# Raunitidine isolated from Duroia macrophylla (Rubiaceae)

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are the antiulcus/antiphlogistic, and the spasmolytic activity, which are attributed to triterpene saponins (glycyrrhicinic acid and derivatives) and flavonoids (liquiritin, isoliquiritin and their aglycones), respectively [1]. According to the purposed use, it would be useful to have to disposal different licorice genotypes with a respective composition of the active compounds. Although licorice is routinely cultivated, it is well known that propagation through conventional methods like e.g. cuttings is slow, when compared to in vitro-techniques. With the aim to develop an *in vitro* protocol for the rapid multiplication of selected genotypes, in our study we chose the method of somatic embryogenesis, because of its potential for scale-up [2]. Cotyledon explants of 7 day old seedlings proved to be best suitable to establish callus cultures. As for the formation of embryogenic callus, the growth regulator TDZ was superior to 2,4-D or picloram, and resulted in vigorous growth of embryogenic callus. For embryo maturation, subculture on nutrient medium without growth regulators gave best results of more than 80 embryos per gram of inoculated callus tissue. Within this study, the genotype did not significantly influence the embryogenic potential. Through this protocol, the large scale clonal propagation of selected genotypes of *Glycyrrhiza glabra* is feasible, allowing for the production of plantlets of defined quality for further field culture. **References:** [1] Wichtl, M. (2009) Teedrogen und Phytopharmaka. 5th edition. Wissenschaftliche Verlagsgesellschaft mbH. Stuttgart, Germany. [2] George, E.F. (2008) Plant Propagation by Tissue Culture. 3 rd edition. Springer. Dordrecht, The Netherlands.

## PJ29 Comparative effects of a valerian extract and single compounds on sleep and body temperature in mice evaluated by telemetry

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Traditional use of *Valeriana officinalis* L. suggests sleep promoting properties, yet contemporary observations in clinical trials and rodent models using the extract and isolated compounds are contradictory [1,2]. We evaluated locomotor activity and body temperature of mice using telemetry to obtain evidence of sleep promoting effects. This method provides a reduced variable environment which improves upon previous methodologies. A 70% ethanolic extract of *Valeriana officinalis* root (250, 500, and 1000 mg/kg) was administered orally and data recorded for 180 minutes thereafter in male C57BL/6J mice. Oral administration of valerian extract had no effect on locomotor activity and body temperature compared to vehicle. Zolpidem (5 mg/kg, positive control) significantly decreased locomotor activity by 57% (activity counts after 30 min; control: 492.1 ± 41.8, zolpidem: 212.6 ± 44.2; $p < 0.001$) and body temperature by 0.57 °C ($\Delta T_{max}$ at 18 minutes, control: 36.53 ± 0.12 °C, zolpidem: 35.96 ± 0.13 °C; $p < 0.01$) whereas caffeine (5 mg/kg, negative control) induced an increase in activity of 47% (activity counts after 30 minutes; control: 492.1 ± 41.8, caffeine: 725.1 ± 76.4; $p < 0.01$) without affecting body temperature. In conclusion, telemetry is a simple, adequate method for the specific measurement of sleep promoting effects. The extract showed no significant difference to vehicle; yet, further studies on single compounds may help substantiate the use of *Valeriana officinalis* as insomnia treatment. **References:** [1]Hattelstohl, M. et al. (2008) Phytomedicine 15:2 – 15. [2] Fernández, S. et al. (2003) Pharmacol. Biochem. Behav. 77:399 – 404.

## PJ30 Raunitidine isolated from *Duroia macrophylla* (Rubiaceae)

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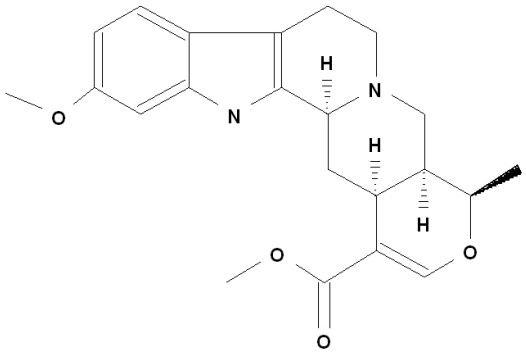
*Duroia macrophylla* Huber is a tropical tree, known as "puruí", which occurs in the Amazon region. Their fruits can be eaten and, as we know, no chemical study has been performed before. Leaves of *D. macrophylla* were dried at room temperature, ground and extracted with dichloromethane, methanol and later with water, by using ultra-sound for 20 minutes, each twice repeated and concentrated with reduced-pressure evaporator or liophylizer. The methanolic extract was fractioned by using chromatographic techniques and HPLC for further purification. The chemical identification of the indolic alkaloid raunitidine was achieved by NMR and MS data analyses and literature comparison [1].




*Acknowledgements: PPBio/INPA/MCT; CNPq; FAPEAM.* **References:** [1] Merlini, L. et al. (1976) Helv. Chim. Acta 59:2254 – 2260.

## PJ31 Cannabinoid receptor Gα fusion proteins as a highly sensitive model system for characterization of receptor ligands

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So far two human cannabinoid receptors (hCBRs) have been identified [1], both belonging to the family of G-protein coupled receptors (GPCRs): the hCB1R [2] is mainly located in the brain and the hCB2R [3] is predominantly located in the periphery on immune cells. Because of their involvement in many physiological functions, such as movement, metabolic regulation, host defense, analgesia and memory, there is a great interest in targeting these receptors for therapeutic applications. For the search for new CBR ligands, we refined an existing *in vitro* assay [4] that allows for the differentiation of the pharmacological properties of a compound. In the already established steady-state [$\gamma$-$^{32}$P]-GTPase assay *Spodoptera frugiperda* (SF9) cells were used for the co-expression of the CBR, the Gα-subunit and the Gβγ-heterodimer. Because the expression levels and the density of these proteins in the cell membrane influence the efficiency of the interaction between the receptor and the G proteins, we improved this assay using CBR-Gα fusion proteins. With these fusion proteins we can ensure a close proximity and defined stoichiometry of the signalling partners, resulting in higher coupling efficiency than the conventional co-expressing system. This very sensitive test system enabled us to detect an agonist at the CBRs in a matrix of other compounds. Therefore we added $\Delta^9$-THC to a $\Delta^9$-THC-free *Cannabis sativa* extract and found the expected increase of potency (e.g. extract $logEC_{50}$ -6,08 vs. extract enriched with $\Delta^9$-THC $logEC_{50}$ -6,86 at the $CB_1R$ and extract $logEC_{50}$ -5,86 vs. extract enriched with $\Delta^9$-THC $logEC_{50}$ -6,38 at the $CB_2R$). **References:** [1] Howlett, A.C. et al. (2002) Pharmacol. Rev. 54:161 – 202. [2] Matsuda, L.A. et al. (1990) Nature 346:561 – 564. [3] Munro, S. et al. (1993) Nature 365:61 – 65. [4] Egger, M. et al. (2008) Chem. Eur. J. 14:10978 – 10984.

## PJ32 Catechin-derivates affinity for human cannabinoid receptors

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Flavonoids are common secondary plant metabolites and possess manifold health-enhancing effects. In addition to neuroprotective and anti-inflammatory activities, growing evidence suggests that flavonoids may