**MOLECULES OF INTEREST**

**Insights into the function and evolution of P450s in plant steroid metabolism**  
pp 1918–1929

Toshiyuki Ohnishi, Takao Yokota, Masaharu Mizutani

A review of the recent developments in understanding cytochrome P450 monoxygenases (P450s) involved in the biosynthesis and metabolism of triterpenoids and steroids, especially brassinosteroids.

**REVIEW**

**Covalent interaction of ascorbic acid with natural products**  
pp 1930–1939

Nicholas G. Kesinger, Jan F. Stevens

Thirty-three natural products reported from a variety of plant sources contain a moiety derived from ascorbic acid (vitamin C). Their structures, mechanism of formation and biological activities are reviewed.

**UPDATE IN BIOINFORMATICS**

**A web-based resource for the Arabidopsis P450, cytochromes b5, NADPH-cytochrome P450 reductases, and family 1 glycosyltransferases (http://www.P450.kvl.dk)**  
pp 1940–1947

Suzanne M. Paquette, Kenneth Jensen, Søren Bak

The Arabidopsis P450, cytochromes b5, NADPH-cytochrome P450 reductases, and family 1 glycosyltransferases website (http://www.P450.kvl.dk) is a sequence repository of manually curated sequences, multiple sequence alignments, phylogenetic trees, sequence motif logos, 3D structures, intron–exon maps, and customized BLAST datasets.
PROTEIN BIOCHEMISTRY AND PROTEOMICS

Partial purification and characterization of three ginsenoside-metabolizing β-glucosidases from Pythium irregulare

M. Andreea Neculai, Dimitre Ivanov, Mark A. Bernards

Extracellular enzymes with β(1 → 6) and β(1 → 2) glycosidase activity toward ginsenosides have been purified from cell cultures of Pythium irregulare.

A rapid method for depletion of Rubisco from soybean (Glycine max) leaf for proteomic analysis of lower abundance proteins

Hari B. Krishnan, Savithiry S. Natarajan

2-DE resolution of soybean leaf is improved through Rubisco depletion using 10 mM Ca²⁺/10 mM phytate. This method is rapid and capable of depleting 85% of Rubisco.

Isolation of a lectin and a galactoxyloglucan from Mucuna sloanei seeds

Daniele M.A. Teixeira-Sá, Fany Reicher, Renata C. Braga, Leila Maria Beltramini, Renato de Azevedo Moreira

Mucuna sloanei Fawcett and Rendle is a member of the Leguminosae (Fabaceae) found in northeast Brazil. In this paper, a lectin and a galactoxyloglucan from seeds were detected, isolated, and characterized; interactions studies were also carried out.

MOLECULAR GENETICS AND GENOMICS

Analysis of CMP-sialic acid transporter-like proteins in plants

Shou Takashima, Junichi Seino, Takeshi Nakano, Kazuhiyo Fujiiyama, Masafumi Tsujimoto, Nobuhiro Ishida, Yasuhiro Hashimoto

Despite the absence of sialic acids in plants, plant genes encoding a protein similar to animal CMP-sialic acid transporter exist. Here, we report that the rice CMP-sialic acid transporter-like protein, OsCSTLP1, has CMP-sialic acid transporter activity, but another protein, OsCSTLP2, does not.
Cloning, functional expression and phylogenetic analysis of plant sterol 24C-methyltransferases involved in sitosterol biosynthesis

Anjanasree K. Neelakandan, Zhihong Song, Junqing Wang, Matthew H. Richards, Xiaolei Wu, Babu Valliyodan, Henry T. Nguyen, W. David Nes

Sterol 24C-methyltransferases, SMT2-1 and SMT2-2, from soybean plants have been cloned and functionally expressed; the genomic organization and phylogenetic distribution of these and other SMT amino acid sequences of diverse origin are examined.

Comparative characterization of the Arabidopsis subfamily a1 b-galactosidases

Dashzeveg Gantulga, Young Ock Ahn, Changhe Zhou, Dorjsuren Battogtokh, David R. Bevan, Brenda S.J. Winkel*, Asim Esen

Characterization of the Arabidopsis subfamily a1 b-galactosidases was extended to include all six members. The results suggest that, despite differences in individual biochemical characteristics and expression patterns, each has the potential to contribute to the dynamics of the Arabidopsis plant cell wall.

METABOLISM

Photochemical dimerization of wasalexins in UV-irradiated Thellungiella halophila and in vitro generates unique cruciferous phytoalexins

M. Soledade C. Pedras*, Qing-An Zheng, Gabriele Schatte, Adewale M. Adio

The production of biswasalexins A1 and A2 in sodium chloride and UV stressed salt cress plants, as well as their chemical syntheses and antifungal activity against four cruciferous pathogens is reported. Biswasalexins A1 and A2 are cruciferous phytoalexins whose formation in planta appears to result from a photochemical reaction that might protect the plant from fungal pathogens and UV-radiation.


Silvia Marquina, José Luis Parra, Manasés González, Alejandro Zamilpa, Jaime Escalante, María R. Trejo-Hernández, Laura Álvarez

Incubations of the fungus Aspergillus niger with ent-kaurenoic (1) afforded the spasmolytic metabolites 4 and 5, while incubation with 2 yielded metabolite 6 in high yield (40%).
Biotransformation of bromosesquiterpenes by marine fungi

Masahiro Koshimura*, Takamitsu Utsukihara, Mai Kawamoto, Michihiko Saito, C. Akira Horiuchi, Masayuki Kuniyoshi

Biotransformation of bromosesquiterpenes was investigated with two types of fungi, *Rhinocladiella atrovirens* NRBC 32362 and also, *Rhinocladiella* sp. K-001 isolated from the Okinawan brown alga *Stypopodium zonale*. *R. atrovirens* NRBC 32362 converted aplysistatin 1 into three compounds 4–6. Transformation of 1, palisadin A 2 and 12-hydroxypalisadin B 3 by *Rhinocladiella* sp. K-001 afforded compounds 7 and 8.

ECOLOGICAL BIOCHEMISTRY

Methyl angolensate changes in *Khaya ivorensis* after fungal infection


HPLC–ESI-MS/MS using Selected Reaction Monitoring (SRM) mode was employed to develop a rapid, selective and sensitive method for detecting methyl angolensate (MA) in all aerial parts of *Khaya ivorensis* with and without symptoms of stem and branch cankers, caused by *Botryosphaeria rhodina*. Outcomes strongly suggested that MA plays a role in plant–pathogen interactions probably as a phytoanticipin.

CHEMOTAXONOMY

Distribution of heterocyst glycolipids in cyanobacteria

Thorsten Bauersachs*, Justine Compaoré, Ellen C. Hopmans, Lucas J. Stal, Stefan Schouten, Jaap S. Sinninghe Damsté

Heterocystous cyanobacteria are characterised by a suite of unique long-chain glycolipids. The distribution of these compounds in species of the families Nostocaceae and Rivulariaceae may be of chemotaxonomical value.

BIOACTIVE PRODUCTS

Isolation of flavonoids from the heartwood and resin of *Prunus avium* and some preliminary biological investigations


An investigation of the constituents in heartwood and resin of *Prunus avium* is reported. A mini-library of structurally diverse flavanones and flavones was screened for human cytochrome P450 1A1, 3A4 and 19 (aromatase) inhibition and for antifungal activity against a panel of pathogenic fungi. The defensive role of these natural plant flavonoids as antifungal phytoalexins and phytoanticipins is discussed.
Cytotoxic, anti-proliferative and antimicrobial furanoditerpenoids from *Stuhlmania moavi*  

The furanoditerpenoids voucapane (1), voucapane-6a,7a-diol (2), voucapane-18,19-diol (3) and 18-hydroxyvoucapan-19-al (4) were isolated from the cytotoxic stem and root bark extracts of *Stuhlmania moavi* Verdc. (Ceasalpiniaceae), and exhibited anti-proliferative, cytotoxic, antibacterial and antifungal activities. Some of the results thus corroborated the traditional medicinal uses of the crude extracts for the treatment of skin infections.

Pterocarpans with inhibitory effects on protein tyrosine phosphatase 1B from *Erythrina lysistemon* Hutch.

Trong Tuan Dao, Phi Hung Nguyen, Phuong Thien Thuong, Keon Wook Kang, MinKyun Na, Derek Tantoh Ndinteh, Joseph Tanyi Mbafor, Won Keun Oh*

Pterocarpans (1–3), named erylysins A–C, along with nine known pterocarpans (4–12), were isolated from the stem bark of *Erythrina lysistemon* Hutch. These prenylated compounds displayed significant inhibitory activity against protein tyrosine phosphatase 1B in an in vitro assay.

**CHEMISTRY**

Tiglicamides A–C, cyclodepsipeptides from the marine cyanobacterium *Lyngbya confervoides*

Susan Matthew, Valerie J. Paul, Hendrik Luesch*

Cyclodepsipeptides, tiglicamides A–C, were isolated from a marine cyanobacterium. They inhibited a mammalian elastase in vitro (IC$_{50}$ 2.14–7.28 μM). These compounds are analogues of co-produced largamides A–C and their simultaneous isolation suggests that a biosynthetic enzyme with unusually relaxed substrate specificity may be operating in this cyanobacterium.

Cytotoxic alkyl benzoquinones and alkyl phenols from *Ardisia virens*

Hsun-Shuo Chang, Yi-Ju Lin, Shiow-Ju Lee, Cheng-Wei Yang, Wei-Yu Lin, Ian-Lih Tsai, Ih-Sheng Chen*

Fourteen compounds (1–14), together with thirty-four other known compounds, including three (15–17) were isolated from *Ardisia virens*. Compounds 3, 10–12, 18, 19, and 31 displayed cytotoxicity against MCF-7, NCI-H460 and SF-268 cancer cell lines in vitro.
Secoiridoid glucosides and unusual recyclized secoiridoid aglycones from *Ligustrum vulgare*

Takao Tanahashi*, Yukiko Takenaka, Naoaki Okazaki, Megumi Koge, Naotaka Nagakura, Toyoyuki Nishi

(2’R)- and (2’S)-10-hydroxy-2’-methoxyleuropeins (1 and 2) and ligustrohemiacetals A (3) and B (4) were isolated from the dried leaves and twigs of *Ligustrum vulgare*. Enzymatic hydrolysis of 10-hydroxyoleuropein to the analog of ligustrohemiacetals A and B led to the structural revision of jasmolactones.

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Steroidal glycosides from the leaves of *Ruscus colchicus*: Isolation and structural elucidation based on a preliminary liquid chromatography–electrospray ionization tandem mass spectrometry profiling

Angela Perrone, Tamara Muzashvili, Assunta Napolitano, Alexandre Skhirtladze, Ether Kemertelidze, Cosimo Pizza, Sonia Piacente*

An HPLC–ESIMS* method, based on high-performance liquid chromatography coupled to electrospray positive ionisation multistage ion trap mass spectrometry has been used as an effective tool to rapidly identify and guide the isolation of target saponins from the ethanol extract of the leaves of *Ruscus colchicus*. Sixteen steroidal glycosides, including thirteen furostanol, two spirostanol and one cholestane glycosides, were identified along with four known furostanol and two spirostanol glycosides.

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Chemical evidence for intrinsic ‘Si’ within *Equisetum* cell walls

Heather A. Currie, Carole C. Perry*

Chemical evidence for intrinsic ‘Si’ in the cell wall of *Equisetum arvense*.

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Diastereoisomeric macrocyclic polydisulfides from the mangrove *Bruguiera gymnorrhiza*

Xiao-Ying Huang, Qi Wang, Hai-Li Liu, Yu Zhang, Guo-Rong Xin, Xu Shen, Mei-Ling Dong*, Yue-Wei Guo*

Ten-membered macrocyclic polydisulfides, trans-3,3’-dihydroxy-1,5,1,5’-tetrathiacyclodecane (1) and its 3’-epimer (2), were isolated from the mangrove *Bruguiera gymnorrhiza*. Their structures were determined by spectroscopic methods and confirmed by X-ray diffraction analysis. A possible biogenetic origin was also proposed.
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