Diet and Lupus: Fact versus Fiction

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With increasing interest in nutrition as a means to prevent or treat various diseases, people with lupus may ask, can dietary management help to alleviate disease activity? Or can certain dietary substances actually exacerbate the condition? This article provides a brief review of some of the recent dietary therapies and supplements that have been studied and that may have an impact on lupus activity.

Introduction

Systemic lupus erythematosus (SLE) is an autoimmune disorder that causes damage via the deposition of autoantibodies and other immune cell complexes in organs throughout the body. Areas primarily affected include the heart, lungs, kidneys, and central nervous system.

Although there has been a great deal of interest in the dietary management of other rheumatological conditions, there is much less information available on diet therapy in SLE. The studies that have been performed are limited in number, and by and large have been carried out in animal models, or without a control group, meaning that there is no basis for comparison when any positive or negative effect is observed. Furthermore, as with other rheumatological disorders, the natural history of flares and remissions in SLE makes it difficult to attribute any observed changes in clinical symptoms to diet alone.

Potential positive impact on disease activity

Calorie restriction

A diet low in energy (calories) may be helpful in terms of reducing disease activity among people with lupus. In particular, diets low in animal fat and protein are thought to be beneficial, although these diets have not been studied in a controlled fashion, so any presumed positive effect remains unsubstantiated. Animal studies have shown the suppression of renal damage in lupus-prone mice, and a decrease in the age-related onset of immune cell (T cell subset) abnormalities, after the administration of a calorie-restricted diet.

However, it is worth mentioning that studies of calorie restriction, performed in animal models, typically involve such a severe restriction in dietary intake—25 percent to 35 percent or more of total intake—that a similar diet cannot reasonably be extrapolated to humans. While calorie restriction is the cornerstone of the treatment of obesity, it can have detrimental effects in humans with inflammatory diseases, because the inflammation itself increases energy and protein requirements. Failing to meet these needs during illness can accelerate loss of muscle and cause malnutrition.

Fish oil supplementation

It has been suggested that fish oil (omega-3 fatty acid) supplementation may lead to prolonged survival and an improvement in renal disease and overall disease activity in people with SLE. Omega-3 fatty acids work by reducing the production of pro-inflammatory compounds, thereby suppressing immunologic mediators of SLE. Although the majority of

animal studies have shown that omega-3 fatty acids alleviate the severity of autoimmune disease, only modest anti-inflammatory effects have been observed in humans.

Vitamins and minerals

Vitamin E supplementation for people with SLE has long been controversial, with both positive and negative results having been observed with daily dosages of 150 to 2000 mg tocopherol (vitamin E). These amounts are much higher than the Dietary Reference Intake of 15 mg.

Vitamin A-deficient animals with SLE have been reported to experience more severe lupus-like symptoms; conversely, supplementation with this nutrient may alleviate some disease symptoms. However, people should be cautious when supplementing with vitamin A due to possible toxicity from high intakes of the fat soluble, animal form of this vitamin. Although beta carotene, the water soluble, plant form of this vitamin, does not lead to the same toxicity symptoms as the animal form, it can produce hypercarotenemia, resulting in orange skin.

Another nutritional complication commonly seen in people with SLE is elevation of serum homocysteine. Homocysteine is a byproduct of amino acid metabolism which is toxic to the endothelial cells lining blood vessels, and has recently been recognized as an important independent risk factor for stroke, heart disease, and peripheral vascular disease. Fortunately, homocysteine is largely controlled by the intake of three B vitamins: folic acid, vitamin B6 and vitamin B12.

Petri et al. showed that homocysteine is also commonly elevated in women with SLE, that it is an independent risk factor for stroke and gangrene in these people, and that the major determinants of elevated homocysteine in this population were low blood levels of folic acid and vitamin B6. Thus, it makes sense that people with SLE should consider taking a multivitamin containing the recommended intake of each of these vitamins, plus vitamin B12, to reduce the risk of thrombosis.

Other supplements

Additional studies have been performed using evening primrose oil, flaxseed, plant herbs (Tripterygium wilfordii hook F, or TWH, also know as Thunder God Vine), and DHEA (dehydroepiandrosterone), all of which may possibly provide some benefit for people with SLE. Extreme caution should be used however, particularly with the ingestion of plant herbs and steroid hormones, as sometimes serious side effects, including death, may occur.

Potential negative impact on disease activity

L-canavanine

L-canavanine is a nonprotein amino acid present naturally in alfalfa seeds and sprouts which may have autoimmune effects, and when consumed in large quantities, may produce lupus and lupus-like symptoms. Specifically, this amino acid is chemically similar to another amino acid, arginine, and can be incorporated into proteins, including cells of the immune system, in place of that amino acid, thereby changing their immunoregulatory function. People with SLE are advised to avoid large amounts of alfalfa seeds and sprouts.

Histamine

Foods high in histamine, like tomatoes, have been blamed for exacerbations of rheumatoid arthritis and other autoimmune diseases. However, a large placebo controlled study of these foods failed to show a consistent effect. In general, our approach is to avoid limiting one's diet as much as possible.

Vitamins and minerals

Numerous nutrients have been proposed as having an immune-enhancing effect; by reducing the dietary intake of nutrients that may act to stimulate the immune system, disease activity in SLE may be reduced. Zinc is important for enhancing the systemic immune response and it has been suggested that zinc deprivation may contribute to a reduction in symptoms of autoimmune disease, including SLE. On the other hand, supplementation with zinc may exacerbate disease activity, and should thus be avoided.

Conclusions

Lupus is an episodic, up-and-down sort of disease, and it is very hard to make sense of how variations in disease activity correlate with changes in diet. We don't know, for example, what sort of lag period is reasonable between the time a potentially noxious stimulus (dietary or otherwise) occurs and when it might result in a lupus flare.

So how can one determine if a food caused a flare? The best way is through careful attention to what one eats, requiring that a pattern of ingestion followed by worsening occur at least three times before that food is banned from the diet. Even if it appears that a food is causing some trouble, it might be the source of the food, use of preservatives or other chemicals in the food, and even the interaction of several foods that are actually the problem. The dangers of a very restricted diet are clear-cut: loss of important nutrients, including vitamins, antioxidants, and minerals. On the other hand, the benefits of restriction are often nebulous, transient, and small.

In summary, dietary management of SLE may be useful as an adjunct to other more substantiated therapies, but does not appear to warrant discontinuing a patient's medical regimen. No definitive dietary recommendations currently exist for people with SLE. Selected foods high in those nutrients discussed above which may modify disease activity are provided in *Table 1*, along with current recommended intakes for all individuals.

It is worth emphasizing again that optimal intakes for people with SLE do not exist. Perhaps the most prudent approach for people with lupus who are interested in attempting to control their disease activity through diet is to recommend a diet consistent with current recommendations for all individuals, including an intake high in fresh fruits, vegetables and whole grains, and with moderate amounts of lean meats, poultry, and an emphasis on fish, particularly marine fish high in omega-3 fatty acids.

More definitive research showing consistent, objective, clinical benefit is needed before specific dietary recommendations can be made for people with SLE. Prior to undertaking any adjuvant therapy, people with SLE should discuss these or any other dietary modifications with their physician.

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Article references available on request.

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Table 1 - Food Sources of Immuno-modulatory Nutrients

Nutrient (adult)	**Food Source**	**Recommended Intake**
Omega-3 fatty acids	Fish oils - sardine oil, cod liver oil	Unknown; most
trials use 3-6 grams	Fish - mackerel, salmon, herring, halibut	per day; in two or
three divided doses		
Zinc	Red meat, poultry, shellfish	11 mg (male); 8
mg (female)		
Vitamin E	Vegetable & seed oils-soybean, safflower, corn	15 mg
	Sunflower seeds, nuts, whole grains, wheat germ	
Vitamin A	Liver, eggs	900 ug (male);
700 ug (female)		
Beta-carotene	Orange & red fruits & vegetables - carrots, sweet potatoes, pumpkin, dried apricots, red bell peppers	Unknown
Vitamin B6	White meats (poultry, pork, fish)	1.3 mg/d (14-50
yr); 1.7 mg/d (51+) (male)		
	Bananas, whole grains	1.3 mg/d (19-50
yr); 1.5 mg/d (51+) (female)		
Vitamin B12	Animal products, especially organ meats, clams, oysters	24 ug/d
Folate	Fortified cereals, citrus fruits and juices	400 ug/d

mg = milligrams ug=micrograms

Source: Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine, National Academy Press, Washington, DC, 2001