidated. We investigated the mechanisms by which two steroids, pregnenolone (P5) and progesterone (P4) affect zebrafish embryo development, and showed that pregnenolone promoted cell migration, while progesterone was involved in dorsal/ventral cell patterning.

Blocking P5 synthesis in early zebrafish embryos resulted in embryonic migration defect and microtubule instability. We identified P5 receptor as a microtubule-binding protein CLIP-1, which stabilized microtubules in response to P5.

When the gene involved in P4 biosynthesis, hsd3b2, was disrupted, zebrafish embryos were dorsalized and their bmp4 transcription was decreased. We identified a progesterone-responsive element located in the enhancer of hsd3b2 that could respond to progesterone receptor (Pgr) and mediate the effect of P4 in regulating bmp4 expression. Depletion of pgr resulted in the same dorsalization phenotype as hsd3b2 mutants. Thus, we showed that hsd3b2 is involved in the synthesis of P4, which activated bmp4 transcription during the early epiboly stage of embryogenesis, thus setting up Bmp4 gradient important for the development of ventral tissues.

The studies described above should provide insights into the novel functions of P4 and P5 both in zebrafish embryogenesis.



References

1. Hsu H-J, Liang M-R, Chen C-T, and Chung B-c, “Pregnenolone stabilizes microtubules and promotes zebrafish embryonic cell movement” Nature 439, 480-483 (2006).
2. Weng J-H, Liang M-R, Chen C-H, Tong S-K, Huang T-C, Lee S-P, Chen Y-R, Chen C-T, and Chung B-c, “Pregnenolone activates CLIP-170 to promote microtubule growth and cell migration” Nature Chem Biol, 9, 636-642 (2013).
3. Lin J-C, Hu S, Ho P-H, Hsu H-J, Postlethwait J, and Chung B-c., “Two zebrafish hsd3b genes are distinct in function, expression and evolution” Endocrinology, 156:2854-2862 (2015).



問い合わせ先：田中　実（内線 2979）