School of Life Sciences

Seminar Series

No. 2019-31

Thu., **5 December**, 4:00pm

Jukhyun Bio Auditorium(RM.121)

Korean

Decoding molecular logic underlying locomotor circuit development

Speaker | Myungin Baek

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Host | Prof. Mi-Ryoung Song

광주과학기술원 생명과학부

Gwangju Institute of Science and Technology School of Life Sciences

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Myungin Baek, Ph.D.

Education/Experience

1998	B.S., Seoul National University, Seoul, Korea
1998-2000	M.S., Korea Advanced Institute of Science and Technology, Daejeon, Korea
2000-2003	Researcher, In2gen Co., Ltd.
2003-2011	Ph.D., Columbia University, New York (Advisor: Dr. Richard S. Mann)
2011-2012	Research Associate (Postdoctoral fellow), HHMI at New York University Medical Center
2012-2018	Postdoctoral fellow, New York University Medical Center (Supervisor: Dr. Jeremy S. Dasen)
2018-present	Assistant Professor, DGIST

Abstract

The motor activities during locomotion require three main systems: 1) a network of interneurons in the spinal cord that generates rhythmic and patterned motor neuron activity; 2) supraspinal centers that communicate with the local interneuron circuits through ascending and descending channels; 3) sensory neurons that modulate locomotor activity through feedback signals. It has not been well understood how these locomotor circuits are properly wired and what are the roles of each motor circuit component during animal behaviors. In this talk, I will briefly present three-pronged approach to understand locomotor circuit development: the evolution of motor circuits, the regulatory mechanism of motor circuit formation, and the development of sensory ascending system. In the first part of my talk, I will discuss about how neuronal circuits for land walking are emerged during the course of vertebrate evolution. The little skate is one of the most primitive fin bearing vertebrate species. Unlike other fish species, little skates can walk using pelvic fins on the sea floor. We found that molecular and neuronal substrates for land walking were already present long before our ancestors occupy land. In the second part of my talk, I will show that motor neuron identity functions as an instructive signal for specific inputs that motor neurons receive; Sensory-motor neuron and interneuron-motor neuron connection specificity depends on motor neuron identity. Lastly, I will briefly introduce most recent data about the development of spinocerebellar tract neurons. In this study we identified molecular markers and circuit wiring mechanisms for spinocerebellar tract neurons through single cell RNA sequencing experiments and mouse genetics.
As an ongoing project we are trying to address how diverse motor behaviors could be derived from the “ground state” motor behavior by studying the regulatory mechanisms of the motor circuit development in diverse vertebrate species.