Lyco-mVm News Letter

This newsletter is compilation of information made available through various articles and studies published across the world about use of selected vitamins, minerals and special carotenoids. It focuses on usefulness of these nutrients in various health conditions such as Diabetes, Cardio-vascular diseases,Infertility, Pre - eclampsia and some ophthalmic conditions.

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Proper 'Diet' is an integral part of a balanced lifestyle. The food we consume decides the way our body develops. Nutrients in the form of vitamins, minerals and even carotenoids are very much part of a complete diet.

But the busy schedule and hectic lifestyle often disturbs the balance in our diet. So it results into inadequate intake of essential nutrients through our diet; and here the need for external nutrient supplements arises very strongly. Proper intake of these nutrients can help in prevention and even in treatment of conditions such as infertility and various serious health conditions such as cardio-vascular diseases, diabetes etc.

Nutrients: In Diabetes and Cardio-vascular conditions:

Chromium – very helpful in controlling Diabetes.

In type 2 diabetes, the pancreas usually produces enough insulin but the body cannot use the insulin effectively. Insulin permits the entry of glucose into most cells, where it is used for energy, stored in the liver and muscles (as glycogen), and converted to fat when present in excess. Insulin resistance leads to higher than normal levels of glucose in the blood (hyperglycemia).

Chromium deficiency impairs the body's ability to use glucose to meet its energy needs and raises insulin requirements. It has therefore been suggested that chromium supplements might help to control type 2 diabetes or the glucose and insulin responses in persons at high risk of developing the disease.

Source: http://ods.od.nih.gov/factsheets/Chromium-HealthProfessional/as accessed on 24-06-2013

Chromium & Biotin – in CVD associated with Diabetes Mellitus

The atherogenic index of plasma (AIP), defined as logarithm [log] of the ratio of plasma concentration of triglycerides to high-density lipoprotein (HDL) cholesterol, has recently been proposed as a predictive marker for plasma atherogenicity and is positively correlated with cardiovascular disease risk. The nutrient combination of chromium picolinate and biotin (CPB) has shown to reduce insulin resistance and hyperglycemia in patients with type 2 diabetes (T2DM). Combination of chromium picolinate and biotin – is a valuable nutritional adjuvant therapy to reduce AIP and correlated CVD risk factors in people with T2DM.

Source- Am J Med Sci. 2007 Mar;333(3):145-53.

The role of antioxidant micronutrients in the prevention of diabetic complications

Diabetes mellitus is associated with an increased production of reactive oxygen species and a reduction in antioxidant defenses. This leads to oxidative stress, which is partly responsible for diabetic complications. Tight glycemic control is the most effective way of preventing or decreasing these complications. Nevertheless, antioxidant micronutrients can be proposed as adjunctive

therapy in patients with diabetes. Indeed, some minerals and vitamins are able to indirectly participate in the reduction of oxidative stress in diabetic patients by improving glycemic control and/or are able to exert antioxidant activity. This article reviews the use of minerals (vanadium, chromium, magnesium, zinc, selenium, copper) and vitamins or cofactors (tocopherol [vitamin E], ascorbic acid [vitamin C], ubidecarenone [ubiquinone; coenzyme Q], nicotinamide, riboflavin, thioctic acid [lipoic acid], flavonoids) in diabetes, with a particular focus on the prevention of diabetic complications. Results show that dietary supplementation with micronutrients may be a complement to classical therapies for preventing and treating diabetic complications. Supplementation is expected to be more effective when a deficiency in these micronutrients exists.

Source - Treat Endocrinol. 2004;3(1):41-52.

Biotin in diabetic peripheral neuropathy

A study was carried out in which Biotin in high doses was given for 1-2 years to three diabetic patients suffering from severe diabetic peripheral neuropathy. Within 4-8 weeks there was a marked improvement in clinical and laboratory findings. It is suggested that in diabetes may exist a deficiency, inactivity or unavailability of Biotin, resulting in disordered activity of biotin-dependent enzyme, pyruvate carboxylase, leading to accumulation of pyruvate and/or depletion of aspartate, both of which play a significant role in nervous system metabolism. Regular biotin administration can be suggested for every diabetic patient for the prevention and management of peripheral neuropathy.

Source - Biomed Pharmacother. 1990;44(10):511-4.

Lycopene and cardiovascular diseases

Lycopene is a natural carotenoid found in tomato, although belonging to the carotenoid family, does not have pro-vitamin A activity but many other biochemical functions as an antioxidant scavenger, hypolipaemic agent, inhibitor of pro-inflammatory and pro-thrombotic factors, thus potentially of benefit in CVD. Several reports have appeared in support of the role of lycopene in the prevention of CVD, mostly based on epidemiological studies showing a dose-response relationship between lycopene and CVD. Supplementation of low doses of lycopene has been already suggested as a preventive measure for contrasting and ameliorating many aspects of CVD.

Source - Curr Med Chem. 2011;18(8):1146-63.

Lycopene may have a cholesterol synthesis-inhibiting effect and may enhance LDL degradation. Available evidence suggests that intimal wall thickness and risk of myocardial infarction are reduced in persons with higher adipose tissue concentrations of lycopene.

Source - Am J Clin Nutr. 2000 Jun;71(6 Suppl):1691S-5S; discussion 1696S-7S.

Tomato lycopene and low density lipoprotein oxidation: a human dietary intervention study.

Increase in low density lipoprotein (LDL) oxidation is considered to be associated with increasing risk of atherosclerosis and coronary heart disease. In recent epidemiological studies, tissue and serum levels of lycopene, a carotenoid available from tomatoes, have been found to be inversely related to risk of coronary heart disease. A study was undertaken to investigate the effect of dietary supplementation of lycopene on LDL oxidation in 19 healthy human subjects. Dietary supplementation of lycopene significantly increased serum lycopene levels by at least twofold. Serum lipid peroxidation and LDL oxidation were significantly decreased. These results may have relevance for decreasing the risk for coronary heart disease.

Source - Lipids. 1998 Oct;33(10):981-4.

Nutrients: In Pregnancy

Lycopene – reduces development of Pre-eclampsia & IUGR

Pre-eclampsia is a human pregnancy specific disorder that adversely affects the mother by vascular

dysfunction and the fetus by intrauterine growth restriction. Using the definition of the International Society for the Study of Hypertension in Pregnancy (ISSHP), non-proteinuric pregnancy induced hypertension (PIH) may be estimated to develop in 8–10% of nulliparous women; preeclampsia in 2–3% and eclampsia in approximately five to six per 10 000 pregnancies beyond 20 weeks' duration. The main risk of non-proteinuric PIH is the later development into proteinuric pre-eclampsia and eclampsia which are one of the leading contributors to maternal mortality, with cerebral hemorrhage as the most primary cause of death. Hypertensive disorders of pregnancy are also a major cause of perinatal mortality in particular due to abruptio placentae, fetal growth restriction and iatrogenic preterm delivery. The major cause of fetal compromise is reduced uteroplacental perfusion.

There is some evidence that protective antioxidant systems are deficient in pre-eclampsia as lower placental tissue and maternal serum carotenoid levels such as b-carotene, lycopene, and canthaxanthin have been observed in pre-eclampsia. Vascular endothelial damage is known to play a role in the pathophysiologic mechanisms of preeclampsia. It has been suggested that free radical mediated lipid peroxidation may be involved in endothelial damage seen in preeclampsia. Excess free radical disturbances are typically accompanied by increased utilization of antioxidants resulting in a decrease in their concentration. Lycopene is a carotenoid micronutrient which is safe to consume and its levels are highly reduced in pre-eclampsia and eclampsia. The results of the present study are very encouraging and lycopene has been found to be very effective in significantly reducing the occurrence of preeclampsia and IUGR. The results of the present study suggest that the antioxidant lycopene reduces the development of pre-eclampsia and intrauterine growth retardation (IUGR) in primigravida women.

Source- International Journal of Gynecology and Obstetrics 81 (2003) 257–262

Nutrients: In Infertility

Excessive generation of reactive oxygen species (ROS) containing free oxygen radicals has been identified as one of the causes of male infertility. Lycopene is a component of human redox defense mechanism against free radicals. It is found in high concentrations in the testes and seminal plasma and decreased levels have been demonstrated in men suffering from infertility. Oral Lycopene therapy seems to have a role in the management of idiopathic male infertility. Maximum improvement seems to occur in the sperm concentration (66% cases).

Source - Int Urol Nephrol. 2002;34(3):369-72.

Supplemental Se and vitamin E may improve semen quality and have beneficial and protective effects, especially on sperm motility. Their use is advocated for the treatment of idiopathic male infertility diagnosed with asthenoteratospermia or asthenospermia in semen analysis.

Source - Int J Gen Med. 2011 Jan 23;4:99-104. doi: 10.2147/IJGM.S16275.

Selenium supplementation in subfertile men with low selenium status can improve sperm motility and the chance of successful conception.

Source - Br J Urol. 1998 Jul;82(1):76-80.

Effect of zinc administration on seminal zinc and fertility of oligospermic males

Fourteen infertile males (age 24-45 years; married over 2 years) with idiopathic

oligospermia (sperm count less than 40 millions/ml) were investigated for the effect of oral zinc sulphate (220 mg) for 4 months on their serum and seminal zinc levels, and seminal parameters. With zinc administration serum zinc levels remained essentially unaffected, however, seminal zinc levels increased significantly. There was significant improvement in sperm count, number of progressively motile and normal spermatozoa, and acid phosphates activity. Observations suggest that zinc has potential to be used in male infertility.

Source - Indian J Physiol Pharmacol. 1987 Jan-Mar;31(1):30-4.

Seminal Zn in fertile and infertile (smokers or nonsmokers) males correlated significantly with sperm count and normal morphology of sperm. Poor Zn nutrition may be an important risk factor for low quality of sperm and idiopathic male infertility.

Source: Nutr Res. 2009 Feb;29(2):82-8.

Nutrients: In Eye Disorders

Measuring serum lycopene is a novel convenient method for evaluating oxidative damage. Diabetic patients, especially those with advanced diabetic retinopathy, had significantly lower serum lycopene levels; this suggests that lycopene may be helpful for the diagnosis, severity, and therapeutic evaluation of diabetic retinopathy.

Source - Eur J Ophthalmol 2010; 20(4): 719 - 723

A study suggest that higher levels of serum carotenoids, in particular zeaxanthin and lycopene, are associated with a lower likelihood of having exudative AMD.

Source - Invest Ophthalmol Vis Sci. 2011 Jun 17;52(7):4338-44. Print 2011 Jun.

Nutrients: Antioxidant activity in reducing risk of Cancer

Overview of mechanisms of action of lycopene.

Dietary intakes of tomatoes and tomato products containing lycopene have been shown to be associated with decreased risk of chronic diseases such as cancer and cardiovascular diseases in numerous studies. Serum and tissue lycopene levels have also been inversely related to the risk of lung and prostate cancers. Lycopene functions as a very potent antioxidant, and this is clearly a major important mechanism of lycopene action. In this regard, lycopene can trap singlet oxygen and reduce mutagenesis in the Ames test. However, evidence is accumulating for other mechanisms as well. Lycopene at physiological concentrations can inhibit human cancer cell growth by interfering with growth factor receptor signaling and cell cycle progression specifically in prostate cancer cells without evidence of toxic effects or apoptosis of cells.

Source -Exp Biol Med (Maywood). 2002 Nov;227(10):920-3.