Perkin 1 Abstracts: Natural Product Synthesis

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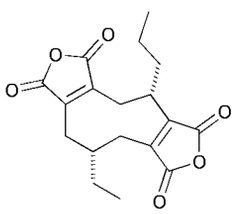
Perkin 1 Abstracts: Natural Product Synthesis aims to highlight syntheses that have been recently published. It includes brief descriptions of *biological activity* and *key steps*. A more comprehensive list of Natural Product syntheses and isolations can be found in *Natural Product Updates*.

(+)-Byssochlamic Acid

Biological activity: not reported.

Key steps: (a) PLE-catalysed desymmetrisation of a diester; (b) intramolecular photochemical [2+2] cycloaddition of a cyclopentene and a cyclobutene followed by a cycloreversion to give the 9-membered carbocyclic ring.

J. D. White, J. Kim and N. E. Drapela, *J. Am. Chem. Soc.*, 2000, **122**, 8665.

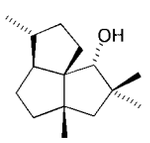


(±)-Cameroonan-7α-ol

Biological activity: (a) isolated from the essential oil of *Echniops giganteus* var. *lelyi* rhizomes; (b) associated with the strong patchouli-like woody fragrance of the oil.

Key steps: Sakurai reaction.

C. E. Davis, B. C. Duffy and R. M. Coates, *Org. Lett.*, 2000, **2**, 2717.

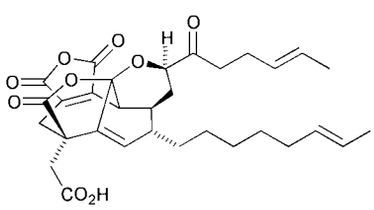


(+)-CP-262,114

Biological activity: (a) cholesterol lowering properties through inhibition of squalene synthase; (b) Ras farnesyltransferase inhibitor.

Key steps: (a) anion-accelerated oxy-Cope rearrangement followed by a transannular Dieckmann cyclisation; (b) Pd(0)-catalysed carbonylation of an alkenyl triflate; (c) TMSOTf-promoted methoxycarbonylation of a silylketene acetal to give a malonate derivative.

C. Chen, M. E. Layton, S. M. Sheehan and M. D. Shair, *J. Am. Chem. Soc.*, 2000, **122**, 7424.

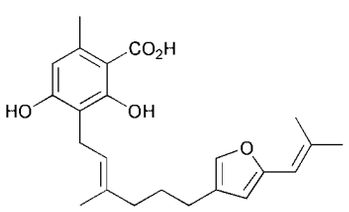


Cristatic Acid

Biological activity: (a) antibiotic activity against Gram-positive bacteria; (b) hemolytic; (c) inhibitory effect against ascites form of Ehrlich carcinoma cells.

Key steps: synthesis of the 2,4-disubstituted furan *via.* Pd(0)-catalysed alkylation of a vinyl epoxide.

A. Fürstner and T. Gastner, *Org. Lett*, 2000, **2**, 2467.

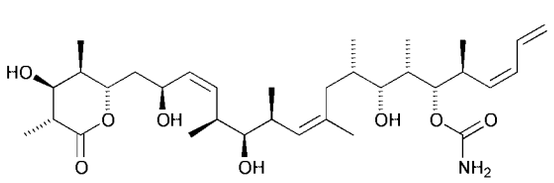


(+)-Discodermolide

Biological activity: (a) immunosuppressant; (b) antimitotic agent with similar activity to that of taxol; (c) promotes microtubule formation; (d) potent against multidrug resistance carcinoma cell lines.

Key steps: (a) three advanced intermediates each containing a stereotriad were derived from a common precursor; (b) modified Negishi coupling; (c) high pressure synthesis of a phosphonium salt; (d) Wittig linkage.

A. B. Smith, T. J. Beauchamp, M. J. LaMarche, M. D. Kaufman, Y. Qiu, H. Arimoto, D. R. Jones and K. Kobayashi, *J. Am. Chem. Soc.*, 2000, **122**, 8654.

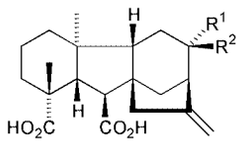


Gibberllins GA_{12}, GA_{111} and GA_{112}

Biological activity: plant growth hormones.

Key steps: an intramolecular Diels-Alder reaction generates 2 rings simultaneously.

M. Toyota, T. Odashima, T. Wadia and M. Ihara, *J. Am. Chem. Soc.*, 2000, **122**, 9036.



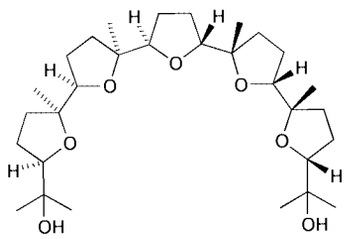
G_{12} $R^1 = R^2 = H$
G_{111} $R^1 = OH$, $R^2 = H$
G_{112} $R^1 = H$, $R^2 = OH$

(–)-Glabrescol

Biological activity: not reported.

Key steps: (a) head-to-head dimerisation of a farnesyl bromide derivative using Rieke barium; (b) 4-fold asymmetric epoxidation using Shi's chiral dioxirane; (c) bidirectional double cyclisation of a tetraol tetraepoxide.

Z. Xiong and E. J. Corey, *J. Am. Chem. Soc.*, 2000, **122**, 9328.

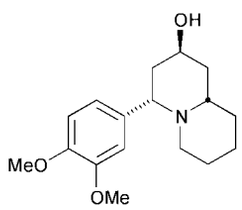


(–)-Lasubine II

Biological activity: (a) isolated from the leaves of *Lagerstroemia subcostata*; (b) biological activity not reported.

Key steps: (a) preparation of a δ-amino β-hydroxy ketone by the reaction of a Weinreb amide with a Grignard reagent; (b) formation of a hydroxy piperidine by the cyclisation a δ-amino β-hydroxy ketone followed by reduction.

F. A. Davis and B. Chao, *Org Lett.*, 2000, **2**, 2623.

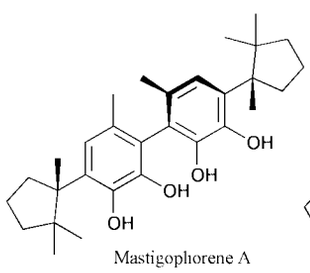


Mastigophorenes A and B

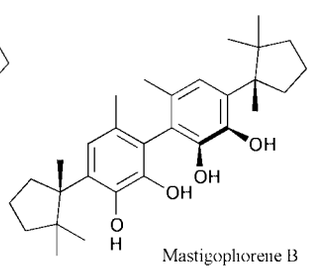
Biological activity: nerve growth stimulating activity.

Key steps: (a) lactone methodology to establish axial chirality; oxazaborolidine reduction to establish centrochirality.

G. Bringmann, T. Pabst, P. Henschel, J. Kraus, K. Peters, E.-M. Peters, D. S. Rycroft and J. D. Connolly, *J. Am. Chem. Soc.*, 2000, **122**, 9127.



Mastigophorene A



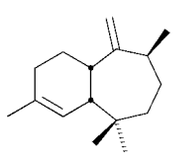
Mastigophorene B

(1*S*,3*S*,7*R*)-3-Methyl-α-himachalene

Biological activity: natural sex pheromone of the male sandfly *Lutzomyia longipalpis*.

Key steps: intramolecular Diels–Alder.

K. Mori, T. Tashiro and S. Sano, *Tetrahedron Lett.*, 2000, **41**, 5243.

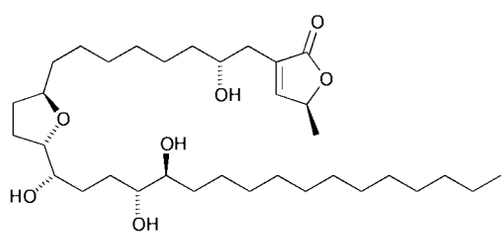


(+)-Muricatetrocin

Biological activity: inhibits PC-3 prostatic adenocarcinoma, PACA-2 pancreatic carcinoma and A-459 lung carcinoma.

Key steps: (a) use of butanediacetal protecting group to accomplish desymmetrisation; (b) hetero-Diels–Alder reaction to install a 1,5-stereochemical relation.

D. J. Dixon, S. V. Ley and D. J. Reynolds, *Angew. Chem., Int. Ed.*, 2000, **39**, 3622.

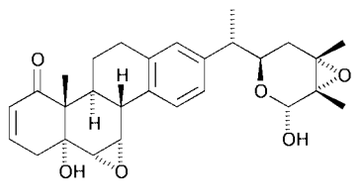


Nicandrenone-1

Biological activity: not reported.

Key steps: (a) *exo*-selective Diels Alder reaction; (b) oxazoborolidine-mediated asymmetric reduction of a ketone; (c) regioselective hydrostannylation; (d) arene chain appendage *via* a modified Stille coupling; (e) hydroxyl-directed hydrogenation of an allylic alcohol. Nicandrenone-1 lactone and nicandrenone-10 were also synthesised.

B. M. Stoltz, T. Kano and E. J. Corey, *J. Am. Chem. Soc.*, 2000, **122**, 9044.

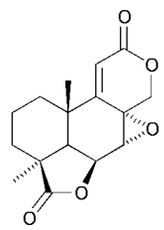


Oidiolactone C

Biological activity: (a) antifeedant; (b) antitumoral; (c) herbicide.

Key steps: (a) Pd-catalysed elimination of an allylic trifluoroacetate to form a conjugated diene; (b) Pd-catalysed bislactonisation.

A. F. Barrero, J. F. Quílez Del Moral, J. M. Cuerva, E. Cabrera and D. Jiménez-González, *Tetrahedron Lett.*, 2000, **41**, 5203.

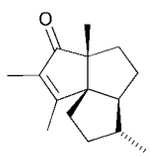


(±)-5-Oxosilphiperfol-6-ene and (±)-Silphiperfol-6-ene

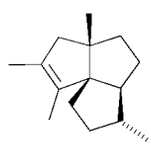
Biological activity: not reported.

Key steps: (a) Diels Alder reaction; (b) intramolecular Paterno Büchi reaction to construct the triquinane framework.

T. J. Reddy and V. H. Rawal, *Org. Lett.*, 2000, **2**, 2711.



(±)-5-Oxosilphiperfol-6-ene



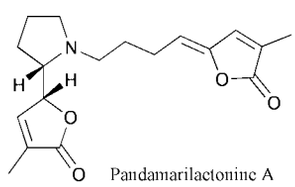
(±)-Silphiperfol-6-ene

(±)-Pandamarilactonine-A and -B

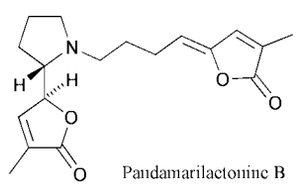
Biological activity: not reported.

Key steps: intramolecular 1,6-addition of an amine to a γ-alkylidene-α,β-unsaturated lactone generates the pyrrolidine ring.

H. Takayama, T. Ichikawa, T. Kuwajima, M. Kitajima, H. Seki, N. Aimi and M. G. Nonato, *J. Am. Chem. Soc.*, 2000, **122**, 8635.



Pandamarilactonine A



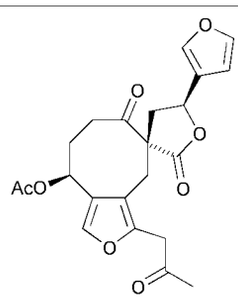
Pandamarilactonine B

(–)-Teubrevin G

Biological activity: not reported

Key steps: (a) regioselective intermolecular [4+2] cycloaddition-cycloreversion of an alkynal and an oxazole to give the furan ring; (b) asymmetric aldol; (c) ring-closing metathesis; (d) remote asymmetric induction to control the stereochemistry of the spirocyclic centre.

I. Efremov and L. A. Paquette, *J. Am. Chem. Soc.*, 2000, **122**, 9324.



Thysiferyl 23-Acetate

Biological activity: specific inhibition of protein phosphatase 2A; (b) induces rapid apoptosis.

Key steps: (a) Sharpless AE; (b) electrophilic cyclisations onto epoxides or trisubstituted alkenes to generate the tetrahydropyran and tetrahydrofuran rings; (c) Re(VII)-induced *syn*-oxidative cyclisation.

C. González and C. J. Forsyth, *J. Am. Chem. Soc.*, 2000, **122**, 9099.