

## GRAPHICAL ABSTRACTS

### Cyclic nucleotides

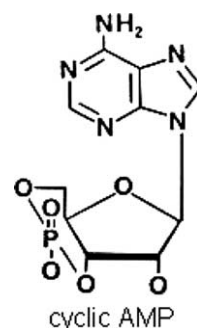
Russell P. Newton, Christopher J. Smith

Biochemistry Group, School of Biological Sciences, Wallace Building, University of Wales Swansea, Singleton Park, Swansea SA2 8PP, UK

Biomolecular Analysis Mass Spectrometry (BAMS) Facility, Grove Building, University of Wales Swansea, Singleton Park, Swansea SA2 8PP, UK

This review marks the development of plant cyclic nucleotide research, describing the significant properties of cyclic nucleotides, and outlining their second messenger functions. Recent findings related to nucleotidyl cyclases, and cyclic nucleotide-responsive protein kinases, -binding proteins and -gated ion channels are detailed within the context of the functional role of cyclic nucleotides in higher plants.

Phytochemistry, 2004, **65**, 2423



### Molecular cloning, expression, and characterization of adenylate isopentenyltransferase from hop (*Humulus lupulus* L.)

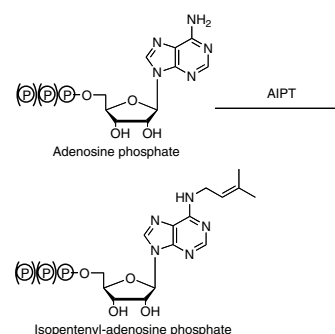
Yuichi Sakano<sup>a</sup>, Yukio Okada<sup>b</sup>, Akiko Matsunaga<sup>a</sup>, Takaharu Suwama<sup>a</sup>, Takafumi Kaneko<sup>b</sup>, Kazutoshi Ito<sup>b</sup>, Hiroshi Noguchi<sup>a</sup>, Ikuro Abe<sup>a</sup>

<sup>a</sup> School of Pharmaceutical Sciences and the 21st Century COE Program, University of Shizuoka, 52-1 Yada, Shizuoka 422-8526, Japan

<sup>b</sup> Plant Bioengineering Research Laboratories, Sapporo Breweries Ltd., 37-1 Kizaki, Nitta, Gunma 370-0393, Japan

A cDNA encoding adenylate isopentenyltransferase was cloned and sequenced from *Humulus lupulus* L. The corresponding recombinant enzyme expressed in *Escherichia coli* catalyzed isopentenyl transfer reaction from DMAPP to the N<sup>6</sup> amino group of AMP, ADP and ATP, respectively. Site-directed mutagenesis of a conserved Asp62 resulted in complete loss of enzyme activity.

Phytochemistry, 2004, **65**, 2439



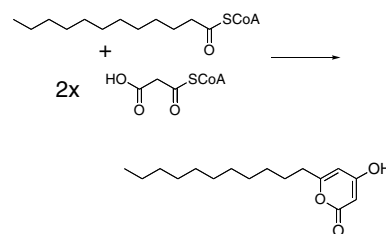
### Enzymatic formation of long-chain polyketide pyrones by plant type III polyketide synthases

Ikuro Abe, Tatsuya Watanabe, Hiroshi Noguchi

School of Pharmaceutical Sciences and the 21st Century COE Program, University of Shizuoka, 52-1 Yada, Shizuoka 422-8526, Japan

Recombinant chalcone synthase from *Scutellaria baicalensis* and stilbene synthase from *Arachis hypogaea* accepted CoA esters of long-chain fatty acid as a starter substrate, and carried out sequential condensations with malonyl-CoA, leading to formation of triketide and tetraketide  $\alpha$ -pyrones.

Phytochemistry, 2004, **65**, 2447



### Stimulating the production of homoisoflavonoids in cell suspension cultures of *Caesalpinia pulcherrima* using cork tissue

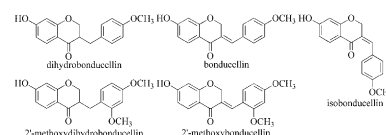
Ping Zhao<sup>a</sup>, Yuko Iwamoto<sup>a</sup>, Isao Kouno<sup>a</sup>, Yaasukuni Egami<sup>b</sup>, Hirobumi Yamamoto<sup>b</sup>

<sup>a</sup> Course of Pharmaceutical Sciences, Medicinal Plant Garden, Graduate School of Biomedical Sciences, Nagasaki University, 1-14 Bunkyo-machi, 852-8521 Nagasaki, Japan

<sup>b</sup> Faculty of Life Sciences, Toyo University, 1-1-1 Izumino, 374-0193 Itakura, Japan

Three homoisoflavonoids (dihydrobonducellin, 2'-methoxydihydrobonducellin, and 2'-methoxybonducellin), bonducellin and isobonducellin were isolated from *Caesalpinia pulcherrima* cultured cells coincubated with methyl jasmonate, yeast extract, and/or cork tissue.

Phytochemistry, 2004, **65**, 2455



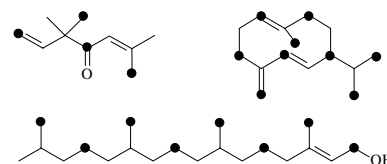
## Biosynthesis of the irregular monoterpene artemisia ketone, the sesquiterpene germacrene D and other isoprenoids in *Tanacetum vulgare* L. (Asteraceae)

Dirk Umlauf, Josef Zapp, Hans Becker, Klaus Peter Adam

FR 8.7, *Pharmakognosie und Analytische Phytochemie der Universität des Saarlandes*, 66041 Saarbrücken, Germany

In *Tanacetum vulgare*, the isoprene units of artemisia ketone, camphor,  $\beta$ -thujone and *trans*-phytol are formed via the methylerythritol phosphate pathway. Germacrene D,  $\beta$ -sitosterol and isofucosterol are synthesized via the mevalonic acid pathway.

*Phytochemistry*, 2004, **65**, 2463



## Alterations in intracellular and extracellular activities of antioxidant enzymes during suspension culture of sweetpotato

Young-Hwa Kim<sup>a</sup>, Yunhee Kim<sup>b</sup>, Eunhee Cho<sup>a</sup>, Sangsoo Kwak<sup>b</sup>, Sukyoon Kwon<sup>b</sup>, Jungmyung Bae<sup>c</sup>, Baekrak Lee<sup>a</sup>, Byungin Meen<sup>a</sup>, Gyung-Hye Huh<sup>a</sup>

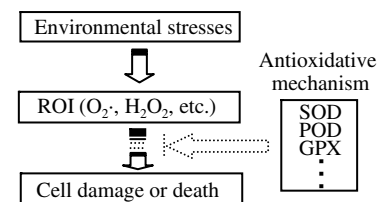
<sup>a</sup> *Genome Research Center, Inje University, 607 Obangdong, Gimhae 621-749, Gyeongnam, Republic of Korea*

<sup>b</sup> *Laboratory Environmental Biotechnology, Korea Research Institute of Bioscience and Biotechnology, Daejeon, Republic of Korea*

<sup>c</sup> *School of Life Sciences and Biotechnology, Korea University, Seoul 136-701, Republic of Korea*

Antioxidant enzymes, SOD, POD and GPX, were not only synthesized in cultured sweetpotato cells but were also secreted at high levels into cultured medium. The activities and isozymes of intracellular and extracellular enzymes were characterized during cell growth.

*Phytochemistry*, 2004, **65**, 2471



## Diacetylenic isobutylamides of *Echinacea*: synthesis and natural distribution

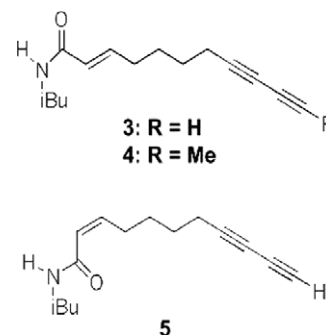
Lankun Wu<sup>a</sup>, Jaehoon Bae<sup>b</sup>, George Kraus<sup>b</sup>, Eve Syrkin Wurtele<sup>a</sup>

<sup>a</sup> *Department of Genetics, Development and Cell Biology, Iowa State University, Ames, IA 50011, USA*

<sup>b</sup> *Department of Chemistry, Iowa State University, Ames, IA 50011, USA*

The syntheses of three diacetylenic isobutylamides of *Echinacea* and their distribution in nine *Echinacea* species are described.

*Phytochemistry*, 2004, **65**, 2477



## Variation in antimicrobial action of proanthocyanidins from *Dorycnium rectum* against rumen bacteria

Subathira Sivakumaran<sup>a</sup>, Abdul L. Molan<sup>a</sup>, Lucy P. Meagher<sup>a</sup>, Burkard Kolb<sup>a</sup>, Lan Yeap Foo<sup>c</sup>, Geoffrey A. Lane<sup>b</sup>, Graeme A. Attwood<sup>a</sup>, Karl Fraser<sup>b</sup>, Michael Tavendale<sup>a</sup>

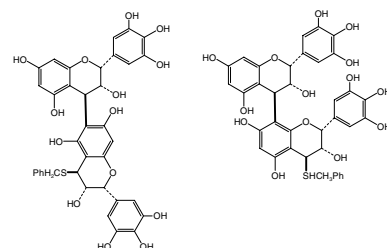
<sup>a</sup> *Nutrition and Behaviour, AgResearch Ltd., Grasslands Research Centre, Private Bag 11008, Palmerston North, New Zealand*

<sup>b</sup> *Plant Breeding and Genomics, AgResearch Ltd., Grasslands Research Centre, Private Bag 11008, Palmerston North, New Zealand*

<sup>c</sup> *Industrial Research Limited, PO Box 31-310, Lower Hutt, New Zealand*

The structure and antimicrobial activity of the proanthocyanidin polymer fractions of *Dorycnium rectum* against various rumen microbes were determined.

*Phytochemistry*, 2004, **65**, 2485



## Antioxidant lignans from *Larrea tridentata*

Phytochemistry, 2004, **65**, 2499

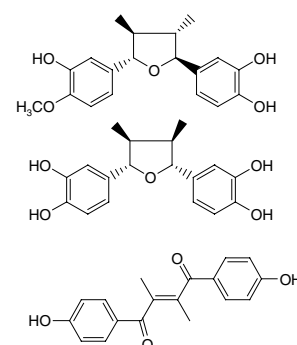
Hassan Abou-Gazar <sup>a</sup>, Erdal Bedir <sup>a,b</sup>, Satoshi Takamatsu <sup>a</sup>, Daneel Ferreira <sup>a,c</sup>, Ikhlas A. Khan <sup>a,c</sup>

<sup>a</sup> National Center for Natural Products Research, Research Institute of Pharmaceutical Sciences, The University of Mississippi, University, MS 38677, USA

<sup>b</sup> Department of Bioengineering, Faculty of Engineering, Ege University, Izmir 35100, Turkey

<sup>c</sup> Department of Pharmacognosy, School of Pharmacy, The University of Mississippi, University, MS 38677, USA

Three lignans, (7*S*,8*S*,7'*S*,8'*S*)-3,3',4'-trihydroxy-4-methoxy-7,7'-epoxylignan and *meso*-(*rel* 7*S*,8*S*,7'*S*,8'*S*)-3,4,3',4'-tetrahydroxy-7,7'-epoxylignan with significant antioxidant properties, and (*E*)-4,4'-dihydroxy-7,7'-dioxolign-8(8')-ene, were isolated from the leaves of *Larrea tridentata*. The structures of the new compounds were determined primarily from 1D and 2D NMR analysis. Their antioxidant activities were evaluated on intracellular reactive oxygen species in HL-60 cells.



## Oxygenated diterpenes and other constituents from Moroccan *Juniperus phoenicea* and *Juniperus thurifera* var. *africana*

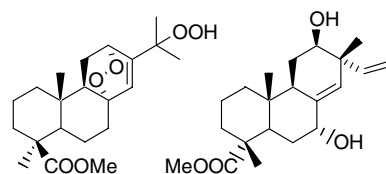
Phytochemistry, 2004, **65**, 2507

Alejandro F. Barrero <sup>a</sup>, José F. Quílez del Moral <sup>a</sup>, M. Mar Herrador <sup>a</sup>, Mohamed Akssira <sup>b</sup>, Ahmed Bennamara <sup>b</sup>, Said Akkad <sup>b</sup>, Mohamed Aitgri <sup>b</sup>

<sup>a</sup> Departamento de Química Orgánica, Instituto de Biotecnología, Facultad de Ciencias, Universidad de Granada, Campus Fuentenueva s/n, 18071-Granada, Spain

<sup>b</sup> Laboratoire de Chimie Biorganique et Analytique, F.S.T., Université Hassan II-Mohammedia, BP146 20800 Mohammedia, Morocco

Six new diterpenic acids isolated as their methyl ester together the isovalerate derivatives of *p*-methoxycinnamyl alcohol and 8-hydroxy-linalool, were isolated from the leaves of *Juniperus thurifera* and *Juniperus phoenicea*, grown in Morocco. The cytotoxicity of the abietane diterpenoids was tested against five cell lines.



## Revised chirality of the acyl group of 8'-*O*-(3-hydroxy-3-methylglutaryl)-8'-hydroxyabscisic acid

Phytochemistry, 2004, **65**, 2517

Tsunashi Kamo <sup>a</sup>, Nobuhiro Hirai <sup>b</sup>, Chiaki Matsumoto <sup>c</sup>, Hajime Ohigashi <sup>c</sup>, Mitsuru Hirota <sup>a</sup>

<sup>a</sup> Department of Bioscience and Biotechnology, Faculty of Agriculture, Shinshu University, 8304 Minami-minowa, Kami-ina, Nagano 399-4598, Japan

<sup>b</sup> International Innovation Center, Kyoto University, Sakyo-ku, Kyoto 606-8501, Japan

<sup>c</sup> Division of Food Science and Biotechnology, Graduate School of Agriculture, Kyoto University, Sakyo-ku, Kyoto 606-8502, Japan

The chirality of the acyl group 8'-*O*-(3-hydroxy-3-methylglutaryl)-8'-hydroxyabscisic acid was revised to *S* based on an HPLC analysis of the diastereomer derived from mevalonolactone obtained by reduction of the conjugate with lithium borohydride.

