



Department of Biotechnology  
Ministry of Science and Technology  
Government of India

**DBT**



National Institute of  
Advanced Industrial Science  
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**AIST**

**DBT - AIST International Laboratory  
for Advanced Biomedicine**

**DAIILAB**

**Classroom for Advanced & Frontier Education**



**CAFE Series - 12**

# DAI LAB - CAFE

## Series - 12

Date and Time – Oct. 7, 2015 (12:30~13:30)

Venue - Central 4 (2F) Meeting Room 1

Speaker – Tomohiro TAMURA

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## Title – Efficient production of active form of vitamin D<sub>3</sub> by microbial conversion

Vitamin D<sub>3</sub> (VD<sub>3</sub>) is a fat-soluble prohormone that plays a crucial role in bone metabolism, immunity, and the control of cell proliferation and differentiation. The most active form, 1 $\alpha$ ,25(OH)<sub>2</sub>VD<sub>3</sub>, is used to treat osteoporosis, hyperparathyroidism, psoriasis, and VD<sub>3</sub> metabolic abnormality. The industrial production of 1 $\alpha$ ,25(OH)<sub>2</sub>VD<sub>3</sub> is performed chemically or microbiologically, but the processes for the microbiological production of the active form of VD<sub>3</sub> are simpler than those for chemical synthesis.

The actinomycete *Pseudonocardia autotrophica* is capable of bioconversion of VD<sub>3</sub> into its physiologically active forms, 25(OH)VD<sub>3</sub> or 1 $\alpha$ ,25(OH)<sub>2</sub>VD<sub>3</sub>. We identified vitamin D<sub>3</sub> hydroxylase (vdh) from *P. autotrophica* and characterized it structurally and enzymatically. Biotransformation of VD<sub>3</sub> into 25(OH)VD<sub>3</sub> was then accomplished with a Vdh-expressed recombinant strain of actinomycete *Rhodococcus erythropolis*. We have recently succeeded in significant improvement of cellular permeability of vitamin D<sub>3</sub> by using nisin-treated cells, and have developed a new platform for vitamin D<sub>3</sub> hydroxylation process.

In this seminar, I would like to introduce how to improve the efficiency of production of hydroxylated form of vitamin D<sub>3</sub> by using *Rhodococcus erythropolis* as a host cell.



Dear Tamura san,  
Thank you!  
for  
An extremely  
interesting  
CAFÉ-TALK  
It was thoroughly  
enjoyed!