

LE Magazine October 2000

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### 1. Selenium modulates breast cell proliferation

Full source: *CANCER EPIDEMIOLOGY BIOMARKERS & PREVENTION*, 2000, Vol 9, Iss 1, pp 49-54

A study assessed the effect of selenium on cell proliferation and cell cycle biomarkers in breast tissue of rodents. Results showed that selenium reduced the total number of premalignant breast cell lesions up to 60%. The findings also suggested that early transformed precancerous cells are sensitive to selenium intervention, whereas normal healthy proliferating cells are not. Selenium blocks cancer growth by a pathway that may not involve cell growth inhibition.

## 2. Cancer inhibition from tea extracts

Full source: *CARCINOGENESIS*, 2000, Vol 21, Iss 1, pp 63-67

Green tea extract components (hot aqueous, polyphenols, epicatechin, epicatechin gallate, epigallocatechin and epigallocatechin gallate) and black tea extracts (hot aqueous, polyphenols and theaflavins) strongly inhibited tumor transformation in rodent breast tissue cultures and epithelial cells, and in human lung epithelial cells. Nearly all tea components strongly inhibited adduct formation with human DNA, as well as artificially-induced free radicals. Beneficial enzymes, glutathione-S-transferase and quinone reductase, were enhanced by nearly all tea components. Glutathione was enhanced by only a few. Ornithine decarboxylase activity (involved in synthesis of urea, an end product of protein metabolism) was inhibited by nearly all the green tea components, but none of from black tea. The results show that black and green tea extracts inhibit genetic mutation, anti-proliferative and anti-cancer activities.

## 3. Ginkgo vs. skin inflammation and photo-aging

Full source: *JOURNAL OF PHARMACY AND PHARMACOLOGY*, 1999, Vol 51, Iss 12, pp 1435-1440

Free radicals are involved in numerous skin diseases, especially inflammatory reactions and photo-aging. A study looked at the effect of a ginkgo biloba extract containing 33% Ginkgo flavone glycosides, mostly quercetin and kaempferol derivatives. Superoxide dismutase (SOD), an endogenous natural antioxidant was used as a positive control. Results showed that quercetin and ginkgo extract demonstrated significant antioxidant properties without a pro-oxidant effect. Ginkgo extract significantly inhibited (by 37%) excessive blood flow in the skin to the same extent as SOD. The researchers concluded that ginkgo extract should be useful for protection of the skin against free radicals.

## 4. Curcumin prevents kidney toxicity

Full source: *BRITISH JOURNAL OF PHARMACOLOGY*, 2000, Vol 129, Iss 2, pp 231-234

A study investigated the effect of curcumin on kidney disease in rodents. The results indicate that artificially-induced (adriamycin, ADR) kidney injury was significantly prevented by treatment with curcumin. Treatment with curcumin significantly protected against induced proteinuria, albuminuria, hypoalbuminaemia and hyperlipidaemia. Curcumin inhibited an increase in the urinary excretion of a marker of kidney tube injury, of fibronectin, glycosaminoglycan, blood cholesterol, and restored kidney function. Curcumin protected against induced kidney injury by suppressing free radicals and increasing content of the antioxidant glutathione and glutathione peroxidase activity in the kidneys. Also, curcumin abolished lipid peroxidation in the mitochondria of kidney cells. Thus, curcumin is a promising approach in the treatment of Kidney disease.

## 5. Control of blood pressure and risk of stroke

Full source: *STROKE*, 2000, Vol 31, Iss 2, pp 420-424

Despite improved control of blood pressure during the last decades in the United States, a considerable proportion of treated hypertensives have not achieved target blood pressure levels. A study looked at strokes occurring among treated hypertensive patients that may be attributable to uncontrolled blood pressure. Subjects were hypertensives who sustained a first fatal or nonfatal, ischemic or hemorrhagic stroke during 1989-1996. The controls were a random sample of stroke-free, treated hypertensive Group Health Cooperative enrollees, similar in age to the stroke cases. Results showed that blood pressure was uncontrolled in 78% of ischemic stroke cases, 85% of hemorrhagic stroke cases, and 65% of controls. Researchers estimated that 27% of the ischemic strokes and 57% of the hemorrhagic strokes among treated hypertensive patients were attributable to uncontrolled blood pressure. Overall, 32% of all strokes were attributable to uncontrolled blood pressure. Thus, strokes among those with hypertension may be prevented by achieving control of blood pressure.

## 6. Lycopene protects DNA from free radical damage

Full source: *JOURNAL OF NUTRITION*, 2000, Vol 130, Iss 2, pp 189-192

Studies have suggested a role of tomato products in protecting against cancer and chronic diseases. A study evaluated whether the consumption of 25 g tomato puree (containing 7 mg lycopene and 0.3 mg beta-carotene) for 14 consecutive days in 9 women increased blood and lymphocyte (immune cell) carotenoid concentration and whether this improved the lymphocyte resistance to an free radical stress from hydrogen peroxide. Results showed that intake of tomato puree increased blood and lymphocyte lycopene concentration and reduced lymphocyte DNA damage by 50%. beta-Carotene concentration increased in blood, but not in lymphocytes. The concentration of lycopene in the blood was 18% and lymphocyte lycopene concentration was 38%. It was observed that when lycopene concentrations rose, oxidative DNA damage was reduced, and vice versa. Therefore, adding small amounts of tomato puree (containing lycopene) to the diet over a short period can increase carotenoid concentrations and the resistance of lymphocytes to free radical stress.

## 7. Alpha-lipoic acid reverses age-related changes

Full source: *NEUROBIOLOGY OF AGING*, 1999, Vol 20, Iss 6, pp 655-664

Among the age-related changes identified in the hippocampus of the rat brain are impairments in LTP (long term repeat) and glutamate release. These deficits have been coupled with decreased arachidonic acid concentration. A study compared LTP and glutamate release in aged and young rats fed for 8 weeks on a diet enriched in alpha-lipoic acid. Results showed that dietary supplementation in aged rats restored arachidonic acid concentration in the hippocampus to levels in tissue from young rats. The evidence supported the hypothesis that the alpha-lipoic acid-enriched diet has antioxidant properties, because the increase in superoxide dismutase activity and decrease in vitamin E concentration, which are age-related, were reversed. Also, the age-related increase in interleukin-1 (IL-1) concentration was also reversed. This suggests a possible role for alpha-lipoic acid in ageing brain function and antioxidant defenses.

## 8. Antiobesity activity of banaba leaf extract

Full source: *JOURNAL OF NUTRITIONAL SCIENCE AND VITAMINOLOGY*, 1999, Vol 45, Iss 6, pp

Banaba (rich in corosolic acid) has been used as a folk medicine for a long time among diabetics in the Philippines. Extracts from banaba leaves have been reported to reduce diabetic symptoms in genetically diabetic mice, Type II. The anti-obesity effect of dietary banaba extract was examined using female diabetic mice with significant body weight gain. Mice were given a 5% extract from banaba leaves, and cellulose as a control for 3 months. Results showed that body weight gain and fat tissue weight were lowered significantly in the banaba diet group. The mice fed banaba extract showed a significant decrease of up to 65% of the control group level in total lipids in the liver. This decrease was due to a reduction in the accumulation of triglycerides. The results suggest that banaba extract has a beneficial effect on the obesity.

## 9. Melatonin protects red blood cells

Full source: *BRAZILIAN JOURNAL OF MEDICAL AND BIOLOGICAL RESEARCH*, 2000, Vol 33, Iss 1,

The cytoskeleton is a sensitive target for peroxynitrites. Melatonin protected the membrane cytoskeleton of red blood cells from the effects of peroxynitrite. Other antioxidants, such as glutathione and cysteine were able to protect the proteins as well in a dose-dependent manner. Melatonin was especially efficient in reducing the loss of spectrin (determines red cell shape) proteins when treated with peroxynitrite (90% at 500  $\mu$ M melatonin). Thus, melatonin protects red blood cells from impaired cell dynamics and structural changes.

## 10. Fish oil vs. corn oil in tumor proliferation

Full source: *CANCER LETTERS*, 2000, Vol 148, Iss 1, pp 27-32

Past studies have shown an association of chronic inflammation with the development of tumors. The colon contains a specialized lymphocyte (immune cell) population that may influence various stages of colon cancer development. Dietary factors affect both inflammation and tumor development in colon tissue. Diets high in n-6 fatty acids (corn oil) are

considered to be pro-inflammatory and tumor-promoting, whereas n-3 fatty acids (fish oil) are not. A study examined the proliferative response of colonic lymphocytes (CL) from mice fed a diet high in either corn oil or fish oil when grown in culture in the presence of proinflammatory cytokines (proteins secreted by different cells, which regulate immune responses). CL from mice fed the high n-3 diet showed lower rates of proliferation following exposure to the inflammatory cytokines than CL from mice fed the high n-6 diet. Thus, diets high in fish oil are more effective in slowing the inflammatory response in the colon compared to diets high in corn oil.

#### 11. **Antioxidants prevent alcohol-induced liver DNA damage**

Full source: *CARCINOGENESIS*, 2000, Vol 21, Iss 1, pp 93-99

Alcohol generated an increased free radical production in the liver of rodents which increased up to 1 hour after the acute dose and then plateaued over the next 30 minutes. After one week's exposure to alcohol, free radical generation increased significantly and then declined again to remain at a low level over the next 2 weeks. This transient increase corresponded closely with the action of an enzyme, cytochrome P-450 in response to alcohol ingestion. (CYP-450 are involved in the metabolism and detoxification of natural endogenous compounds such as steroids, fatty acids, prostaglandins, leukotrienes, etc., as well as drugs, carcinogens and mutagens after the process of eating). However, pretreatment with vitamin C (400 mg/kg, daily for 5 days) or vitamin E (100 mg/kg, for 5 days) inhibited generation of the adducts by 30 and 50%, respectively, and both agents prevented the increased frequency of DNA single-strand breaks caused by alcohol.

#### 12. **Glycine vs. acute ischaemic stroke**

Full source: *CEREBROVASCULAR DISEASES*, 2000, Vol 10, Iss 1, pp 49-60

A study confirmed the safety and the efficacy of the amino acid glycine in 200 individuals with acute (less than 6 hours) ischaemic stroke in the carotid artery. The glycine treatment at the dose of 1.0g/day showed a 5.9% decreased 30-day mortality and 10% in 2.0 g/day glycine groups vs. 14% mortality in the placebo and 14.3% in 0.5 g/day glycine groups. Also, there was an early normalization of antibodies in the blood, a reduction of glutamate and aspartate levels, an increase in GABA concentrations and also a reduction of TEARS levels in brain and spinal cord fluid after 3 days. Thus, this suggests that taking a sublingual dose of 1.0-2.0 g/day glycine started within 6 hours after the start of acute ischaemic stroke in the carotid artery territory is safe and can exert favorable effects.

#### 13. **GH and osteoporosis in elderly women**

Full source: *CLINICAL ENDOCRINOLOGY*, 1999, Vol 51, Iss 6, pp 715-724

Bone mineral density (BMD) and growth hormone (GH) secretion rate both decline during normal human ageing. A study evaluated the effects of human GH on body composition and bone turnover in 8 elderly osteoporotic women aged 68-75 years. GH treatment caused a rapid (within 2 weeks) increase in serum levels of IGF-I and IGF-binding protein-3 (IGFBP-3) which was sustained throughout the study. Bone formation and assimilation were both gradually increased up to 24 weeks of GH treatment. Bone formation remained high during GH treatment, while bone assimilation tended to return to starting levels after 24 weeks of GH therapy. GH treatment for 48 weeks caused a significant increase in hand grip and a decrease in waist/hip ratio. There were no major side-effects except mild swelling and joint pain. BMD continued to be monitored after discontinuation of GH treatment for another 48 weeks. Significant increases in mid-radius and lumbar spine BMD (8.1 and 3.8 % above pretreatment values, respectively) were shown. The results indicate that GH increases muscle strength and bone mass, as well as reducing the gain of abdominal fat with ageing in elderly women.

#### 14. **Improved glucose sensor implant**

Full source: *DIABETES CARE*, 2000, Vol 23, Iss 2, pp 208-214

Continuous glucose sensors were implanted under the skin in dogs that were made temporarily diabetic by blocking pancreatic insulin secretion. Results showed a 90% response-time for the sensors that were in the range of 4-7 min during sensor lifetime. The sensors had bioprotective and angiogenic membranes, had a best-case recalibration interval of 20 days,

and had a maximum lifetime of greater than 160 days. Stable clinically useful sensor performance was demonstrated as early as 7 days after implantation and for a sensor lifetime of 3-5 months. This type of subcutaneous glucose sensor appears to be promising as a continuous and painless long-term method for monitoring blood glucose. Sensors that stimulate angiogenesis (development of blood vessels) at the sensor/tissue interface may have better dynamic measurement range, longer lifetimes, and better calibration stability than previously reported sensors.

#### 15. **Vitamin E increases stability of refined olive oil**

Full source: FREE RADICAL RESEARCH, 1999, Vol 31, Suppl. S, pp S129-S135

A study investigated if vitamin E supplementation affects refined olive oil response to oxidation. They looked at the stability of the oil and the protection in vivo against lipid peroxidation in rodents after its intake in comparison with other edible oils. After frying, refined olive oil supplemented with 200 mg/kg vitamin E compared with the non-supplemented refined olive oil had a higher concentration of vitamin E (240.34 mg/kg vs. 131.94 mg/kg), more resistance against oxidation (19.01% vs. 10.6%) and less polar components (4.2% vs. 5.45%). In another experiment, rodents were fed diets based on same oils as above, unfried for 4 weeks. Then, adriamycin (10 mg/kg/ day) was administered to provoke an oxidative stress. The rats fed on refined olive oil plus vitamin E had lower hydroperoxides concentrations (26.8 nmol/mg vs. 35.6 nmol/mg) higher coenzyme Q levels (128.1 pmol/mg vs. 81.25 pmol/mg) and higher vitamin E values (1.23 mmol/mg vs. 0.93 +/- 0.06 mmol/mg) in the liver. Thus, the supplementation of refined olive oil with 200 mg/kg of vitamin E increases the stability of this oil under pro-oxidant conditions, and its intake decreases free radical damage in rodents.

#### 16. **Heart protection with red wine extract and resveratrol**

Full source: *JOURNAL OF CARDIOVASCULAR PHARMACOLOGY*, 2000, Vol 35, Iss 2, pp 263-268

Studies have shown red wine extract to be a potent antioxidant by its ability to scavenge peroxy free radicals in vitro. Alcohol-free red wine extract was given to rodents for 15 minutes before subjecting them to 30 minutes of global ischemia followed by 2 hours of reperfusion. Another group was treated with resveratrol, one of the major antioxidants found in red wines. Results demonstrated that both red wine extract and resveratrol were equally protective of the heart. They improved heart functions after induced ischemia, including developed pressure and arterial flow. The developed blood pressure values 60 minutes after reperfusion were 81.8 and 68.8 mm Hg for the red wine extract and resveratrol groups, respectively, versus 49.7 mm Hg for the control group. They also reduced the size of the heart attack compared with the control hearts (20% and 10.5% for red wine extract and resveratrol groups, respectively, vs. 29.9% for the control group). The amount of malonaldehyde formation in the heart tissue after ischemia was reduced by red wine extract and resveratrol, indicating a reduction of free radical stress in the ischemic reperfused heart. Thus, the study indicates that red wines are protective of the heart by their ability to function as an in vivo antioxidant.

#### 17. **Benefits of HRT in menopausal women**

Full source: *MATURITAS*, 1999, Vol 33, Suppl. 1, pp S1-S13

Women in the West can now expect to live one third of their life in postmenopause, and consequently in a state of estrogen deficiency. This can have a number of consequences, and many women suffer endocrine, somatic and psychic changes occurring at the end of the female reproductive period (menopause). Estrogen deficiency can also result in changes to the skin, hair, urinary, genital, cardiovascular and skeletal systems. Hormone replacement therapy (HRT) is well documented to reduce vasomotor (dilation or constriction of blood vessels) symptoms in women suffering from estrogen deficiency, and can have beneficial effects on the skin and the prevention of skin aging. HRT has beneficial effects on urinary/genital function including reductions in urinary incontinence and vaginal atrophy. HRT is used as a first-line treatment to prevent or reverse the development of postmenopausal osteoporosis and can reduce the risk of fractures if taken for 5-10 years from the start of menopause. Estrogen replacement therapy (ERT) has been associated with a reduction in the risk of coronary heart disease. Recently, estrogen has been linked to beneficial effects in the central nervous system including an association with a reduction in the risk of developing Alzheimer's Disease.

#### 18. **Aminoguanidine and diabetes mellitus**

A study determined the effect of topical aminoguanidine (0.5 mM) on outflow of blood from the microcirculation of the hamster cheek pouch during diabetes mellitus. Results showed that the magnitude of clearance of FITC-dextran-70K and 20K was significantly greater in diabetic compared to nondiabetic hamsters. Topical application of aminoguanidine restored permeability characteristics of diabetic hamsters to that observed in nondiabetic hamsters. This suggests that acute treatment of the microcirculation in vivo with aminoguanidine reduces the increases in the escape of blood into the tissues of macromolecules during diabetes mellitus. Aminoguanidine may suppress the blood outflow into tissues in diabetic hamsters by inhibiting the enzyme nitric oxide synthase. Thus, aminoguanidine may be an important approach for the treatment of diabetes-related vascular dysfunction.

#### 19. **The virus therapy of cancer**

Full source: *PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE*, 2000, Vol

Cancer is one of the leading causes of death in the United States. Although there has been significant progress in the area of the causes of cancer, diagnostic techniques, and cancer prevention, adequate therapeutic approaches for many cancers have lagged behind. One promising line of investigation is the virus therapy of cancer. This approach entails the use of viruses, such as retroviruses, adenovirus, and vaccinia virus, to modify tumor cells so that they become more susceptible to being killed by the host immune response, chemotherapeutic agents, or programmed cell death. Given the potential of viruses to kill tumor cells directly or transfer genetic material from one cell to another by viral infection, to allow a vigorous host antitumor immune response, the virus therapy of cancer holds great promise in the treatment of cancer.

#### 20. **Pyruvate improves heart performance**

Full source: *PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE*, 2000, Vol

Pyruvate, a metabolic product of glycolysis (the conversion of glucose to the simpler compounds, resulting in energy stored in the form of ATP, as occurs in muscle) and an oxidizable fuel in the heart wall, increases cardiac mechanical performance, especially when supplied at high concentrations. The effects of pyruvate on the force of muscular contractions are most impressive in hearts that have been reversibly injured (stunned) by ischemia/reperfusion stress. Glucose is an essential co-substrate fuel for pyruvate's healthful effects in stunned hearts. Other fuels including lactate, acetate, fatty acids, and ketone bodies produce little or no improvement in postischemic function. Catecholamines (including dopamine, epinephrine and norepinephrine) also influence the contractility of muscular tissue and are major elements in responses to stress. By contrast, metabolic muscular contraction by pyruvate also increases cardiac energy reserves and bolsters the endogenous glutathione antioxidant system. Thus, pyruvate should be considered as a therapeutic intervention for clinical management of heart failure.

#### 21. **Dietary enzymes protect against macular degeneration**

Full source: *PROGRESS IN RETINAL AND EYE RESEARCH*, 2000, Vol 19, Iss 2, pp 205-221

Free radical stress plays a role in the cause of age-related macular degeneration (AMD). Studies of diet, environmental and behavioral risk factors suggest that this stress is a contributing factor of AMD. Pathological studies indicate that damage to the retinal pigment epithelium (RPE) happens early in AMD. Studies show that RPE cells subjected to oxygen, undergo apoptosis (cell death), a possible mechanism by which RPE cells are lost during the early phase of AMD. The main target of oxidative injury seems to be mitochondria, a cell organelle that accumulates genetic damage in other tissues after cell division, during aging. The endogenous antioxidant glutathione and its amino acid precursors protect RPE cells from free radical-induced apoptosis (cell death). Dietary enzymes also increase glutathione synthesis, and thus offer similar protection. Thus, nutritional intervention to enhance the glutathione antioxidant capacity of RPE may provide an effective way to prevent or treat AMD.

#### 22. **Diet and lung function in middle aged men**

Full source: *THORAX*, 2000, Vol 55, Iss 2, pp 102-108

A study of 2,512 Welshmen aged 45-59 in 1979-1983 was used to investigate associations between diet and lung function. Forced expiratory volume in one second (FEV1) was used as a measurement, as well as dietary data. The results showed that good lung function, indicated by high maximum FEV1 given age and height, was associated with high intakes of vitamin C, vitamin E, beta-carotene, citrus fruit, apples, and the frequent consumption of fruit juices/squashes. Following adjustment for confounding factors including body mass index (BMI), smoking history, social class, exercise, and total energy intake, only the associations with vitamin E and apples persisted, with lung function estimated to be 39 ml higher for vitamin E intakes and 138 ml higher for those eating five or more apples per week compared with non-consumers. Thus, a strong positive association was seen between lung function and high vitamin E intake, and the number of apples eaten per week, substantiating the known protective effect of hard fruit rather than soft/citrus fruit.

### 23. Prozac increases bioavailability of oral melatonin

Full source: *CLINICAL PHARMACOLOGY & THERAPEUTICS*, 2000, Vol 67, Iss 1, pp 1-6

Fluvoxamine (Prozac), a selective serotonin reuptake inhibitor (SSRI), is known to elevate melatonin serum concentrations. Five healthy males received 5 mg melatonin either with or without coadministration of 50 mg Prozac. Blood concentrations of melatonin and Prozac were assessed from 0 to 28 hours after melatonin intake. Results showed coadministration of Prozac, on average, led to a 12-fold higher blood peak concentration of melatonin. There was a 39% correlation between the melatonin and Prozac blood concentrations. Those with poor metabolism were found to have a more pronounced and longer-lasting effect of Prozac on the positive effects of melatonin. The effects of Prozac on the boosting melatonin blood concentrations in those with depression might be caused by inhibiting the elimination of melatonin, and not attributable to an increased production of melatonin. Thus, coadministration of Prozac increased the bioavailability of oral melatonin.

### 24. Telomeres and the immune response

Full source: *EMBO JOURNAL*, 2000, Vol 19, Iss 3, pp 472-481

The reduction of germinal center reactivity (cell reproduction) is a landmark of aging and contributes to immune system dysfunction in the elderly. (Germinal centers (GC) exhibit extensive cell expansion and selection of B lymphocytes to generate the pool of memory B cells). During the immune response, there is extensive proliferation undergone by B lymphocytes in the GC. Telomere maintenance by the enzyme, telomerase has been proposed to allow this. A study showed that senescent mice, which lack the mouse telomerase enzyme, and thus have short telomeres, show a dramatic reduction in GC number following antigen immunization. (An antigen is any substance that induces a specific immune response). After immunization with an antigen, a high activity of telomerase in the spleen GC is present with the telomeres in splenocytes (red blood cells) that are naturally elongated. In contrast, splenocytes which are deficient in telomerase, show telomere shortening after immunization, presumably due to cell proliferation in the absence of telomerase. The results demonstrate the importance of telomere maintenance for antibody-mediated immune responses and support the notion that telomere elongation is mediated by telomerase.

### 25. Herpes virus selectively destroys liver cancer

Full source: *FASEB JOURNAL*, 2000, Vol 14, Iss 2, pp 301-311

Viruses used for gene therapy are usually genetically modified to deliver therapeutic newly introduced genes and prevent viral replication. In contrast, viruses that are not prevented from replicating may be used for cancer therapy because replication of some viruses within cancer cells can result in their destruction (oncolysis). Two or three times more viruses are produced from infection of colon carcinoma cells than from infection of normal liver cells. This viral replication can destroy the tumors (oncolytic). A single administration of the virus into mice with liver metastases dramatically reduces tumors. The tumor inhibition works in immune-competent and immune-incompetent mice, suggesting that viral oncolysis, and not the immune response, is the primary mechanism of tumor destruction. The destruction of liver cancer by the Herpes virus is also effective in mice preimmunized against Herpes. The results indicate that Herpes virus mutants which are able to replicate hold significant promise as cancer therapeutic agents.

## 26. **Vitamin D-3 increases effectiveness of immune system therapy**

Full source: *JOURNAL OF IMMUNOTHERAPY*, 2000, Vol 23, Iss 1, pp 115-124

Tumor growth can increase the number of CD34 cells derived from immature bone marrow which naturally suppress the activity of healthy T-cell (CD8) immune function. A study showed that these CD34 natural suppressor cells were present within tumors. However, after administration of vitamin D-3, their levels declined. Several studies determined whether vitamin D-3 treatment to diminish the CD34 natural suppressor cell levels in mice with tumors would enhance (a) the immune system reaction toward tumors, and (b) the antitumor activity of therapy using lymph node cells, which are tumor-reactive. The results showed that vitamin D-3 treatment alone increased the CD8 cell content of the tumors. Although vitamin D-3 treatment had no effect on the size of the primary tumor, it lessened the extent of tumor metastasis. Treating mice with the combination of vitamin D-3 and immunotherapy significantly reduced metastasis in mice with established tumors, and reduced both metastasis and regional recurrence after surgical removal of the primary tumor. The studies demonstrate that vitamin D-3 treatment increases T-cell immune reactivity within the tumors. Thus, combining vitamin D-3 treatment to diminish the levels of CD34 natural suppressor cells, with immunotherapy, enhances the effectiveness of the lymph node cells at limiting both metastasis and regional tumor recurrence.

## 27. **PUFAs modulate mean life span**

Full source: *JOURNAL OF NUTRITION*, 2000, Vol 130, Iss 2, pp 221-227

A study investigated the effects of dietary polyunsaturated fatty acids (PUFAs) on longevity and blood lipid concentrations in senescence-accelerated mice (SAM, used in studies of aging). They were fed either an (n-3) PUFA-rich perilla oil or an (n-6) PUFA-rich safflower oil diet beginning at 6 weeks of age. Results showed that the groups did not differ in body weight gain, but those fed perilla oil had significantly lower scores of aging relative to those fed safflower oil. The mean life span of mice fed perilla oil was 357 days and of those fed safflower oil, 426 days. However, pathological studies revealed that the incidence of tumors was significantly lower in the perilla oil group than in the safflower oil group. The blood total cholesterol, HDL cholesterol, triglyceride and phospholipid concentrations were significantly lower in the perilla oil group than in the safflower oil group. There was a marked decrease of blood HDL cholesterol concentrations in advanced age in the mice fed perilla oil. The results show the importance of both (n-3) and (n-6) PUFAs together in modulating life span, since they differ in their effects on blood lipid metabolism.

## 28. **Vitamin E suppresses free radicals in macrophages**

Full source: *JOURNAL OF NUTRITIONAL SCIENCE AND VITAMINOLOGY*, 1999, Vol 45, Iss 6, pp

A study investigated the effect of high vitamin E supplementation for 10 days on the activation state of macrophages in rodents subjected to free radicals, such as superoxide and hydrogen peroxide. Results showed free radical increases of 2.5-fold from macrophages in the diet group fed 50 mg vitamin E. However, there was no increase in free radicals for the macrophages of the diet groups fed 250 or 1,250 mg vitamin E. Similar results were obtained on treating the macrophages with proinflammatory cytokines (proteins which regulate immune responses) IL-1 beta or TNF-alpha. Thus, the suppression in free radical release in response to various stimulants, may be due to the direct and/or indirect effect of high vitamin E (250 and 1,250 mg) diet supplementation.

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