



# OIST SEMINAR

Hosted by Optical Neuroimaging Unit

**Speaker: Akihiro Takemura, Ph.D.**

Department of Chemistry, Biology and Marine Science  
University of the Ryukyus

DATE: **Tuesday, September 1**

TIME: **15:00 – 16:00**

VENUE: **Meeting Room D015, Level D, Lab 1**

## **Rhythms in fish reproduction: possible involvement of dopaminergic activity in tidal-related spawning of a tropical wrasse**

### *Abstract:*

Most tropical wrasses show a daily pattern of spawning with a gamete release typically near daytime high tide. It is hypothesized that environmental cues in relation to daily and tidal cycles are perceived by fish and transduced as internal stimuli. To gain insight into these issues, involvement of monoamines in mediating endogenous day-night and tidal rhythms in the threespot wrasse, *Halichoeres trimaculatus*, were examined. Levels of dopamine (DA), 3,4-dihydroxyphenylacetic acid (DOPAC, a metabolite of DA) in the brain of this species were measured with high-performance liquid chromatography and electrochemical detection. DOPAC and the metabolic rate of DA activity (DOPAC/DA) increased during the day and decrease during the night for fish held under a natural photoperiod. Intraperitoneal injection of melatonin resulted in a significant reduction in DOPAC/DA. DOPAC/DA was lower in fish held at 3 m compared to 0 m depth, suggesting that hydrostatic pressure influences DA metabolic rate. In vitro culture of ovaries from pressurized fish in the presence of human chorionic gonadotropin resulted in an increase in 17 $\alpha$ ,20 $\beta$ -dihydroxy-4-pregnen-3-one in the medium. These results indicate that light and hydrostatic pressure control dopaminergic activity in the brain of threespot wrasse. Wrasles bury themselves in the sand at the bottom of the ocean at night and arrest their movement. Therefore, darkness and hydrostatic pressure under stable conditions in sands may be used to synchronize its spawning activity.

If you want to talk to the speaker, please contact [bkuhn@oist.jp](mailto:bkuhn@oist.jp).