



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 - 001

Date and Time - June 13, 2014/ 4 PM ~

Venue - Central 6-9; 2F (Room-228)

Speaker - Yoshihiro Nakajima

Affiliation - Biofunctional Regulation Research Group, Health Research Institute, AIST

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Title - A multicolor luciferase assay system for monitoring multiple gene expressions: Basics and application

Bioluminescent reporters, which emit light by oxidizing its substrate luciferin, have become an essential tool for studying various aspects of biological functions, including gene expression, posttranscriptional modification and protein-protein interactions, because the sensitivity and range of the linear response are superior to those of other reporters. In particular, luciferases are used as sensitive probes to monitor gene expression, quantitatively, and longitudinally in living cells, explant tissues, and *in vivo*.

Recent advances in luciferase technology, involving improvements in both the luciferase and the detection system and a newly cloned luciferase gene, allow us to monitor the expression of multiple genes simultaneously when luciferase are used that induce differently colored emission spectra in the catalysis of a common substrate. Recently, we have developed a multicolor luciferase assay system in which multiple gene expressions can be simultaneously monitored using green-, orange- and red-emitting beetle luciferases. Using this system, we have successfully monitored multiple gene expressions simultaneously, such as clock genes, inflammatory cytokine genes *in vitro* and *ex vivo*, and applied to cell based assay. In this seminar, I would like to present and discuss basic, utility and possibility of the luciferase assay system for life science study, drug discovery and chemical risk analysis.



DAILAB-CAFE 001 (2014|06|13): Dr. Nakajima



DAILAB-CAFE

Topic - DBT
 Date and Time: June 13, 2014 (Thu)
 Venue: Lecture A-17 (Room 410)
 Location: Yashiki Building
 Affiliation: Collaborative Research Program (Health Research Network, AIST)
 E-mail: enr@dbt.aist.go.jp

Title - A multicolor luciferase assay system for monitoring multiple gene expressions.
Relevance and application
 Bioluminescent reporters, which emit light by oxidizing its substrate luciferin, have become indispensable for studying various aspects of biological functions, including gene expression, post-transcriptional modification and protein-protein interactions, because the sensitivity and range of the linear response are superior to those of other reporters. In particular, luciferases are used as sensitive probes to monitor gene-expression quantitatively, and long-term stability in living cells, reporter stability, and so on.
 Recent advances in luciferase engineering, involving improvements in both the luciferase and the detector system and a newly derived luciferase gene, allow us to monitor the expression of multiple genes simultaneously when luciferase are used that induce differently colored emission spectra in the analysis of a common substrate. Recently, we have developed a multicolor luciferase assay system in which multiple gene expressions can be simultaneously monitored using green-, orange- and red-emitting luciferases. Using this system, we have successfully monitored multiple gene expressions simultaneously, such as 2000 genes, in mammalian cell lines in vitro and in vivo, and applied to cell-based assays. In this seminar, I would like to present and discuss basic ability and possibility of the luciferase assay system for the various fields, drug discovery and chemical lab analysis.

Dear Dr. Nakajima

*Please accept our thanks for being the
 DAILAB-CAFE
 Speaker
 on
 June 13, 2014
 We enjoyed your talk and appreciate
 your efforts !*

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