Adaptogenic and nootropic activities of aqueous extract of *Vitis vinifera* (grape seed)

The aerial parts of *Vitis vinifera* Linn. (Common grape, Hindi — Angur) have been widely used in Ayurveda to treat a variety of common and stress related disorders. The seed extract of grapes was evaluated by Sreemantula and others for antistress activity in normal and stress induced rats. Furthermore, the extract was studied for nootropic activity in rats and *in vitro* antioxidant potential to correlate its antistress activity. Daily administration of *V. vinifera* at doses of 100, 200 and 300 mg/kg body wt one hour prior to induction of stress inhibited the stress induced urinary biochemical changes in a dose dependent manner. However, no change in the urinary excretion of VMA and ascorbic acid was observed in normal animals at all the doses studied. The cognition, as determined by the acquisition, retention and recovery in rats was observed to be dose dependent. The extract also produced significant inhibition of hydroxyl radicals in comparison to ascorbic acid in a dose dependent manner. The study provides scientific support for the antistress (adaptogenic), antioxidant and nootropic activities of grape seed extract and substantiate the traditional claims for the usage of grape fruits and seeds in stress induced disorders [Satyanarayana Sreemantula, Srinivas Nammi, Rajabhanu Kolanukonda, Sushruta Koppula and Krishna M. Boini, Adaptogenic and nootropic activities of aqueous extract of *Vitis vinifera* (grape seed): An experimental study in rat model, *BMC Compl Altern Med*, 2005, 5,1;doi:10.1186/1472-6882-5-1].

Induction of insulin secretion by *Urtica dioica* leaves

The blood glucose lowering effect of *Urtica dioica* Linn. (Stinging Nettle) leaves has been noted in old writings such as those of Avicenna. Recently, there has also been other investigators that indicated the hypoglycaemic effect of this species. The scientists at Tehran University of Medical Sciences, Tehran, Iran arranged perifusion system in which an exact number of Langerhans Islets were exposed to several fractions of extracts of the leaves of the plant by TLC. The active ingredient fraction named $F_1$, caused a marked increase in insulin secretion. A simultaneous assay of glucose showed that the increase in insulin level was associated with a decrease in glucose level. Furthermore, the active component of Stinging Nettle was found to increase the insulin content of blood sera in normal and streptozotocin diabetic rats that were injected intraperitoneally (i.p.) with the active ingredient of the extract. The *in vivo* studies showed that not only an increase in insulin level of blood sera was observed in rats after 30 min from the initial point of injection but a simultaneous decrease of blood sugar was detected when similar sera was tested for glucose. The increase in insulin level was six times during the 120 min of determination. The decrease in blood sugar was found to be similar both in the level and time of initiation. On the basis of these findings, it is assumed that $F_1$ is the active ingredient of plant leaves extract and the blood lowering effect of the extract was due to the enhancement of insulin secretion by Langerhans Islets [Farzami Bijan, Ahmadvand D, Vardashi S, Majin FJ and Sh Khaghani, Induction of insulin secretion by a component of *Urtica dioica* leave extract in perifused Islets of Langerhans and its *in vivo* effects in normal and streptozotocin diabetic rats, *J Ethnopharmacol*, 2003, 89(1), 47-53].
Effects of garlic essential oil on human liver tumour cells

Garlic (Allium sativum Linn.) is a widely consumed herb in foodstuffs and medicines. Epidemiological, clinical and laboratory studies have shown that crushed or processed garlic and their active principles, such as allicin, diallyl sulfide (DAS), diallyl disulfide (DADS) and diallyl trisulfide (DATS), give diverse biological activities, including antitumorigenesis, antiatherosclerosis, blood sugar modulation and antibiotics. Garlic has been reported to reduce chemically induced oesophageal, skin, pulmonary, stomach, colon, mammary and lung tumour.

In a study conducted by Wu and others at Taiwan, DAS, DADS and DATS, which are major organosulfur compounds (OSC) of garlic, were used as experimental materials to investigate their modulation effects on cell viability and cell cycle in human liver tumour cells (J5). According to the results of cell viability assay, 50 or 100 µM DATS significantly decreased the cell viability as compared with the control (P < 0.05) in dose and time dependent relations. Phenomena of cell number loss, shape deformation and lysis were observed after treatment with 100 µM DATS for 24 hr. Cell cycle studies showed that J5 cells were significantly arrested in G2/M phase as the cells were treated with 100 µM DADS, 10, 50 or 100 µM DATS for 24 hr (P < 0.05). DATS was more effective in arresting cells in G2/M phase than DADS, and the phenomena of arresting J5 cells in G2/M phase increased obviously in dose and time dependent relations. According to the Western blot analysis, DATS decreased cyclin-dependent kinase (Cdk)-Cdk7 (i.e. Cdc2 activate kinase) protein levels in J5 cells but increased cyclin B1 protein level. The modulation potency to cyclin B1 and Cdk7 expressions was in the order of DATS>DADS>DAS. The modulation potency to cyclin B1 and Cdk7 protein levels increased with increasing in DATS concentration and culture time. In conclusion, DATS might affect cell viability and cell morphological changes in J5 cells and lead cells to be arrested in G2/M phase via controlling the expression of cyclin B1 and Cdk7 in J5 cells, and the controlling action might relate to the sulfuric atom numbers in the structures of all these allyl sulfides. Results indicate that DATS show various effects on inhibition of proliferation of human liver tumour cells (J5). The inhibition capability of DATS was higher than DADS and DAS. DADS gave higher inhibition capability than DATS. DATS can arrest the J5 cells at G2/M phase of cell cycle by regulating the protein expressions of cyclin B1 and Cdk7. The number of sulfur atom of allyl sulfide in garlic oil was correlated with potency in modulating the cyclin and Cdk5 expressions and biological actions and in the order of DATS>DADS>DAS [Wu C-C, Chung JG, Tsai JS, Yang JH and LY, Differential effects of allyl sulfides from garlic essential oil on cell cycle regulation in human liver tumor cells, Food Chem Toxicol, 2004, 42 (11), 1937-1947].

Antimalarial activity of flavanones from the roots of Sophora flavescens

Four lavandulyl flavanones, (2S)-2’-methoxylavandulyl flavanone (1), sophoraflavanone G (2), leachianone A (3), and (–)-kurarinone (4), which are isolated from the roots of Sophora flavescens Ait. have been tested for in vitro antimalarial activity against Plasmodium falciparum by researchers of Wonkwang University, Korea. Compounds 1-3 showed moderate antimalarial activities with EC₅₀ values of 2.4×10⁻⁶, 2.6×10⁻⁶ and 2.1×10⁻⁶ M, respectively. These compounds did not show selective toxicity against P. falciparum in the toxicity test on mouse mammalian tumour cells, however, it is suggested that the position of methoxyl groups in flavanone skeleton plays an important role on antimalarial activity [Kim Youn Chul, Kim Hye-Sook, Wataya Yusuke, Sohn Dong Hwan, Kang Tai Hyun, Kim Myung Soo, Kim Yong Man, Lee Geon-Mok, Chang Jong-Duk and Park Hyun, Antimalarial Activity of Lavandulyl Flavanones Isolated from the Roots of Sophora flavescens, Biol Pharm Bull, 2004, 27 (5), 748-750].
Ocular side effects of herbal medicines and nutritional supplements

Herbal medicines and nutritional supplements are of clinical importance to ophthalmologists, because many of these therapies can cause unwanted side effects, and some interfere with prescribed medications. Approximately 40% of patients who use alternative therapies do not disclose this information to their doctor. A variety of these therapies are touted as beneficial for eye disease and many are associated with ocular side effects.

A retrospective observational case series of reports of ocular side effects or systemic side effects from medications used for the eye from herbal medicines and nutritional supplements were conducted by researchers in USA. Cases were collected from spontaneous reports submitted to the WHO, the Food and Drug Administration, and the National Registry of Drug-Induced Ocular Side Effects. A review of the world’s literature was performed to obtain additional case reports and insight into adverse ocular reactions. Data were collected on age, gender, duration of therapy, concomitant medications, dosage, and dechallenge and rechallenge results.

The National Registry of Drug-Induced Ocular Side Effects received 263 spontaneous reports, in addition to 60 case reports from the literature. Canthaxanthine, chamomile, Datura, Echinacea purpurea, Ginkgo biloba, licorice, niacin and vitamin A are all associated with clinically significant ocular side effects. Herbal medicines and nutritional supplements can cause ocular side effects. Therefore, clinicians must remain vigilant in recognizing adverse ocular reactions as well as inquiring whether these alternative treatments are being used, as patients frequently do not disclose this information to their physicians [Fraunfelder Frederick W, Ocular side effects from herbal medicines and nutritional supplements, Am J Ophthalmol, 2004, 138 (4), 639-647].

Rice bran oil lowers cholesterol in humans

Researchers at the Division of Functional Foods Research, Pennington Biomedical Research Center, Louisiana State University, Baton Rouge, LA carried out studies to assess the effects of defatted rice bran and rice bran oil in diet on blood lipids in moderately hypercholesterolemic persons. Twenty-six healthy volunteers consumed a diet with 13–22g dietary fibre/day for 3 weeks and then 13 of the volunteers were switched to a diet with defatted rice bran to double the fibre intake for 5 weeks. Study 2 was a randomized, crossover, 10-week feeding study performed on 14 volunteers who consumed a diet with rice bran oil (1/3 of the total dietary fat) substituted for an oil blend that had a fatty acid composition similar to that of the rice bran oil. Serum lipids and factor VII were measured in both studies. Defatted rice bran did not lower lipid concentrations. In study 2, total cholesterol was significantly lowered with consumption of the diet containing rice bran oil than with consumption of the control diet. Moreover, with consumption of the rice bran oil diet, LDL cholesterol decreased by 7% (P < 0.0004), whereas HDL cholesterol was unchanged. Rice bran oil, not fibre, lowers cholesterol in healthy, moderately hypercholesterolemic adults. There were no substantial differences in the fatty acid composition of the diets; therefore, the reduction of cholesterol was due to other components present in the rice bran oil, such as unsaponifiable compounds [Most Marlene M, Tulley Richard, Morales Silvia and Lefevre Michael, Rice bran oil, not fiber, lowers cholesterol in humans, Am J Clin Nutr, 2005, 81(1), 64-68].
Supplementation with cactus pear fruit decreases oxidative stress

Cactus pear, *Opuntia ficus-indica* (Linn.) Mill. fruit contains vitamin C and characteristic betalain pigments, the radical-scavenging properties and antioxidant activities of which have been shown in vitro. Researchers of Italy investigated the effects of short-term supplementation with cactus pear fruit compared with vitamin C alone on total-body oxidative status in healthy humans. In a randomized, crossover, double-treatment study, 18 healthy volunteers received either 250g fresh fruit pulp or 75mg vitamin C twice daily for 2 weeks, with a 6-week washout period between the treatments. Before (baseline) and after each treatment, 8-epi-prostaglandin F$_{2\alpha}$ (8-epi-PGF$_{2\alpha}$) and malondialdehyde in plasma, the ratio of reduced to oxidized glutathione (GSH:GSSG) in erythrocytes and lipid hydroperoxides in LDL were measured as biomarkers of oxidative stress; plasma Trolox-equivalent antioxidant activity (TEAC) and vitamins A, E and C were evaluated as indexes of antioxidant status. Both treatments caused comparable increases compared with baseline in plasma concentrations of vitamin E and vitamin C ($P < 0.05$); vitamin A and TEAC did not change significantly. After supplementation with cactus pear fruit, 8-epi-PGF$_{2\alpha}$ and malondialdehyde decreased by $\approx 30\%$ and $75\%$, respectively; GSH:GSSG shifted toward a higher value ($P < 0.05$); and LDL hydroperoxides were reduced by almost one-half. Supplementation with vitamin C did not significantly affect any marker of oxidative stress.

Consumption of cactus pear fruit positively affects the body’s redox balance, decreases oxidative damage to lipids and improves antioxidant status in healthy humans. Supplementation with vitamin C at a comparable dosage enhances overall antioxidant defense but does not significantly affect body oxidative stress. Components of cactus pear fruit other than antioxidant vitamins may play a role in the observed effects [Tesoriere Luisa, Butera Daniela, Pintaudi Anna Maria, Allegra Mario and Livrea Maria A, Supplementation with cactus pear (*Opuntia ficus-indica*) fruit decreases oxidative stress in healthy humans: a comparative study with vitamin C, *Am J Clin Nutr*, 2004, 80 (2), 391-395].

Inhibition of allergic reactions by stem extract of *Plumbago zeylanica*

The antiallergic properties of the 70% ethanol extract from *Plumbago zeylanica* Linn. stems (EPZ) were investigated by researchers in China. The extract (500, 1000 mg/kg, p.o.) dose-dependently inhibited systemic anaphylactic shock induced by compound 48/80 in mice, reduced homologous passive cutaneous anaphylaxis and skin reactions induced by histamine or serotonin in rats, significant differences were observed at the dose of 1000 mg/kg. *In vitro*, EPZ (5, 20, 50 µg/ml) concentration-dependently reduced histamine release from rat peritoneal mast cells caused by compound 48/80 and antigen. EPZ (50 µg/ml) markedly increased intracellular cAMP content of rat mast cells. These findings demonstrate that EPZ inhibits mast cell-dependent immediate allergic reactions, which is probably mediated by reducing the release of mediators such as histamine from mast cells via elevating intracellular cAMP level and weakening the inflammatory action of mediators [Dai Yue, Hou Li Fei, Chan Yiu-Pong, Cheng Ling and But Paul Pui-Hay, Inhibition of Immediate Allergic Reactions by Ethanol Extract from *Plumbago zeylanica* Stems, *Biol Pharm Bull*, 2004, 27 (3), 429-432].
Hypolipidemic effect of North eastern herbal home remedy

*Clerodendron colebrookianum* Walp. is a perennial shrub indigenous to the north eastern region of India. It is widely used by a cross section of people of this region as a home remedy against hypertension and as anthelmintic. The usual process is to boil the tender leaves and shoots in water with salt and spices and take both the infusion and the residue and occasionally tender leaves and shoots are fried in mustard oil and eaten. Keeping these reports in view the researchers at Institute of Advanced Study in Science and Technology, Guwahati and Department of Zoology, Gauhati University, Guwahati, Assam investigated the effect of crude extract and different organic extracts of leaf on lipid profile, which is closely associated with many cardiovascular diseases.

It was found that after administration of both crude and organic extracts the serum lipid profile, i.e. total cholesterol (TC), triglycerides (TG) and low density lipoprotein (LDL) lowered significantly \((P<0.001)\) from their respective control except TG in methanol extract (ME)-treated rats. The decreased percentage of TC, TG and LDL after administration of crude extract (CE) and ethylacetate extract (EE) with normal diet were found to be 35, 39 and 48%, and 33, 18 and 91%, respectively, after 7 days of treatment. In case of ME the lowering of TC and LDL were noted to be 41 and 85%, respectively. Both TC and TG were lowered significantly \((P<0.001)\) even after the administration of crude extract against high-fat diet. Significant increase of cardioprotective lipid, i.e high density lipoprotein (HDL) after administration of EE (46%) and ME (38%) was another interesting finding of this experiment. Total cholesterol:HDL and LDL:HDL ratios were significantly lower in the experimental group. Therefore, it was concluded that the leaves have definite cardioprotective potentiality, and there is a valid scientific basis for consuming it for better health in NE region of India [Rajlakshmi Devi and Sharma D K, Hypolipidemic effect of different extracts of *Clerodendron colebrookianum* Walp. in normal and high-fat diet fed rats, *J Ethnopharmacol*, 2004, 90(1), 63-68].

Memory enhancing activity of *Glycyrrhiza glabra* in mice

The roots and rhizomes of Liquorice, *Glycyrrhiza glabra* Linn. (Hindi — *Mulhatti*) have been employed clinically for centuries for their medicinal properties. The researchers at Guru Jambheshwar University, Hisar, Haryana and University Institute of Pharmaceutical Sciences, Punjab University, Chandigarh have investigated the effects of liquorice on learning and memory in mice. Elevated plus-maze and passive avoidance paradigm were employed to test learning and memory. Three doses (75, 150 and 300mg/kg p.o.) of aqueous extract were administered for 7 successive days in separate groups of animals. The dose of 150mg/kg of the aqueous extract of liquorice significantly improved learning and memory of mice. Furthermore, this dose significantly reversed the amnesia induced by Diazepam (1mg/kg i.p.) and Scopolamine (0.4mg/kg i.p.). Anti-inflammatory and antioxidant properties of liquorice may be contributing favourably to the memory enhancement effect. Since, Scopolamine-induced amnesia was reversed by liquorice, it is possible that the beneficial effect on learning and memory was due to facilitation of cholinergic-transmission in mouse brain. However, further studies are necessitated to identify the exact mechanism of action [Dhingra Dinesh, Parle Milind and Kulkarni SK, Memory enhancing activity of *Glycyrrhiza glabra* in mice, *J Ethnopharmacol*, 2004, 91(2-3), 361-365].
Combination chemoprevention by tomato and garlic

Dietary chemoprevention is a cost-effective approach to control the incidence of cancer. Epidemiological studies have emphasised the consistent association between increased intake of fruits and vegetables and reduced risk of various cancers. Combination chemoprevention by dietary agents is a promising strategy for cancer prevention. Combined chemopreventive effect of tomato (*Lycopersicon esculentum* Mill.) paste and aqueous garlic (*Allium sativum* Linn.) extract against 7,12-dimethylbenz[a]anthracene (DMBA)-induced hamster buccal pouch (HBP) carcinogenesis was evaluated by scientists at Department of Biochemistry, Annamalai University, Annamalainagar, Tamil Nadu.

The experiment was carried out with male Syrian hamsters, aged 8–10 weeks weighing 90–100 g and they were divided into eight groups. Animals in group 1 served as control. Groups 2, 3 and 4 were given tomato, garlic and mixture of tomato and garlic, respectively. The right buccal pouches of animals in group 5 were painted with 0.5% DMBA three times a week. Animals in groups 6 to 8 painted with DMBA as in group 5, received in addition, intragastric administration of tomato paste, aqueous garlic extract alone and in combination, respectively on days alternate to DMBA application. Lipid peroxidation, reduced glutathione (GSH), glutathione peroxidase (GPx), glutathione-S-transferase (GST), glutathione reductase (GR) and γ-glutamyltranspeptidase (GGT) as well as GSH/GSSG ratio were measured in the buccal pouch, liver and erythrocytes at the end of 14 weeks. Diminished lipid peroxidation in the HBP tumours was associated with enhanced levels of GSH and GSH-dependent enzymes. In contrast to the buccal pouch, the liver and erythrocytes of tumour-bearing hamsters exhibited elevated lipid peroxidation accompanied by compromised antioxidant status. Although administration of tomato paste and garlic alone significantly reduced the tumour incidence and tumour burden, combined administration of tomato and garlic was more effective in inhibiting the development of HBP carcinomas as revealed by modulation of the cellular redox status. From these results, we suggest that broader spectrum of chemoprevention with less adverse effects can be attained through effective combination of functional foods [Bhuvaneswari V, Chandra Mohan KVP and Nagini S, Combination chemoprevention by tomato and garlic in the hamster buccal pouch carcinogenesis model, *Nutr Res*, 2004, 24(2),133-146].

Naringenin inhibits Dimethylnitrosamine-induced liver damage

Naringenin, a phytoalexin found in grapefruits and tomatoes, has been reported to exhibit a wide range of pharmacological properties. Researchers at Pusan National University, Korea investigated the protective effect of naringenin on hepatic injury induced by Dimethylnitrosamine (DMN) in rats. Oral administration of naringenin (20 and 50 mg/kg daily for 4 weeks) remarkably prevented the DMN-induced loss in body and liver weights and inhibited the elevation of serum alanine transaminase, aspartate transaminase, alkaline phosphatase, and bilirubin levels. Naringenin also restored serum albumin and total protein levels, and reduced the hepatic level of malondialdehyde. Furthermore, DMN-induced collagen accumulation, as estimated by histological analysis of liver tissue stained with Sirius red, was reduced in the naringenin-treated rats. A reduction in hepatic stellate cell activation, as assessed by α-smooth muscle actin staining, was associated with naringenin treatment. In conclusion, these results demonstrated that naringenin exhibited in vivo hepatoprotective and anti-fibrogenic effects against DMN-induced liver injury. It suggests that naringenin may be useful in preventing the development of hepatic fibrosis [Lee Mi-Hye, Yoon Sik and Moon Jeon-Ok, The Flavonoid Naringenin Inhibits Dimethylnitrosamine-Induced Liver Damage in Rats, *Biol Pharm Bull*, 2004, 27 (1), 72-76].