NEURO GLOBAL
Seminar

Speaker

Makoto TOMINAGA, M.D., Ph.D.

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Title

For the 2021 Nobel Prize in Physiology or Medicine

Date / Time/ Venue

November 18, 2021 (Thursday) 16:00-17:30 ONLINE

Registration

Refer to the message from the NGP office.

Laboratory HP

http://www.nips.ac.jp/cs/

●Neuro Globalプログラム生(Neuro Global Program Students)
【脳科学セミナーシリーズEx】/【先進脳科学セミナーシリーズEx】セミナー1ポイント
【Brain Science Seminar Series Ex】/【Advanced brain science seminar series Ex】1 point
●医学系研究科(Graduate School of Medicine)
【医学履修課程】国際交流セミナー (アドバンスド講義科目)」(出席1回分)
【Medical Science Doctoral Course】International Interchange Seminar (Advanced Lecture course) (It will be counted as 1 attendance.)
●生命科学研究科(Graduate School of Life Sciences)
【単位認定セミナー】
単位認定セミナーとして2ポイントを付与します。
【Credit-granted seminar】
2 point will be granted to the students who will attend this seminar.

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Abstract

The Nobel Assembly at Karolinska Institute has decided to award the 2021 Nobel Prize in Physiology or Medicine jointly to David Julius and Ardem Patapoutian for their discoveries of receptors for temperature and touch. I would like to sincerely say congratulations on their receiving the award.
A gene for capsaicin receptor TRPV1 was isolated by a group of David Julius in 1997, and it was clarified that TRPV1 is activated by noxious heat stimulus with a temperature over 43 °C, getting a lot of attention as the first temperature sensor. Then, eleven so called thermosensitive TRP channels including TRPM8 which is activated by both menthol and cold stimulus were reported. Ardem Patapoutian reported Piezo 1 and Piezo 2 as mechanosensors in 2010. Although mechanisms for detection of physical stimuli made a slow progress without clear molecular entities, discoveries of thermosensitive TRP channels and Piezo channels pushed forward the progress of researches. Because TRPV1 works as a sensor for nociceptive stimuli, this award would lead to not only the progress of research for regulating our sensory systems, but also the development of novel analgesic agents.
I was involved in the cloning and functional characterization in TRPV1 and TRPV2, another heat sensor, as a postdoctoral fellow in the David Julius laboratory in University California at San Francisco from 1996 to 1999. Because there was a fierce competition for the cloning of capsaicin receptor, we felt relieved upon publishing the paper in Nature. I remember that I got excited very much when we found that TRPV1 works as a heat sensor as well. This experiment was inspired by our experience that we feel hot in mouth upon eating capsicums. We thought that heat stimulus might activate TRPV1, and it turned out to be the case. It is known that we feel pain upon exposure to high temperaturse over 43 °C, and indeed TRPV1 was found to work as a sensor for temperatures causing pain in our body.
Another Nobel Laureate Ardem Patapoutian is also a 20 years friend of mine and we did some collaboration, which made me happier. My lab also published several papers about Piezo channels. I really hope that their receiving the Nobel Prize would lead to the further progress of researches regarding thermosensation and mechanosensation in the future.

Reference

1. Caterina MJ, Schumacher MA, Tominaga M, Rosen TA, Levine JD, Julius D. The capsaicin receptor: a heat-activated ion channel in the pain pathway. Nature 1997:389:816-824.
2. Tominaga M, Caterina MJ, Malmberg AB, Rosen TA, Gilbert H, Skinner K, Raumann BE, Basbaum AI, Julius D. The cloned capsaicin receptor integrates multiple pain-producing stimuli. Neuron 1998:21:531-543.
3. Coste B, Mathur J, Schmidt M, Earley TJ, Ranade S, Petrus MJ, Dubin AE, Patapoutian A. Piezo1 and Piezo2 are essential components of distinct mechanically activated cation channels. Science 2010:330: 55-60.

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