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[[Lab. of Pharmacognosy]

The Effect of Cork Pieces on Pseudohypericin Production in Cells of *Hypericum perforatum* Shoots.

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The stimulating effect of cork pieces on hypericin and pseudohypericin biosynthesis was studied in cells of shoots regenerated from the callus cultures of St. John's wort (*Hypericum perforatum* L.). The addition of the cork matrix slightly stimulated shoot growth and enhanced pseudohypericin biosynthesis about threefold (to 0.4 mg/g dry wt). Pseudohypericin production increased proportionally with the amount of cork material added (from 1 to 4 mg/ml of growth medium). Further increase in the amount of cork pieces inhibited both pseudohypericin production and shoot growth. Organic and aqueous extracts of cork pieces did not affect the production of these substances.

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[Lab. of Pharmacognosy]

Molecular Cloning and Characterization of Isomultiflorenol Synthase, a New Triterpene Synthase from *Luffa cylindrica*, Involved in Biosynthesis of Bryonolic Acid.

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An oxidosqualene cyclase cDNA, LcIMS1, was isolated from cultured cells of *Luffa cylindrica* Roem.. Expression of LcIMS1 in yeast lacking endogenous oxidosqualene cyclase activity resulted in the accumulation of isomultiflorenol, a triterpene. This is in consistent with LcIMS1 encoding isomultiflorenol synthase, an oxidosqualene cyclase involved in bryonolic acid biosynthesis in cultured *Luffa* cells. The deduced amino acid sequence of LcIMS1 shows relatively low identity with other triterpene synthases, suggesting that isomultiflorenol synthase should be classified into a new group of triterpene synthases. The levels of isomultiflorenol synthase and cycloartenol synthase mRNAs correlated with the accumulation of bryonolic acid and phytosterols over a growth cycle of the *Luffa* cell cultures. Isomultiflorenol synthase mRNA was low during the early stages of cell growth. Induction of this mRNA preceded accumulation of bryonolic acid. In contrast, cycloartenol synthase mRNA accumulated in the early stages of culture cycle. These results suggest independent regulation of these two genes and of the accumulation of bryonolic acid and phytosterols.

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[Lab. of Pharmacognosy]

Hopeafuran and a C-Glucosyl Resveratrol Isolated from Stem Wood of *Hopea utilis*.

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The structures of the new compounds were determined by spectroscopic and chemical means. A new resveratrol dimer and a new C-glucosyl resveratrol were isolated from stem wood of *Hopea utilis* along with nine stilbenoid derivatives comprising bergenin and (+)-lyoniresinol. The structures have been elucidated on the basis of the spectroscopic evidence.

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[[Lab. of Pharmacognosy]

Stilbenoid in Lianas of *Gnetum parvifolium*.

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Five new stilbene dimers were isolated from the lianas of *Gnetum parvifolium* in addition to known stilbenoids. The structures of the compounds were established on the basis of spectroscopic evidence, including long-range coupling and nuclear Overhauser effect experiments, in NMR spectrum. Among the isolates, 2 β -hydroxyampelopsin F showed potent inhibitory activity in the Maillard reaction.