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## Low Protein Diet, Natural Source of L-dopa May Be of Value in Parkinson's Disease

Parkinson's disease, caused by a deficiency of dopamine in the brain, results in mild-to-severe tremors and weakness. It is typically treated with the drug L-dopa, based on the amino acid precursor of dopamine.

A recent article by P. A. Kempster, MD, of the Monash Medical Center, Melbourne, Australia, reviewed the dietary management of Parkinson's disease. Of particular interest, Kempster noted the value of low-protein diets and *natural* sources of L-dopa.

"Most patients with Parkinsonian motor fluctuations are able to observe effects of food intake on motor function (body movement), and many remark spontaneously that meals tend to cause shortening or failure of response to L-dopa tablet doses," Kempster wrote in *Nutrition Reviews* (May 1994;52:51-8).

The reason, Kempster explained, is that high protein intake—and the consequential increase in blood levels of amino acids—interferes with the effectiveness of L-dopa treatment. In contrast, carbohydrate loading stimulates the release of insulin and reduces amino acid levels.

Perhaps most noteworthy, Kempster cited research showing that the fava bean (*Vicia faba*) contains pharmacological levels of L-dopa.

"There are anecdotal reports that patients with Parkinson's disease will benefit from meals of broad beans, and that response to *Vicia faba* may even be better than to conventional L-dopa medication in some cases," wrote Kempster. "Recent studies have established the dose-response and L-dopa absorption characteristics of *Vicia faba*. There is sufficient L-dopa in broad bean pods to be pharmacologically

active in Parkinson's disease. The beans are a natural food which contains L-dopa in a physiochemical form different from that of tablet formulations and may thus have some use in the management of Parkinsonian motor fluctuations."

On a more conservative note, Kempster wrote that tremor reductions following *V. faba* consumption are "generally equivalent to but no better than" responses to the drug versions of L-dopa.

Another cautionary note, expressed by numerous researchers, is that some people of Mediterranean descent carry a genetic defect that results in low blood levels of the antioxidant glutathione. This defect limits natural defenses against two fava bean toxins.

"Natural sources of L-dopa cannot compete with tablet formulations for convenience and predictable bio-availability," Kempster added. "However, *V. faba* does have some

Continued on page 4

## Free Radicals, Antioxidants May Also Influence Parkinson's Disease

Lifelong oxidative stress may also be a factor in Parkinson's disease, according to a theory proposed by C. R. Burkhardt, MD, a neurologist at the University of Colorado School of Medicine, Denver.

Autopsies of the brains of Parkinson's patients have found clear signs of oxidative stress, Burkhardt noted in *Medical Hypotheses* (Aug. 1994;43:111-114). For example the substantia nigra, a portion of the brain affected by Parkinson's, contained low levels of glutathione and superoxide dismutase, two important antioxidants. Conversely, the substantia nigra in these patients contained high levels of iron and increased levels of lipid peroxidation. Excessive iron promotes the generation of free radicals.

The oxidation and aging of brain cells may begin in the mitochondria, considered the energy factory of the cell. The mitochondria "are the most vulnerable to the toxic effects of oxygen, and are critically in need of protection," Burkhardt wrote. "The an-

tioxidant mechanisms that we are aware of today depend heavily on several vitamins and minerals, the most well known being vitamins C and E, carotenoids, and selenium."

Burkhardt suggested that "a life-long diet rich in antioxidants would protect against developing Parkinson's disease, even though later supplementation may not be able to halt the progression of the disease." □

## Coenzyme Q10 Protects Brain

Coenzyme Q10 can protect the brain from damage caused by a loss of blood flow during cardiopulmonary bypass surgery and from subsequent free-radical injury when blood flow is restored.

Researchers gave a group of dogs 10 mg of CoQ10 per kilogram (2.2 pounds) of body weight before stopping blood flow, as is done during cardiopulmonary bypass surgery.

According to a report in the *Journal*

Continued on page 4

# Aging Association Discusses Research on Free Radicals and Antioxidants

The American Aging Association met for its 24th annual meeting Oct. 14-18, 1994, in Washington, D.C. The meeting's theme was "Towards the Golden Age of the Free Radical Theory of Aging," and many of the presentations focused on the role of antioxidant nutrients in the prevention of age-related diseases.

One of the most interesting papers was presented by Denham Harman, MD, PhD, who developed the free radical theory of aging 40 years ago. (See THE NUTRITION REPORTER, Nov. 1994). He hypothesized that Alzheimer's disease is caused by a mutation in mitochondrial DNA *early in life* that increases the production of free radicals.

He explained that the incidence of senile dementia of the Alzheimer's type (SDAT) might be decreased if women consumed antioxidant supplements during pregnancy and if people, later in life, ate more fruit and vegetables. "The function of SDAT patients should be temporarily improved by measures, such as with ubiquinone (coenzyme Q10), employed with other mitochondrial disorders," Harman added.

Other highlights:

- In a study of gerbils, researchers found that hydroxyl radicals increased in the brain with the age of the animals. "The ratio of oxidized to reduced glutathione also rose with age consistent with the increase in oxidative stress. The levels of vitamin E and reduced ascorbate increased in parallel with the increase in oxidative stress," probably as part of the body's response mechanism. E.D. Hall, The Upjohn Co., Kalamazoo, Mich.

- Researchers have known since 1935 that caloric restriction without malnutrition slows aging and extends the lifespan of warm-blooded animals. For the first time, the effect of dietary restriction is being evaluated in a primate species. After the first four years

of a study, 28 caloric-restricted monkeys have less body fat than other animals. Dietary restricted monkeys also have better glucose tolerance and lower blood pressure. R. Weindruch, et al. University of Wisconsin, Madison.

- One possible explanation for the benefits of dietary restriction is that it reduces damage to the body's protective antioxidant systems. M.A. Lane, National Institute on Aging, Baltimore, Md.

- "There is considerable evidence to support the concept that mitochondria play a major role in the aging process as ... the primary generators of reactive oxygen species as well as the victims of oxidative damage." R.S. Sohal, Southern Methodist University, Dallas, Texas.

- People living in industrialized, polluted regions have high levels of superoxide anions and hydrogen peroxide and increased breakage in DNA strands, all signs of oxidative stress. "Oxidative stress and free-radical-mediated lipid peroxidation can cause damage to the biological membranes and DNA, which may lead to diseases like atherosclerosis and malignancies... the industrial population who were exposed to various environmental contaminants and toxicants may be vulnerable to stress and disease status." K.K. Reddy, Sri Venkateswara University, India.

- "We have estimated that longevity of the human brain could reach 250 years, were it not for cell injuries due to oxygen free radicals." Vitali K. Koltover, Institute of Chemical Physics, Russian Academy of Sciences.

- "We speculate that increased oxidative damage to macromolecules during aging might be responsible for the decline in cellular immunity..." Huachen Wei, University of Alabama, Birmingham, Ala.

- The liver uses the cytochrome P-450 enzyme system to detoxify toxic

foreign substances as well as those produced by the body as part of normal metabolism. While the cytochrome P-450 system prevents immediate death, it does produce some harmful metabolites, including free radicals. L. Yu, Moscow State University, Russia.

- "Dietary restriction enhances liver detoxification capability... which may contribute to the delaying of the age-related pathologic process..." Linda H. Chen, University of Notre Dame, Ind.

- "Bio-Normalizer, a white granular yeast-fermented nutritional health food from *Carica papaya*, other tropical herbal plants, and traditional Japanese foodstuffs, has been shown to exhibit antioxidant actions by scavenging hydroxyl radicals." Librado A. Santiago, Gifu University, Japan.

- "The growing knowledge of antioxidant action in biological systems, coupled with efforts to slow free radical reaction initiation rates by mitochondria, should result in significant increases in the functional lifespan of man." Denham Harman, University of Nebraska, Omaha.

- "Supplementation with dietary antioxidants decreases (prostaglandin) PGE2 production and increases immune response in the aged." S.N. Meydani, Tufts University, Boston.

- A diet supplemented with omega-3 fish oils delayed autoimmune disease and prolonged the lifespan of laboratory mice, possibly by increasing liver and kidney antioxidant levels. Gabriel Fernandes, University of Texas Health Science Center, San Antonio.

- "Glutathione (GSH) deficiency... may play a key role in the aging process. Recently, we observed that dietary restriction of...methionine resulted in a 40% increase in longevity and a doubling of GSH levels in blood throughout the lifespan of the rat." J.P. Richie Jr., American Health Foundation, Val-

Continued on page 3

# Calcium Supplements Lower the Risk of Colon Cancer Among Intestinal Bypass Patients

Fecal bile acids and fat levels typically increase after intestinal bypass surgery. These bile acids and fats promote the growth of colon cancer cells, but new research suggests that calcium supplements may inhibit their effects.

Gideon Steinbach, MD, of the Anderson Cancer Center, Houston, gave 15 intestinal bypass patients either calcium supplements (2,400 or

3,600 mg) or a placebo daily for 12 weeks.

Before and after bowel biopsies indicated that calcium reduced the subjects' whole crypt labeling index, a sign of cell proliferation, by 38 percent and upper crypt labeling index by 56 percent, according to Steinbach's report in *Gastroenterology* (May 1994;106:1162-7).

So while an intestinal bypass

causes the rapid growth of colon cells, "oral calcium reverses the proliferative changes."

Why? When bile acids are elevated, they promote the production of diacylglycerol (DAG), a chemical involved in cellular growth. Calcium decreases DAG levels, according to an article by Steinbach in *Cancer Research* (March 1, 1994;54:1216-19). □

## New Study: Beta-Carotene Supplements Do Help Smokers

Although last year's much-publicized Finnish study failed to show that beta-carotene benefited long-term smokers, another study found that the nutrient does, in fact, reduce oxidative stress among smokers.

Johane Allard, MD, of the University of Toronto, first measured levels of pentane in the breath of 25 smokers and 38 nonsmokers. Pentane levels serve as a marker of lipid peroxidation, one type of oxidative stress caused by free radicals. He found that levels of the chemical were significantly higher among the smokers.

Allard then gave 20 mg (33,333 IU) of beta-carotene daily to all the subjects for four weeks. When he again measured pentane levels, he found that beta-carotene reduced levels of the chemical among the smokers, but not among the nonsmokers.

"Cigarette smoking is a good model of chronic oxidative stress," Allard wrote in the *American Journal of Clinical Nutrition* (April 1994;59:884-

90). Tobacco smoke contains a variety of oxidizing agents, or free radicals, which induce lipid peroxidation. This results in oxidative cellular damage, which is believed to contribute to the pathogenesis of chronic lung disease and perhaps lung cancer." □

## Australian Journal: Older People Need Vitamins C and E

Although it's not clear whether antioxidant supplements will slow the aging process in the elderly, increasing scientific evidence does point to the role of free radicals in heart disease, Parkinson's disease, cataract, rheumatoid arthritis, and some types of cancer.

An article titled "Free radicals, antioxidants and preventive geriatrics" in *Australian Family Physician* (Ward, J., July 1994;23:1297-1301) pointed out that confirming the benefits of antioxidant nutrients has been hampered by the complexity of the variables, as well as by "the limited financial return for drug companies."

"In the meantime," wrote the author, "there seems no reason to discourage older people who wish to ingest extra vitamin E and vitamin C. A diet with adequate vegetables and fruits should provide sufficient beta carotene." □

## Our Cold Season Recommendation

THE NUTRITION REPORTER is generally parsimonious in recommending specific products. But this being the traditional cold and flu season, we recommend Cold-Eeze, a zinc lozenge made by the Quigley Corp.

Two years ago, John Godfrey, PhD, published a report on the successful treatment of the common cold and sore throat using zinc gluconate-glycine lozenges in a tannic acid base. When college students began taking the lozenges within one day of the onset of cold symptoms, the duration of their colds was halved, according to Godfrey's report in the *Journal of International Medical Research* (1992;20:234-66).

Since then, many companies have introduced zinc lozenges. We've tried lots of them. Most just don't seem to work. Cold-Eeze does—probably because it follows Godfrey's zinc formula. For details and prices, call the Quigley company at 1-800-505-COLD. By the way, THE NUTRITION REPORTER has no financial interest in the product or the company. □

## Zinc in Seminal Fluid

An analysis of trace minerals in seminal fluid found that zinc levels were 30 times higher than in the blood, according to a report by Choon-Nam Ong, Ph.D., in *Biological Trace Element Research* (Jan. 1994;40:49-57). □

## Aging Association...

Continued from page 2  
halla, NY.

• "Both glutathione oxidation and mitochondrial DNA damage can be prevented by oral administration of antioxidants." J. Garcia de la Asuncion, Universidad de Valencia. □

## More Studies: Magnesium is Safe, Effective and Inexpensive Treatment for Heart

Intravenous magnesium offers an effective and inexpensive method of increasing patient survival after a myocardial infarction.

Kent Woods, MD, FRCP, of the University of Leicester, England, tracked the progress of 2,316 patients given magnesium sulfate IVs after a heart attack and before receiving any other form of therapy. He wanted to determine whether doubling blood levels of magnesium during the acute phase of a heart attack would reduce the rate of death.

The function of the heart's left ventricle after a heart attack is the strongest predictor of whether a patient will live or die. When magnesium was given during the first 24 hours after a heart attack, the incidence of left ventricular failure was reduced by 25 percent.

Deaths from ischemic heart disease decreased by 21 percent and death from all causes decreased by 16 percent over a period ranging from 1 to 5.5 years (mean average of 2.7) after the heart attack, according to Woods' report in *The Lancet* (April 2, 1994;343:816-19).

"The treatment regimen described here is safe, cheap, and simple to administer," Woods wrote.

In a separate study, Michael Brodsky, MD, of the University of California, Irvine, looked at the value of com-

binning magnesium with digoxin in patients with "new-onset" atrial fibrillation, a type of arrhythmia.

Brodsky wrote in the *American Journal of Cardiology* (June 15, 1994;73:1227-9) that the benefit of intravenous magnesium "was evident almost immediately," because the heart rate slowed within 15 minutes. The heart rate dropped from more than 130 beats per minute to less than 100 beats per minute after two hours, and to less than 90 beats per minute at 9.5 hours.

"Magnesium therapy has several advantages compared with other therapies...magnesium is rapidly active, easy to administer and titrate, and has a safe toxic-therapeutic ratio,"

Brodsky wrote.

He also compared the cost of magnesium to drug treatment of atrial fibrillation during a 24-hour period: esmolol, \$400; diltiazem, \$200; digoxin, \$2; and magnesium sulfate, \$1.

In an article on the use of magnesium in the treatment of arrhythmias in *Emergency Medicine* (May 1994;26:53) Stephen Gottlieb, MD, of the University of Maryland School of Medicine, was quoted as saying, "It's so safe and inexpensive that I can't think of a reason not to give it." He added that magnesium not be limited to patients with deficiencies because deficiencies are difficult to determine. □

## Vitamin C Might Bring a Healthier Piggy to Market

To speed weight gain in commercially raised pigs, farmers routinely add large amounts of copper to animal feed. Although copper is an essential nutrient, the levels greatly exceed the animals' nutritional requirements and function as a growth stimulant.

As researchers recently discovered, this elevated copper intake increases the pigs' retention of cadmium, a toxic metal and common industrial pollutant. The animals store cadmium in the kidneys, liver, and muscle. When people eat pork, they consume the cadmium.

Adding zinc to the animals' diet failed to lower cadmium levels, according to a team of German researchers. However, according to their report in the German journal *Zeitschrift*

*fur Ernährungswissenschaft* (Rothe, S., March 1994;33:61-7) adding vitamin C to the feed *did* substantially reduce cadmium retention.

Although the researchers focused on animal husbandry and stressed that vitamin C improved the quality of the food, the human implications are obvious. It is very likely that vitamin C can help people as well as pigs limit cadmium retention. □

## CoQ10 Protects Brain...

Continued from page 1

*nal of Thoracic and Cardiovascular Surgery* (Ren, Z., et al. July 1994;108:126-33), the dogs pretreated with CoQ10 maintained higher levels of adenosine triphosphate (ATP), needed for energy production in the cell.

"The results suggest that oxygen-derived free radicals and abnormal energy metabolism might play critical roles in brain ischemia/reperfusion injury," the researchers wrote. "Coenzyme Q10 could protect the brain by improving cerebral metabolism." □

## Parkinson's...

Continued from page 1

potential advantages in reducing the interaction between oral L-dopa medication and diet. Rather than simply restricting oral protein intake, a diet that substitutes *V. faba* for other foods which contain protein...may have a stabilizing effect on motor fluctuations..." □

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