

成年斑马鱼OKR行为学分析

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摘要 作为视功能检测与视觉有关突变体筛选的方法, 眼动(Optokinetic response, OKR)和视动(Optomoter response, OMR)行为学是简单有效的视功能检测手段, 广泛用于幼年斑马鱼研究中, 而成年斑马鱼OKR的分析方法却很少有报道。文章介绍了成年斑马鱼眼动反应诱导方式, 以及使用模板匹配(Pattern match)的方法程序跟踪眼部运动, 实现了成年斑马鱼OKR的定量分析。使用该方法, 检测到斑马鱼双眼视觉区对OKR行为的产生具有一定的贡献作用, 并且成年斑马鱼单眼对运动光栅表现出一定的方向敏感性。同样的方法也可适用于幼年斑马鱼的OKR行为学分析。利用此方法初步检测到了钟基因*period1b*突变体幼鱼的OKR异常。

关键词: 成年斑马鱼 OKR 视动反应 行为学 幼鱼 模板匹配

Abstract: As a means of visual function testing and visual related mutants screening, the optokinetic response (OKR) and the optomotor response (OMR) behaviour tests are simple and effective tools for visual functional testing, which have been widely used in studying zebrafish larvae. However, adult zebrafish OKR analysis method is rarely reported. In this study, the methods of inducing adult zebrafish OKR behaviour, as well as tracking the movement of eyes using Pattern Match approaches, are presented. The quantitative measurement of the adult zebrafish OKR behaviour was successfully established. Using these methods, the binocular vision area was found to make a certain contribution to OKR behaviour. Moreover, the monocular vision of adult zebrafish showed a certain degree of directional sensitivity to moving gratings. Such approaches can also be applied to the zebrafish larvae OKR. The abnormal OKR behaviour phenomenon of *period1b* mutant larvae fish was detected.

Keywords: adult zebrafish, OKR, optokinetic response, behavior, larvae, pattern match

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- [1] Portugues R, Engert F. The neural basis of visual behaviors in the larval zebrafish. *Curr Opin Neurobiol*, 2009, 19(6): 644-647. 
- [2] Maurer CM, Huang YY, Neuhauss SC. Application of zebrafish oculomotor behavior to model human disorders. *Rev Neurosci*, 2011, 22(1): 5-16.
- [3] Huang YY, Neuhauss SCF. The optokinetic response in zebrafish and its applications. *Frontiers in Bioscience*, 2008, 13: 1899-1916. 
- [4] Easter SS Jr, Nicola GN. The development of eye movements in the zebrafish (*Danio rerio*). *Dev Psychobiol*, 1997, 31(4): 267-276. 3.0.CO;2-P target="_blank"> 
- [5] Emran F, Rihel J, Adolph AR, Wong KY, Kraves S, Dowling JE. OFF ganglion cells cannot drive the optokinetic reflex in zebrafish. *Proc Natl*

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- [6] Roeser T, Baier H. Visuomotor behaviors in larval zebrafish after GFP-guided laser ablation of the optic tectum. *J Neurosci*, 2003, 23(9): 3726-3734.
- [7] Matsui JI, Egana AL, Sponholtz TR, Adolph AR, Dowling JE. Effects of ethanol on photoreceptors and visual function in developing zebrafish. *Invest Ophthalmol Vis Sci*, 2006, 47(10): 4589-4597. 
- [8] Neuhauss SCF. Behavioral genetic approaches to visual system development and function in zebrafish. *J Neurobiol*, 2003, 54(1): 148-160. 
- [9] Mueller KP, Neuhauss SC. Quantitative measurements of the optokinetic response in adult fish. *J Neurosci Methods*, 2010, 186(1): 29-34. 
- [10] Zou SQ, Yin W, Zhang MJ, Hu CR, Huang YB, Hu B. Using the optokinetic response to study visual function of zebrafish. *J Vis Exp*, 2010, doi: 10.3791/1742.
- [11] Beck JC, Gilland E, Tank DW, Baker R. Quantifying the ontogeny of optokinetic and vestibuloocular behaviors in zebrafish, medaka, and goldfish. *J Neurophysiol*, 2004, 92(6): 3546-3561. 
- [12] Brockerhoff SE. Measuring the optokinetic response of zebrafish larvae. *Nat Protoc*, 2006, 1(5): 2448-2451. 
- [13] Rinner O, Rick JM, Neuhauss SCF. Contrast sensitivity, spatial and temporal tuning of the larval zebrafish optokinetic response. *Invest Ophthalmol Vis Sci*, 2005, 46(1): 137-142. 
- [14] Emran F, Rihel J, Adolph AR, Dowling JE. Zebrafish larvae lose vision at night. *Proc Natl Acad Sci USA*, 2010, 107(13): 6034-6039. 
- [15] Easter SS, Nicola GN. The development of vision in the zebrafish (*Danio rerio*). *Dev Biol*, 1996, 180(2): 646-663. 
- [16] Cahill H, Nathans J. The optokinetic reflex as a tool for quantitative analyses of nervous system function in mice: application to genetic and drug-induced variation. *PLoS One*, 2008, 3(4): e2055.
- [17] Qian H, Zhu Y, Ramsey DJ, Chappell RL, Dowling JE, Ripps H. Directional asymmetries in the optokinetic response of larval zebrafish (*Danio rerio*). *Zebrafish*, 2005, 2(3): 189-196. 
- [18] Thirumalai V, Cline HT. A commanding control of behavior. *Nat Neurosci*, 2008, 11(3): 246-248. 
- [19] Wang H. Comparative analysis of period genes in teleost fish genomes. *J Mol Evol*, 2008, 67(1): 29-40. 
- [20] DeBruyne J, Hurd MW, Gutierrez L, Kaneko M, Tan Y, Wells DE, Cahill GM. Isolation and phenogenetics of a novel circadian rhythm mutant in zebrafish. *J Neurogenet*, 2004, 18(2): 403-428. 
- [21] Vallone D, Gondi SB, Whitmore D, Foulkes NS. E-box function in a period gene repressed by light. *Proc Natl Acad Sci USA*, 2004, 101(12): 4106-4111. 

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