頭脳循環プログラム報告会

日時　：　3月30日（木）14:00−15:30
場所　：　理学部E館1階　E131号室

Sox5 is involved in pigment cell fate specification by modulating Sox10 function in medaka and zebrafish

長尾　勇佑（University of Bath, UK）

Neural crest-derived pigment cell is an excellent model system for studying cell fate specification since it is classified into multiple types in fish; three types (melanophore, iridophore and xanthophore) in zebrafish and four types in medaka with fourth leucophore. Our previous work demonstrated that medaka Sox5 is a key switch regulating xanthophore vs leucophore lineage by promoting xanthophore specification. In zebrafish, Sox10 is necessary for all types of pigment cells. In mouse, Sox5 antagonises Sox10 function in melanocyte specification. Our phenotypic analysis of compound mutants of *sox5* and *sox10* in medaka and zebrafish showed that antagonistic function of Sox5 against Sox10 in melanophore is conserved in both species. We also revealed that cooperative activity between Sox5 and Sox10 would be unique to medaka to regulate xanthophore vs leucophore fate choice.

Imaging and electrophysiological analysis of functional integration among spinal projection neurons in zebrafish

谷本　昌志（Janelia Research Campus, HHMI, USA）

The brain is an assembly of functionally segregated units, or modules. Expression of functions requires integration of neural activity among the modules through circuit connections. Although researches have been finding modules dedicated to specific functions across brain areas, basic rules for the intercommunication among the modules are less understood. Toward cellular level understanding of neural circuit organization for the integration, we investigate functional relationship among spinal projection neurons in the midbrain and hindbrain in larval zebrafish. These neurons are uniquely identifiable and thought to be functionally segregated modules: the Mauthner (M-) cell initiates escape, whereas some other neurons are recruited during swimming and turning behaviors. Two-photon Ca^{2+} imaging combined with electrophysiological recording shows that an action potential in the M-cell evokes a transient Ca^{2+} responses in a particular neuronal groups including swimming-related neurons. Axon collaterals of interneurons postsynaptic to the M-cell project closely to a part of the activated neurons, indicating these interneurons integrates the modules to coordinate motor outputs for generation of a sequential bouts during escape behavior.

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