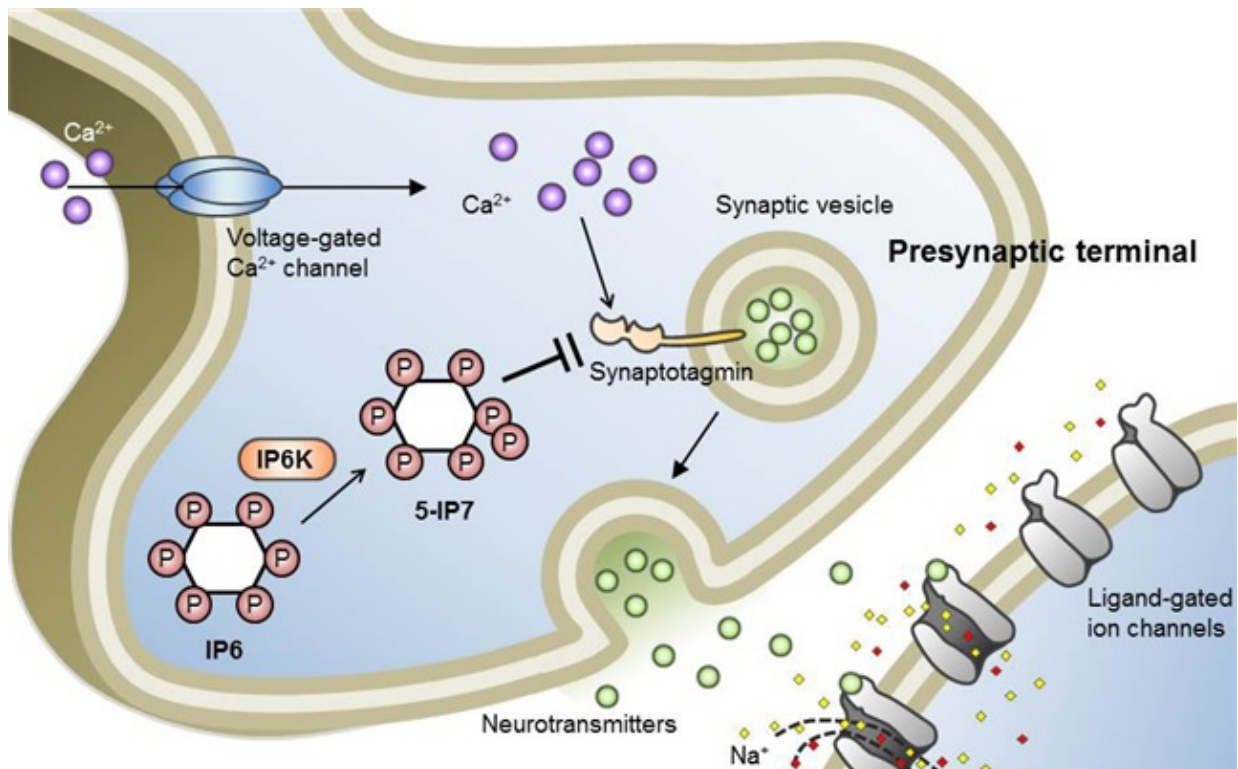


# Research team identifies a neuron signal controlling molecule

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Schematic Image of Controlling the Synaptic Exocytotic Pathway by 5-IP7 , Helping the Understanding of the Signaling Mechanisms of Inositol Pyrophosphates. Copyright : KAIST

A research team led by Professor Seyun Kim of the Department of Biological Sciences at Korea Advanced Institute of Science and Technology (KAIST) has identified inositol pyrophosphates as the

molecule that strongly controls neuron signaling via synaptotagmin.

Professors Tae-Young Yoon of Yonsei University's Y-IBS and Sung-Hyun Kim of Kyung Hee University's Department of Biomedical Science also joined the team.

The results were published in the *Proceedings of the National Academy of Sciences* of the United States of America (PNAS) on June 30, 2016.

This interdisciplinary research project was conducted by six research teams from four different countries and covered a wide scope of academic fields, from neurobiology to super resolution optic imaging.

Inositol pyrophosphates such as 5-diphosphoinositol pentakisphosphate (5-IP7), which naturally occur in corns and beans, are essential metabolites in the body. In particular, inositol hexakisphosphate (IP6) has anti-cancer properties and is thought to have an important role in cell signaling.

Inositol pentakisphosphate (IP7) differs from IP6 by having an additional phosphate group, which was first discovered 20 years ago. IP7 has recently been identified as playing a key role in diabetes and obesity.

Psychopathy and neurodegenerative diseases are known to result from the disrupted balance of inositol pyrophosphates. However, the role and the mechanism of action of IP7 in brain neurons and nerve transmission remained unknown.

Professor Kim's team has worked on inositol pyrophosphates for several years and discovered that very small quantities of IP7 control cell-signaling transduction. Professor Yoon of Yonsei University identified IP7 as a much stronger inhibitor of neuron signaling compared to IP6. In particular, IP7 directly suppresses synaptotagmin, one of the key

proteins in neuron signaling. Moreover, Professor Kim of Kyung Hee University observed IP7 inhibition in sea horse neurons.

Together, the joint research team identified inositol pyrophosphates as the key switch metabolite of brain-signaling transduction.

The researchers hope that future research on synaptotagmin and IP7 will reveal the mechanism of neuron-signal transduction and thus enable the treatment of neurological disorders.

These research findings were the result of cooperation of various science and technology institutes: KAIST, Yonsei-IBS (Institute for Basic Science), Kyung Hee University, Sungkyunkwan University, KIST, University of Zurich in Switzerland, and Albert-Ludwigs-University Freiburg in Germany.

Provided by The Korea Advanced Institute of Science and Technology (KAIST)

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