

Pharmacognosy

Department of MEDICAL CHEMISTRY

Outline

Medicinal plants have been the principal material used as drugs by mankind. Most of natural crude drugs used in Kampo-medicine are made from medicinal plants. We are trying to create high quality medicinal plants, using plant tissue culture technique. Moreover, we are trying to search for new natural products of medicinal plants by isolation and structure elucidation.

Faculty members

Professor ; Mareshige KOJOMA, Ph.D.

Lecture ; Sang-Yong KIM, Ph.D.

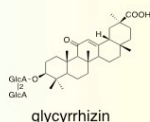
Main research in progress

- 1) The production of high quality medicinal plants and secondary metabolites, using plant tissue culture
- 2) The search for new natural products of medicinal plants, isolation/structure elucidation.
- 3) Fieldwork for study of medicinal plants in Hokkaido and etc.
- 4) Usage and quality control of natural dyes from medicinal plants

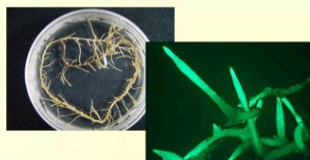
The production of high quality medicinal plants and secondary metabolites, using plant tissue culture



Licorice (*Glycyrrhiza* plants)



clonal propagation



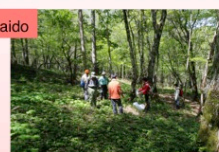
secondary metabolites production

The search for new natural products of medicinal plants, isolation/structure elucidation



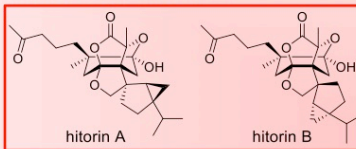
Hitotsubuki
(*Chloranthus japonicus*)

Fieldwork in Hokkaido



Isolation / Structure elucidation

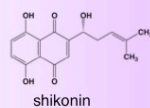
Discover new natural products



The study for usage and quality control of natural dyes from medicinal plants



Murasaki
(*Lithospermum erythrorhizon*)



quality control / method for cultivation



conditions for dyeing

Current publications

- * Glycyrrhizin Production in Licorice Hairy Roots Based on Metabolic Redirection of Triterpenoid Biosynthetic Pathway by Genome Editing, Chiyo N, Seki H, Kanamoto T, Ueda H, Kojoma M, Muranaka T, Plant & cell physiology, <https://doi.org/10.1093/pcp/pcad161>, 2024.
- * Disruption of a licorice cellulose synthase-derived glycosyltransferase gene demonstrates its in planta role in soyasaponin biosynthesis, Sakanishi M, Chung SY, Fujiwara K, Kojoma M, Muranaka T, Seki H, Plant Cell Reports 43(1), <https://doi.org/10.1007/s00299-023-03095-6>, 2024.
- * Cultivation study of *Lithospermum erythrorhizon* to obtain “Shikon” as a purple dye and traditional medicine – root growth and shikonin derivatives content, Kojoma M, Acta Hort. 1361: 13-20, 2023.
- * *Mesorhizobium* sp. J8 can establish symbiosis with *Glycyrrhiza uralensis*, increasing glycyrrhizin production, Kusaba I, Nakao T, Maita H, Sato S, Chijiwa R, Yamada E, Arima S, Kojoma M, Ishimaru K, Akashi R, Suzuki A, Plant Biotechnology, <https://doi.org/10.5511/plantbiotechnology.20.1124a>, 2021.
- * Hyperdioxanes, dibenzo-1,4-dioxane derivatives from the roots of *Hypericum ascyron*, Niwa K, Tanaka N, Shimomoto Y, Tsuji D, Kim AY, Kojoma M, Itoh K, Chen CH, Lee KH, Kashiwada Y, Journal of Natural Medicines, <https://doi.org/10.1007/s11418-021-01540-y>, 2021.
- * Agesasines A and B, bromopyrrole alkaloids from marine sponges *Agelas* spp, Lee S, Tanaka N, Takahashi S, Tsuji D, Kim SY, Kojoma M, Itoh K, Kobayashi J, Kashiwada Y, Marine Drugs, 18: No.455, 2020.
- * Linaburiosides A-D acylated iridoid glucosides from *Linaria buriatica*, Niwa K, Yi R, Tanaka N, Kitaguchi S, Tsuji D, Kim SY, Tsogbaatar A, Bunddulam P, Kawazoe K, Kojoma M, Damdinjav D, Itoh K, Kashiwada Y, Phytochemistry, 171: No.112247, 2020.
- * The Basic Helix–Loop–Helix Transcription Factor GubHLH3 Positively Regulates Soyasaponin Biosynthetic Genes in *Glycyrrhiza uralensis*, Tamura K, Yoshida K, Hiraoka Y, Sakaguchi D, Chikugo A, Mochida K, Kojoma M, Mitsuda N, Saito K, Muranaka T, Seki H, Plant Cell Physiol, 59: 783-96, 2018.
- * Hyperdioxane A, a Conjugate of Dibenzo-1,4-dioxane and Sesquiterpene from *Hypericum ascyron*, Niwa K, Tanaka N, Kim SY, Kojoma M, Kashiwada Y, Organic Letters. 18: 5977-80, 2018.
- * CYP716A179 functions as triterpenoid C28-oxidase in tissue cultured stolons of *Glycyrrhiza uralensis*, Tamura K, Seki H, Suzuki H, Kojoma M, Saito K, Muranaka T. Plant Cell Reports, 36: 437-445, 2017.
- * Hitorins A and B, Hexacyclic C25 Terpenoids from *Chloranthus japonicus*, Kim SY, Nagashima H, Tanaka N, Kashiwada Y, Konayashi J, Kojoma M, Organic Letters, 18: 5420-3, 2016.
- * RNA-seq Transcriptome Analysis of *Panax japonicus*, and Its Comparison with Other Panax Species to Identify Potential Genes Involved in the Saponins Biosynthesis, Rai KA, Yamazaki M, Takahashi H, Nakamura M, Kojoma M, Suzuki H, Saito K, Frontiers in Plant Science, Article, 481: 1-20, 2016.
- * Glycyrrhizin production in hairy root cultures of *Glycyrrhiza uralensis* induced triterpenoid biosynthetic gene, Kojoma M, Seki H, Kim SY, Muranaka T, Planta Medicas, DOI: 10.1055/s-0036-1596798, 2016.
- * Prenylated benzophenones from *Triadenum japonicum*, Oya A, Tanaka N, Kusama T, Kim SY, Hayashi S, Kojoma M, Hishida A, Kawahara N, Sakai K, Gono T, Kobayashi J, Journal of Natural Products,
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- * Kojoma M, Hayashi S, Shibata T, Yamamoto Y, Variation of glycyrrhizin and liquiritin contents within a population of 5-year-old licorice (*Glycyrrhiza uralensis*) plants cultivated under the same conditions. Biol & Pharm Bull, 34: 1334-7, 2011.
- * Kim SY, Kashiwada Y, Kawazoe K, Murakami K, Sun HD, Li SL, Takaishi Y, Spicachlorantins G-J, new lindenane sesquiterpenoid dimers from the roots of *Chloranthus spicatus*. Chem & Pharm Bull, 59: 1281-4, 2011.
- * Ali A, Kim SY, Kurimoto S, Sasaki H, Shibata H, Kashiwada Y, Takaishi Y, Flavonoids from Flowers of *Butea monosperma* (Lam.) Taub. Heterocycles, 83: 2079-89, 2011.
- * Oian K, Kim SY, Hung HY, Chen CH, Lee KH, New betulinic acid derivatives as potent proteasome inhibitors. Bioorg Med Chem. Lett, 21: 5944-7, 2011.