



FENS Forum - Abstract

ABSTRACT CONFIRMATION

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Title	Genetic dissection of neural circuits by Tol2 transposon-mediated Gal4 gene and enhancer trapping in zebrafish.
Text	We developed a novel targeted gene expression approach for functional studies of zebrafish neural circuits by using the Tol2 transposon-mediated transgenesis technology. First, we created gene trap and enhancer trap transposon constructs carrying an engineered yeast Gal4 transcription activator (Gal4FF). We also created transgenic reporter fish carrying the GFP and RFP gene downstream of the Gal4 recognition sequence UAS. Second, we created random integrations of the Gal4FF gene and enhancer trap constructs in the zebrafish genome and performed large-scale screens for gene and enhancer trapping. We generated 185 fish lines that expressed the Gal4FF gene in specific cells including various types of neurons. We will describe characterization of some of these lines. Finally, to apply this method to functional studies of vertebrate neural circuits, we developed transgenic effector fish carrying the tetanus toxin light chain (TeTxLC) gene downstream of UAS, which blocks synaptic transmission. By crossing the UAS:TeTxLC fish with Gal4FF trap lines, we identified fish embryos that exhibited defects in touch response behavior. We analyzed expression patterns of the toxin in these embryos by constructing transgenic line carrying a TeTxLC:CFP fusion gene downstream of UAS. From these analyses, we demonstrated that targeted expression of TeTxLC in distinct populations of neurons in the brain and the spinal cord caused distinct abnormalities in the touch response behavior. We propose that our Gal4FF gene trap and enhancer trap methods should be important genetic tools to analyze the structure and the function of neuronal circuits that regulate vertebrate behaviors.
Theme 1	Development Neurogenesis and gliogenesis Neuronal differentiation
Theme 2	Techniques, history and teaching Neurotechniques None

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