Research Abstracts

Rhodiola Rosea

A randomized trial of two different doses of a SHR-5 Rhodiola rosea extract versus placebo and control of capacity for mental work

A randomized, double-blind, placebo-controlled, parallel-group clinical study with an extra non-treatment group was performed to measure the effect of a single dose of standardized SHR-5 Rhodiola rosea extract on capacity for mental work against a background of fatigue and stress. An additional objective was to investigate a possible difference between two doses, one dose being chosen as the standard mean dose in accordance with well-established medicinal use as a psychostimulant/adaptogen, the other dose being 50% higher. Some physiological parameters, e.g. pulse rate, systolic and diastolic blood pressure, were also measured. The study was carried out on a highly uniform population comprising 161 cadets aged from 19 to 21 years. All groups were found to have very similar initial data, with no significant difference with regard to any parameter. The study showed a pronounced antifatigue effect reflected in an antifatigue index defined as a ratio called AFI. The verum groups had AFI mean values of 1.0385 and 1.0195, 2 and 3 capsules respectively, whilst the figure for the placebo group was 0.9046. This was statistically highly significant ($p < 0.001$) for both doses (verum groups), whilst no significant difference between the two dosage groups was observed. There was a possible trend in favour of the lower dose in the psychometric tests. No such trend was found in the physiological tests. Shevtsov VA, Zholus BI, Shervarly VI, Vol'skij VB, Korovin YP, Khristich MP, Roslyakova NA, Wikman G. *Phytomedicine*. 2003 Mar;10(2-3):95-105.

Rhodiola rosea in stress induced fatigue--a double blind cross-over study of a standardized extract SHR-5 with a repeated low-dose regimen on the mental performance of healthy physicians during night duty

The aim of this study was to investigate the effect of repeated low-dose treatment with a standardized extract SHR/5 of rhizome Rhodiola rosea L, (RRE) on fatigue during night duty among a group of 56 young, healthy physicians. The effect was measured as total mental performance calculated as Fatigue Index. The tests chosen reflect an overall level of mental fatigue, involving complex perceptive and cognitive cerebral functions, such as associative thinking, short-term memory, calculation and ability of concentration, and speed of audio-visual perception. These parameters were tested before and after night duty during three periods of two weeks each: a) a test period of one RRE/placebo tablet daily, b) a washout period and c) a third period of one placebo/RRE tablet daily, in a double-blind cross-over trial. The perceptive and cognitive cerebral functions mentioned above were investigated using 5 different tests. A statistically significant improvement in these tests was observed in the treatment group (RRE) during the first two weeks period. No side-effects were reported for either treatment noted. These results suggest that RRE can reduce general fatigue under certain stressful conditions. Darbinyan V, Kteyan A, Panossian A, Gabrielian E, Wikman G, Wagner H. *Phytomedicine* 2000 Oct;7(5):365-71.

A double-blind, placebo-controlled pilot study of the stimulating and adaptogenic effect of Rhodiola rosea SHR-5 extract on the fatigue of students caused by stress during an examination period with a repeated low-dose regimen

The objective was to investigate the stimulating and normalizing effect of the adaptogen Rhodiola rosea extract SHR-5 in foreign students during a stressful examination period. The study was performed as a double-blind, randomized and placebo-controlled with low repeated dose regime. The study drug and the placebo were taken for 20 days by the students during an examination period. The physical and mental performance were assessed before and after the period, based on objective as well as on subjective evaluation. The most significant improvement in the SHR-5 group was seen in physical fitness, mental fatigue and neuro-motoric tests ($p < 0.01$). The self-assessment of the general well-

being was also significantly ($p < 0.05$) better in the verum group. No significance was seen in the correction of text tests or a neuro-muscular tapping test. The overall conclusion is that the study drug gave significant results compared to the placebo group but that the dose level probably was suboptimal. Spasov AA, Wikman GK, Mandrikov VB, Mironova IA, Neumoin VV. *Phytomedicine* 2000 Apr;7(2):85-9.

The participation of the mu-, delta- and kappa-opioid receptors in the realization of the anti-arrhythmia effect of Rhodiola rosea

A course of the adaptogen extractum Rhodiola rosea (3.5 ml/kg given per os daily for 8 days). produces am antiarrhythmic effect on models of epinephrine-induced arrhythmia. Blockade of mu-opiate receptors (OR) by naloxone (0.2 mg/kg) and delta-OR by ICI 174.864 (2.5 mg/kg) had no effect on the resistance of the heart of rats adapted to epinephrine. Higher doses of naloxone reduced significantly the antiarrhythmic effect of extr. Rhodiola. The antiarrhythmic effect of the extract is assumed to be related to activation of the opioid system and stimulation of kappa-OR. Maimeskulova LA, Maslov LN, Lishmanov IuB, Krasnov EA. *Eksp Klin Farmakol* 1997 Jan-Feb;60(1):38-9.

The cardioprotective and antiadrenergic activity of an extract of Rhodiola rosea in stress

The course of administration of Rhodiola rosea extract was studied for effects on the pattern of stress-induced cardiac damage which was assessed by 99mTc-pyrophosphate accumulation in the heart. Rhodiola rosea was found to prevent stress-induced cardiac damage. Simultaneously, myocardial catecholamines and cAMP levels were measured. Rhodiola rosea was ascertained to prevent both stress-induced catecholamine release and higher cAMP levels in the myocardium. Moreover, the adaptogen prevented lower adrenal catecholamines during stress. The findings suggest that the antistressor and cardioprotective effects of Rhodiola rosea are associated with limited adrenergic effect on the heart. Maslova LV, Kondrat'ev BIu, Maslov LN, Lishmanov IuB. *Eksp Klin Farmakol* 1994 Nov-Dec;57(6):61-3.

Plasma beta-endorphin and stress hormones in stress and adaptation

The experiments on white rats have shown that the induction of 4 hour stress produces an acute increase in beta-endorphin level, as well as characteristic changes in ACTH, cortisol, insulin, thyroxin and triiodothyronine concentrations. Different types of adaptation (training with short stress periods or injection of rhodiola rosea extract) promote a moderate increase in the amount of serum immunoreactive beta-endorphin, preventing its subsequent stress-induced elevation. Adaptation is characterized by a decrease or total prevention of hormonal changes peculiar to stress. The role of opioid neuropeptides in enhancing stress tolerance and the effect of adaptation factors are discussed. Lishmanov IuB, Trifonova ZhV, Tsibin AN, Maslova LV, Dement'eva LA. *Biull Eksp Biol Med* 1987 Apr;103(4):422-4.

Effects of Alcohol Aqueous Extract From Rhodiola rosea L. Roots On Learning and Memory

The effect of alcohol-aqueous extract (1:1) from Rhodiola rosea L. roots on the processes of learning and memory is studied on rats. Several methods of active avoidance with negative and positive reinforcements are used, as well as of passive avoidance. Using the maze-method with negative (punitive) reinforcement, it has been found that Rhodiola extract in a single dose of 0.10 ml per rat essentially improves learning and retention after 24 hours. Significant improvement of the long-term memory is also established in memory tests after 10-day treatment with the same dose of the extract. In the other two doses tested (0.02 and 1.0 ml per rat) the extract has no substantial effect on learning and memory. In a dose of 0.10 ml per rat the Rhodiola extract had a favourable effect on the training process using the "staircase" method with positive (food) reinforcement as well. With the other methods used (active avoidance method with negative reinforcement "shuttle-box" and passive avoidance methods "step down" and "step through") Rhodiola extract in the dose used (0.10 ml per rat) had no substantial effect on learning and memory (a certain deterioration of the training process was even observed using the "shuttle-box" method, while the "step-down" method resulted in deterioration of the memory). The great significance of the method used for studying the effects of the pharmacological agents on learning and memory for the results obtained is evident. Petkov VD, Yonkov D, Mosharoff A. *Acta Physiol Pharmacol Bulg* 1986;12(1):3-16.

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