部門公開セミナー

July 26 (Mon), 2010　13:00　～　15:00

Myodaiji　Seminar room 3

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Evolution of a novel behavior mediated by the lateral line system adapts blind cavefish to life in darkness.

Cavefish are faced with the challenge of finding food and mates in a completely dark environment. Here we describe studies designed to reveal the physiological and genetic base of an adaptive behavior in *Astyanax mexicanus,* which has an eyed surface (surface fish) and a blind cave (cavefish) dwelling forms. Vibration attraction behavior (VAB) is the ability of fish to swim toward the source of a water disturbance in darkness. Quantitative laboratory assays indicate that VAB is common in cavefish but rarely observed in surface fish. In competitive prey-capture experiments, surface fish with VAB predominated over those without VAB in darkness but not in light, showing that VAB is beneficial for feeding in the dark. VAB was evoked by vibration stimuli peaking at 35 Hz, blocked by the lateral line inhibitors cobalt and gentamicin. The behavior appeared following increases in superficial neuromast (SN) number and size during development, and was significantly reduced by bilateral ablation of SN. Mating experiments between surface fish and cavefish suggested that vibration attraction behavior is a polygenic trait. QTL mapping using 317 F2 offspring showed a major epistatic interaction between QTLs on LG1 and LG5, which explained 29% of the phenotypic variance of VAB. To our knowledge, this is the first example of an evolved behavioral trait controlled by an epistatic interaction. We propose that the evolution of vibration attraction behavior has been instrumental in adapting cavefish to life in perpetual darkness.

生殖細胞研究部門・初期発生研究部門合同部門セミナー

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