

## CURRENT TOPICS IN NUTRACEUTICAL RESEARCH VOLUME 6 NUMBER 1

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### Current Topics in Nutraceutical Research 6 (1): 1-12

- 1-12 Molecular actions of ascorbic acid  
**John K. Lodge**

ABSTRACT: Ascorbic acid is an important water-soluble antioxidant and epidemiological data suggest an association between low intakes and low plasma concentrations with increased risk of degenerative

disease. In humans ascorbate is associated with a number of metabolic functions, all of which are dependent on the powerful reducing properties of the molecule. During the catalytic cycle of the eight ascorbate dependent enzymes, or following scavenging of reactive oxygen or nitrogen species during its antioxidant role, ascorbate is oxidized losing either 1 or 2 electrons. However, efficient intracellular recycling systems exist that convert the oxidized species back to ascorbate. These processes can be enzymatic or non-enzymatic and usually rely on GSH and NAD(P)H as the ultimate source of electrons. In this way, ascorbate recycling can influence central metabolism. It has now been established that ascorbate also functions at the molecular level. These data include the modulation of collagen formation, modulation of cell differentiation, modulation of nuclear transcription factors, modulation of nitric oxide production and the modulation of a number of other genes involved in various cellular systems. These metabolic and molecular functions of ascorbate form the main focus of this review.

## **Current Topics in Nutraceutical Research 6 (1): 13-20**

- 13-20      Postprandial glucose and free fatty acid response is improved by wheat Bread fortified with germinated wheat seedlings  
**Gaby Andersen, Peter Koehler, and Veronika Somoza**

**ABSTRACT:** The intake of cereals is associated with a decreased risk for type 2 diabetes. The aim was to study whether a wheat bread fortified with germinated wheat seedlings positively affects glucose regulating factors compared to a control wheat bread in healthy volunteers. The study was conducted in a longitudinal design with 14 subjects. For a period of nine days, either a wheat bread with 30 w/w-% imbibed wheat kernels (control bread) or a wheat bread with 30 w/w-% germinated wheat seedlings (experimental bread) was administered. An oral glucose tolerance test was performed at the beginning and at the end of the two bread periods. The total antioxidant capacity, levels of phenolic compounds, glucose, insulin, C-peptide, glucose-dependent insulintropic polypeptide (GIP), and free fatty acids (FFA) in the plasma were determined. Both breads lowered plasma FFA- levels in the subjects. Additionally, the experimental bread lowered fasting as well as postprandial glucose levels. These effects can not be attributed to an increased fiber intake of the subjects. The glucose-lowering effect of the wheat bread fortified with wheat seedlings appears to be evoked by non-fiber compounds of wheat seedlings.

## **Current Topics in Nutraceutical Research 6 (1): 21-26**

- 21-26      Identification of volatile orange juice components that increase the IL-4And IL-10 formation in buccal cells  
**Sandra Held and Veronika Somoza**

**ABSTRACT:** The aim of this study was to investigate the immune modulatory effect of orange juice and its components. For this purpose, epithelial buccal cells (KB) were exposed to orange juice or orange juice fractions containing the dry matter, the volatile compounds (aqueous distillate), or individual non-volatile or volatile components. Intracellular formation of the anti- inflammatory cytokines IL-4 and IL-10 was analyzed by flow cytometry. Exposure to whole orange juice and the DM resulted in a decrease in IL-4 and IL-10 formation compared to non- treated control cells. The sugars and organic acids were identified as active components inducing this pro-inflammatory effect. In cells treated with the aqueous distillate in higher concentrations, an increased IL-4 and IL-10 formation was analyzed. In order to identify the anti-inflammatory compounds in the aqueous distillate, cells treated with the aqueous distillate were analyzed by GC-MS. Aroma compounds identified therein were limonene, linalool and a-

terpineol. Subsequent studies on the intracellular IL-4 and IL-10 production revealed that linalool and limonene had no significant effects, whereas  $\alpha$ -terpineol had a stimulating effect. This anti-inflammatory effect on cytokine production in buccal cells by the orange juice aroma component  $\alpha$ -terpineol has been for the first time.

### Current Topics in Nutraceutical Research 6 (1): 27-38

- 27-38 Plant based ‘mood foods’- targeting anxiety  
**E.M. Gould, S. Parkar, K. Crawford, D. Forbes, M.A. Skinner, and A. Scheepens**

**ABSTRACT:** The increasing prevalence of anxiety and depression are becoming a serious burden on society in terms of psychosocial and financial costs. Throughout human history, man has self medicated with plant-based foods and herbs and this holistic and non-pharmaceutical approach is now regaining popularity in the treatment of mild to moderate mood fluctuations. This review summarizes the biology of mood and, in particular, some of the molecular mechanisms that can be realistically targeted by plant-based foods in order to enhance emotional wellbeing. It also highlights foods which have some anxiolytic or antidepressive properties and their mechanisms of action if known.

### Current Topics in Nutraceutical Research 6 (1): 39-44

- 39-44 The effects of garum armoricum® (GA) on elevated-plus maze and Conditioned light extinction tests in rats  
**Michaël Messaoudi, Robert Lalonde, Amine Nejdi, Jean-François Bisson, Pascale Rozan, Herve Javelot, and Henri Schroeder**

**ABSTRACT:** Garum Armoricum® (GA), a compound rich in polyunsaturated fatty acids, free amino acids, small peptides, vitamins and minerals, was evaluated on two fear-related assays in rats. GA and diazepam (DZP) increased entries into open arms relative to placebo, as well as percentage of open arm entries in the elevated plus-maze test. In a similar fashion, all drugged groups spent more time inside the open arms and less time inside the enclosed arms. After a two-day period of conditioned avoidance learning of an aversive bright light, GA and vehicle groups successfully discriminated the active from the inactive lever. On the initial day of acquisition, GA and piracetam (PIR) groups achieved successful discrimination though the control group did not. These results indicate that GA may have anxiolytic-like effects without causing learning deficiencies. These psychotropic properties of GA may be due to the synergistic action of its active constituents.

### Current Topics in Nutraceutical Research 6 (1): 45-51

- 45-51 Protective effect of *Triticum aestivum* l. Extract and its component, Starch, in rat focal cerebral ischemia  
**Hyung Soo Han, Jung Sook Choi, Yoon Jung Kim, Sun Ha Lim, Hyeong-Kyu Lee, Jung-Hee Jang, Yong Suk Moon and Jongwon Lee**

**ABSTRACT:** Stroke is a major cause of death and disability in the world. But few drugs are used in the clinical setting against stroke. When treated for 7 days before ischemic insult, a preparation of *Triticum*

aestivum L. extract (TALE) and its starch fraction reduced the ischemic area and therefore was effective as a preventive drug. In the ischemic brain, the induction of intercellular adhesion molecule (ICAM)-1, increased neutrophil infiltration and microglial activation were observed. By treating the animals with TALE, ICAM-1 and neutrophils were both reduced. In addition, microglial activation was also attenuated by TALE. Brain edema formation and blood brain barrier disruption were not prevented by TALE treatment, however. Matrix metalloproteinase (MMP) induction was also not inhibited by TALE. In conclusion, this study demonstrates that TALE has a neuroprotective effect in an animal model of brain ischemia. TALE may act by preventing neutrophil or microglia related inflammation in ischemic brain. These results suggest that TALE can be used as a medicinal material for the development of neuroprotective agents in ischemic brain injury.