

OIST SEMINAR

Date: Thursday, May 15, 2014

Time: 14:00 – 15:00

Venue: OIST Campus Lab 1, Meeting Room C016 (Level C)

Speaker: Dr. Sachihiko Suzuki

Affiliation: Department of Biological Structure, University of Washington

Title: “Generation of functionally distinct cone photoreceptor types in zebrafish”

Abstract:

Color vision requires multiple types of cone photoreceptors, each of which exhibits a maximum sensitivity to a distinct wavelength of light. Each species comprises a set number of cone types, which are spatially arranged into a non-random, mosaic-like distribution across the retina. However, little is known about how different cone types are generated *in vivo*. To address this, we traced cone photoreceptor genesis by multi photon *in vivo* time-lapse imaging analysis in zebrafish larvae. We found that red cones are exclusively generated by symmetric cell division of a dedicated precursor that is labeled by fluorescent protein expression driven under the *thyroid hormone receptor beta 2 (trβ2)* promoter. We also found that other cone types (UV, blue, and green cones) are produced by symmetric divisions of their own dedicated precursors. Loss- and gain-of function studies revealed that *trβ2* expression at cone precursor cell stage is essential for the production of cones expressing only red opsin whereas *trβ2* expression restricted to differentiated cones results in mixed cone types expressing multiple opsins. A difference in the onset of *trβ2* expression during development may explain why some species have pure cone types and others have mixed cone types. I will also present ongoing analysis of cone mosaic formation in the adult retina in which the ratio and spatial arrangement of UV, blue, green, and red cone are strictly determined. In particular, we are interested in whether the cell generation and cell placement strategies engaged in the larval retina are also deployed in the organizing the adult retina.

Ref.

Suzuki, S.C., Bleckert, A., Williams, P.R., Takechi M., Kawamura, S., and Wong, R.O.L. (2013) Cone photoreceptor types in zebrafish are generated by symmetric terminal divisions of dedicated precursors. *Proc Natl Acad Sci U S A* 110, 15109-15114.