Department of Biotechnology
Ministry of Science and Technology
Government of India
DBT

National Institute of
Advanced Industrial Science
and Technology
AIST

DBT - AIST International Laboratory for Advanced Biomedicine

DAILAB

Classroom for Advanced & Frontier Education

CAFE

DAILAB-CAFE

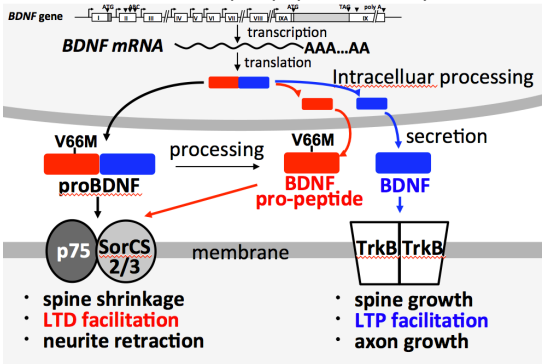
Series - 07

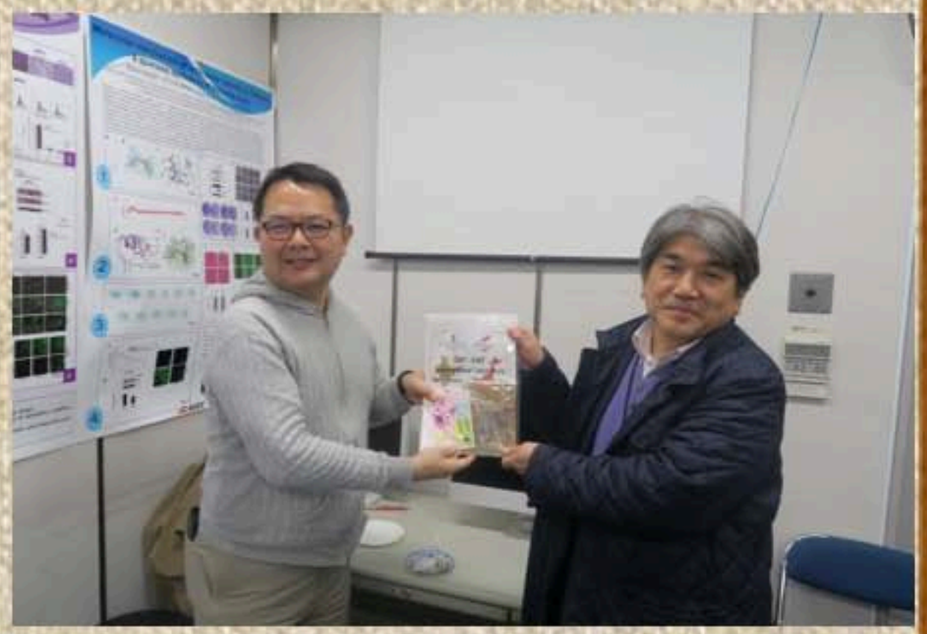
Date and Time - February 9, 2015 (16:00~17:00) Venue - Central 4 (5F) Room 5105

Speaker – Masami Kojima
Affiliation – National Institute of Advanced Industrial Science and Technology (AIST), Japan
E-mail: m-kojima@aist.go.jp

Title – Single nucleotide polymorphism and proteolytic processing multiply the biological actions of growth factor in brain: A new insight into the growth factor theory

Most growth factors are initially synthesized as precursors and subsequently processed into their mature form by proteolytic cleavage, resulting in simultaneous removal of a pro-peptide. However, ac compared to that of mature form, the biological role of the pro-peptide is poorly understood. Here, we investigated the biological role of the pro-peptide of brain-derived neurotrophic factor (BDNF) and first showed that the pro-peptide is expressed and secreted in hippocampal tissues and cultures, respectively. Interestingly, we found that the BDNF pro-peptide directly facilitates hippocampal long-term depression (LTD), requiring the activation of GluN2B-containing N-methyl-D-aspartate (NMDA) receptors and the pan-neurotrophin receptor $p75^{NTR}$. The BDNF pro-peptide also enhances NMDA-induced alpha-amino-3-hydroxy-5-methyl-4-isoxazole propionic acid receptor endocytosis, a mechanism crucial for LTD expression. Thus, the BDNF pro-peptide is involved in synaptic plasticity that regulates a mechanism responsible for promoting LTD. The well-known BDNF polymorphism Val66Met affects human memory function. Here, the BDNF pro-peptide with Met mutation completely inhibits hippocampal LTD. These findings Demonstrate functional roles for the BDNF pro-peptide and a naturally occurring human BDNF polymorphism in hippocampal synaptic depression.





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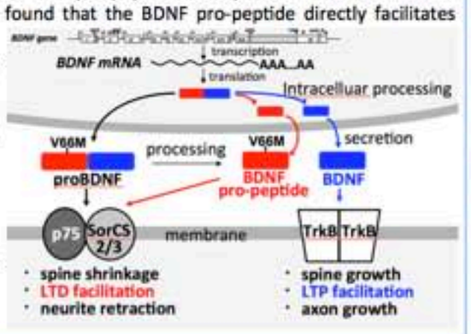

Dear Dr Kojima
Thank you !
for being CAFÉ 07 Speaker
We all enjoyed your talk and appreciate your efforts !
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