



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

DAIILAB

Classroom for Advanced & Frontier Education

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DAiLAB-CAFE

Series - 023

Date & Time – October 24, 2017

Venue - Central 5-41; 2F (Conference Room # 1)

Speaker – Nobutaka Mitsuda

Title: **Comprehensive study of plant transcription factors --- Toward regulon biotechnology**

Affiliation – Bioproduction Research Institute, AIST Tsukuba.

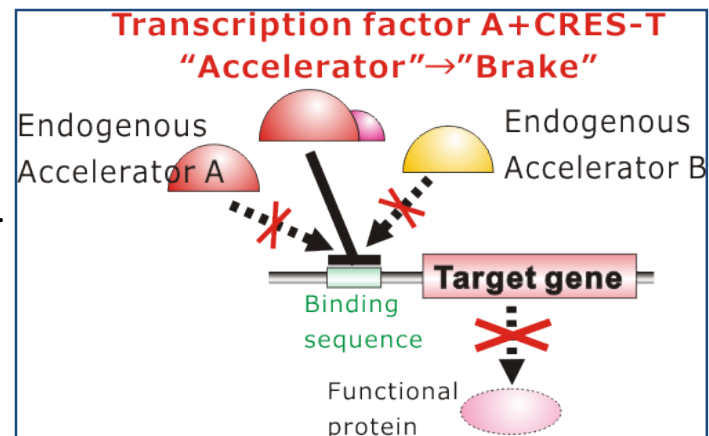
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Abstract

Transcription factor (TF) is a fascinating target of genetic manipulation to improve crop traits because TF regulates expression of many genes at once. We call this unit consisting of TF and its target genes as “regulon”. Most TFs work as activator to activate gene expression like an accelerator of automobile. The model plant *Arabidopsis thaliana* has ca. 2,000 TFs, which regulate the expression of whole ca. 27,000 genes in the genome (regulonome). For functional analyses of plant TFs, we developed a gene-silencing technology CRES-T, the method to express repression-domain-fused TF in plant. This method changes most TFs to repressor (chimeric repressor) like a brake of

automobile (Figure). We applied this method to almost all TFs in *Arabidopsis* and half of rice TFs and observed numerous aberrant phenotypes. We also prepared the pool of T2 seeds of CRES-T lines to find a particular phenotype of interest and have isolated many kinds of TFs which can confer stress tolerances. In addition to the model plants, we also applied CRES-T to various horticultural plants to modify their flower traits and constructed “FioreDB” database that stores phenotypic data and information regarding plant TFs. Furthermore, we prepared Gateway entry clones of almost all *Arabidopsis* TFs and more than 1,000 rice TFs and developed TF-only yeast-one/two-hybrid library. This library enabled us to isolate TF that interacts with specific DNA/protein efficiently. Using these tools, we are trying to establish the “regulon biotechnology” to create “tailor-made” plant which could meet various demands of farmers, companies, and consumers.



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Indonesia

Hanyang University, South
Korea

Series 23

Speaker: Nobutaka Mitsuda
Topic: Comprehensive study of plant
transcription factors - Toward regulon
biotechnology

Date: 23rd Oct., 2017(16:00-17:00 hours JST)

Host: DAILAB@AIST, Japan

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CAFÉ!**



Thanks for participation!



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