Toho University

Laboratory of Microbial Chemistry

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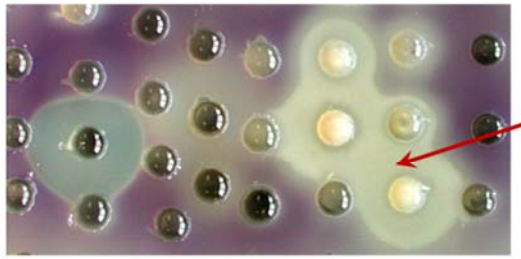
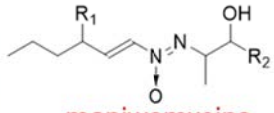
Our laboratory uses actinomycetes, which are antibiotic-producing bacteria, as the main research material, and conducts research in the fields of drug discovery, medicine, and environment using a variety of techniques including natural product chemistry, molecular biology, biochemistry, and taxonomy.



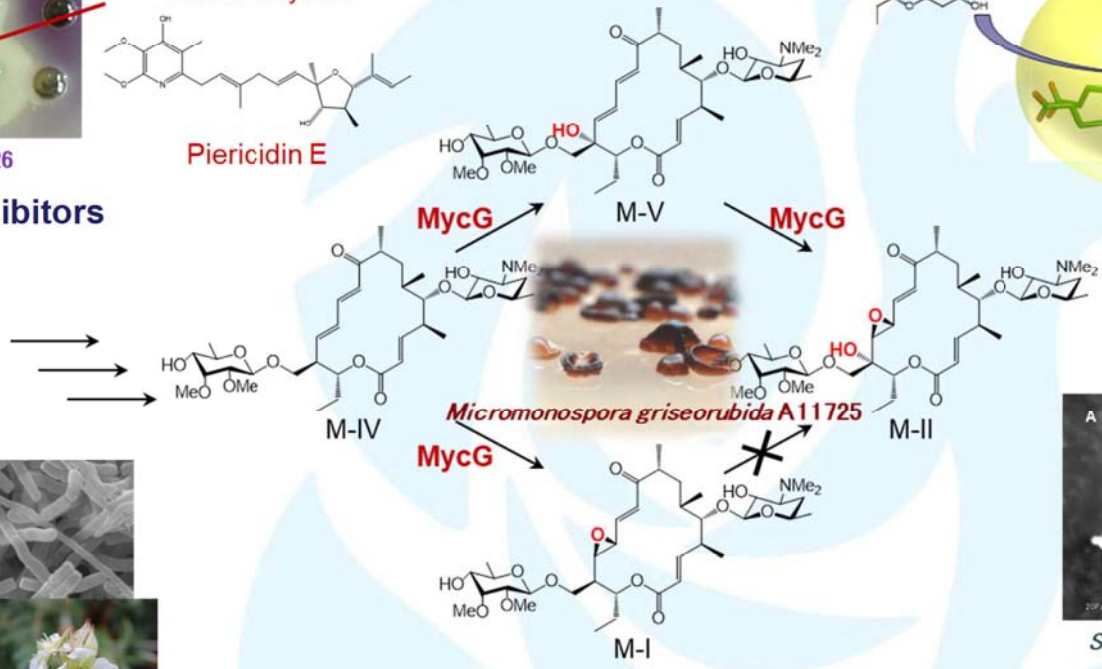
Chromobacterium violaceum CV026



maniwamycins

Piericidin E

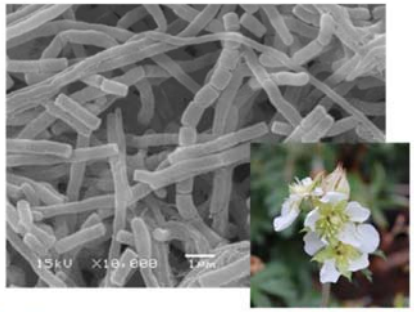
Novel quorum sensing inhibitors



Micromonospora griseorubida A11725

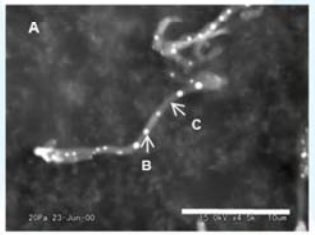
Multifunctional P450 MycG

Multistep P450 RosC

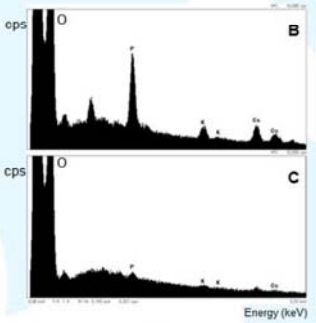


Actinocatenispora comari NUM-2625^{T}

New species of actinomycete isolated from Mongolian medicinal plants



Streptomyces sp. K202



High accumulation of cesium in actinomycetes

Toho University

Our Research

- **Genetic and biochemical studies of secondary metabolism in actinomycetes**

  Functional analysis and functional modification of multifunctional P450 enzymes and multistep P450 enzymes

  Elucidation of biosynthetic pathways of bioactive compounds

- **Discovery and development of novel bioactive compounds**

  Screening of quorum sensing inhibitors

  Screening of anti-inflammatory compounds

  Establishment of production methods for bioactive compounds by genetic engineering

- **Genetic and physiological studies on cesium accumulation in actinomycetes**

  Identification and functional analysis of genes involved in cesium accumulation

Selected Publications

1. *Actinocatenispora comari* sp. nov., an endophytic actinomycete isolated from aerial parts of *Comarum salesowianum*.
   Oyunbileg N, Iizaka Y, Hamada M, Davaapurev B -O, Fukumoto A, Tsetseg B, Kato F, Tamura T, Batkhuu J, Anzai Y.
   International Journal of Systematic and Evolutionary Microbiology. **2021** 71(7):ijsem.0.004861.
2. An overview of the cytochrome P450 enzymes that catalyze the same-site multistep oxidation reactions in biotechnologically relevant selected actinomycete strains.
   Iizaka Y, Sherman DH, Anzai Y.
   Applied Microbiology and Biotechnology. **2021** 105(7):2647–61.
3. Artificial control of the multistep oxidation reactions catalyzed by the cytochrome P450 enzyme RosC.
   Iizaka Y, Kanai H, Suzuki T, Maruyama Y, Kurita M, Sano M, Watanabe A, Fukumoto A, Saito R, Anzai Y.
   Applied Microbiology and Biotechnology. **2020** 104(8):3403-15.
4. Quorum sensing inhibitors against *Chromobacterium violaceum* CV026 derived from an actinomycete metabolite library.
   Ohta T, Fukumoto A, Iizaka Y, Kato F, Koyama Y, Anzai Y.
   Biological and Pharmaceutical Bulletin. **2020** 43:179-83.
5. Cytochrome P450 enzyme RosC catalyzes a multistep oxidation reaction to form the non-active compound 20-carboxyrosamicin.
   Iizaka Y, Takeda R, Senzaki Y, Fukumoto A, Anzai Y.
   FEMS Microbiology Letters. **2017** 364(12):fnx110.
6. Maniwamycins: new quorum-sensing inhibitors against *Chromobacterium violaceum* CV026 were isolated from *Streptomyces* sp. TOHO-M025.
   Fukumoto A, Murakami C, Anzai Y, Kato F.
   The Journal of Antibiotics. **2016** 69:395-9.
7. Function of cytochrome P450 enzymes RosC and RosD in the biosynthesis of rosamicin macrolide antibiotic produced by *Micromonospora rosaria*.
   Iizaka Y, Higashi N, Ishida M, Oiwa R, Ichikawa Y, Takeda M, Anzai Y, Kato F.
   Antimicrobial Agents and Chemotherapy. **2013** 57(3):1529-31.
8. Production of a hybrid 16-membered macrolide antibiotic by genetic engineering of *Micromonospora* sp. TPMA0041.
   Sakai A, Mitsumori A, Furukawa M, Kinoshita K, Anzai Y, Kato F.
   Journal of Industrial Microbiology and Biotechnology. **2012** 39(11):1693–701.
9. Function of the cytochrome P450 enzymes MycCI and MycG in *Micromonospora griseorubida*, a producer of the macrolide antibiotic mycinamicin.
   Anzai Y, Tsukada S, Sakai A, Masuda R, Harada C, Domeki A, Li S, Kinoshita K, Sherman DH, Kato F.
   Antimicrobial Agents and Chemotherapy. **2012** 56(7):3648-56.
10. Characteristics of cesium accumulation in the filamentous soil bacterium *Streptomyces* sp. K202.
    Kuwahara C, Fukumoto A, Nishina M, Sugiyama H, Anzai Y, Kato F.
    Journal of Environmental Radioactivity. **2011** 102(2):138-44.
11. Gene targeting for *O*-methyltransferase genes, *mycE* and *mycF*, on the chromosome of *Micromonospora griseorubida* producing mycinamicin with disruption cassette containing bacteriophage ϕC31 *attB* attachment site.
    Tsukada S, Anzai Y, Li S, Kinoshita K, Sherman DH, Kato F.
    FEMS Microbiology Letters. **2010** 304(2):148-56.
12. Functional analysis of MycCI and MycG, cytochrome P450 enzymes involved in biosynthesis of mycinamicin macrolide antibiotics.
    Anzai Y, Li S, Chaulagain M.R, Kinoshita K, Kato F, Montgomery J, Sherman DH.
    Chemistry and Biology. **2008** 15(9):950–59.

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