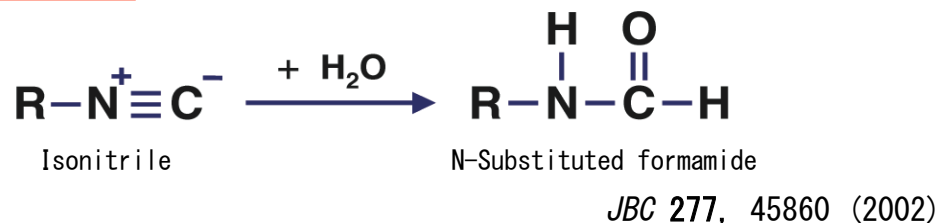


Molecular Microbial Bioengineering Lab

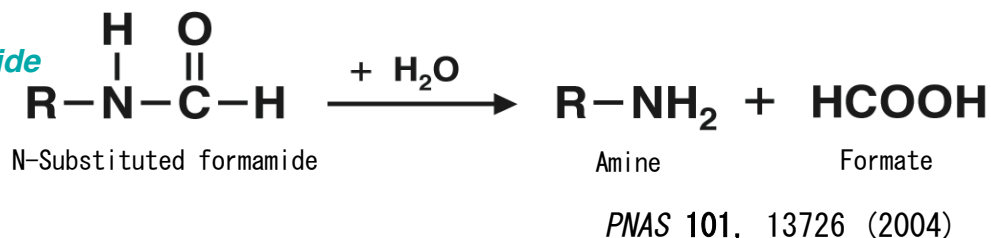
Faculty : Prof. Michihiko Kobayashi, and Assistant Prof. Yoshiteru Hashimoto

Discovery of novel enzymes (with each new E.C. number)

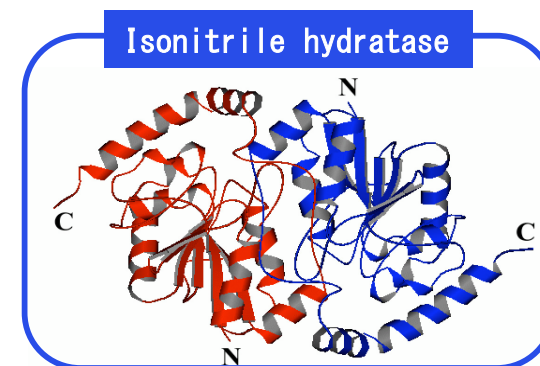
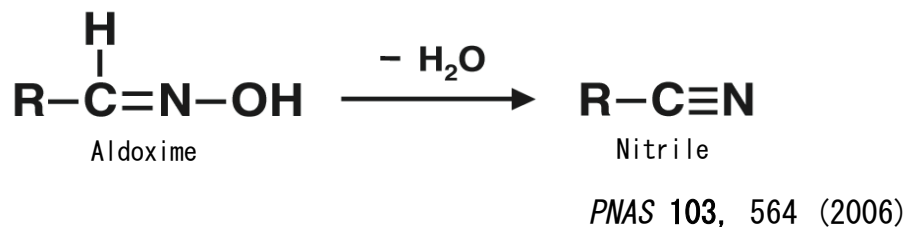
**Isonitrile
Hydratase**
(EC 4.2.1.103)



**N-Substituted formamide
deformylase**
(EC 3.5.1.91)



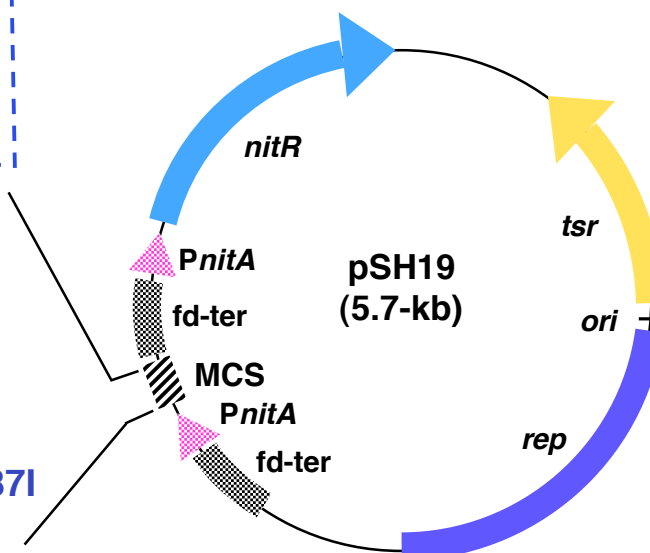
**Aliphatic
aldoxime
dehydratase**
(EC 4.99.1.5)



**Expression vector
for *Streptomyces***

PNAS 101,
14031 (2004)

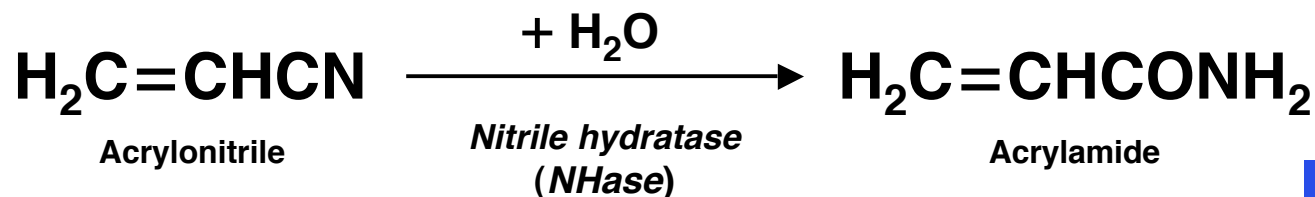
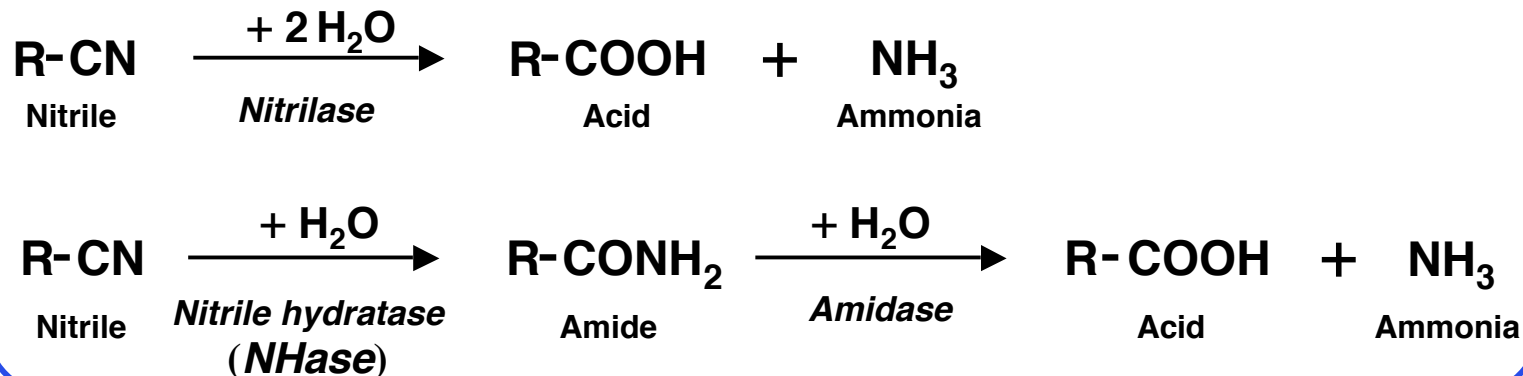
• *Eco* RI
• *Sac* I
• *Kpn* I
• *Bam* HI
• *Xba* I
• *Pst* I
• *Sse* 8387I
• *Hin* dIII



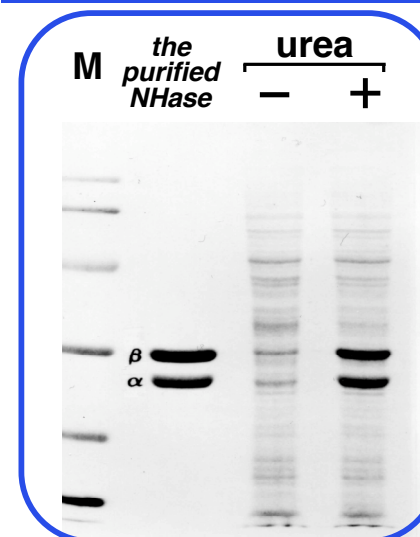
Strategy :

- (1) Screening of microorganisms with a novel enzyme
- (2) Analysis of the microbial metabolism and the enzyme function
- (3) Biotransformation by the enzyme or cells
- (4) Analysis of the regulation mechanism of the enzyme expression
- (5) Development of an expression system using the enzyme gene promoter

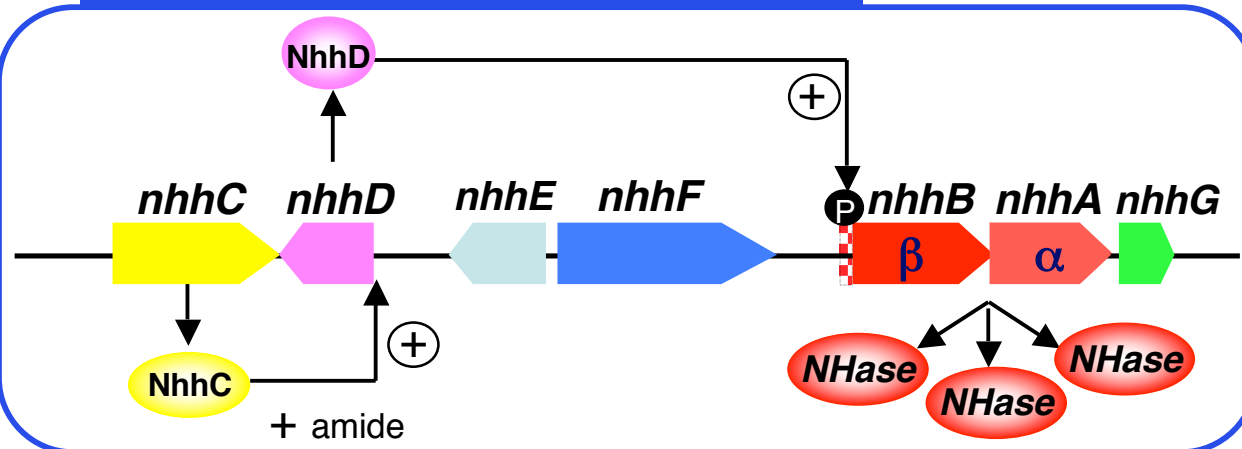
Two pathways for nitrile metabolism in microorganisms



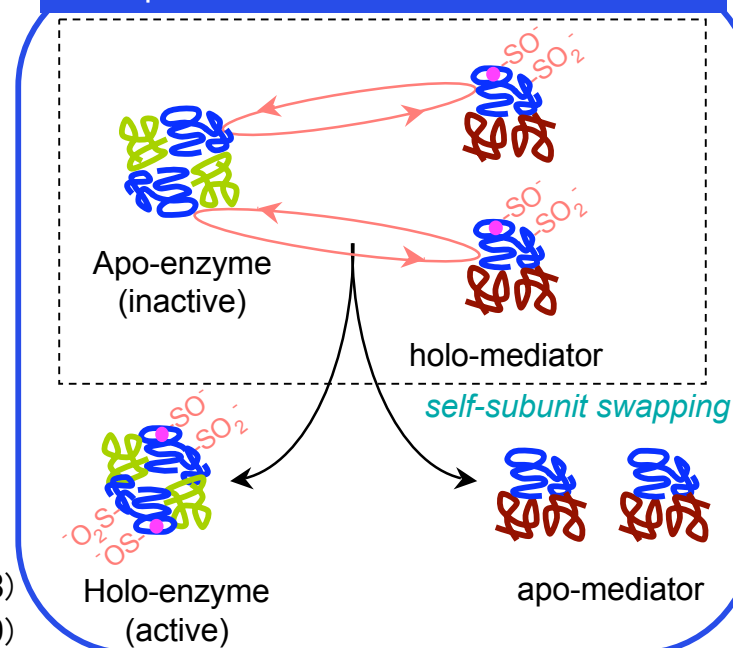
Overproduction of NHase of urea-induced cultured *Rhodococcus rhodochrous* J1



Unique nitrile hydratase expression mechanism



Discovery of “self-subunit swapping” novel post-translational modification mechanism



PNAS 105, 14849 (2008)
JBC 284, 14930 (2009)