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Nutrition & the Immune System



*Diane E. Clayton, Ph.D.
Biochemist, Nutritionist
Health Practitioner*

Today we are facing some of the greatest environmental challenges to our health. Pathogens such as viruses and bacteria seem to be mutating at an increasing rate, developing resistance to our most powerful drugs, and in some cases even escaping detection by our immune system. It has never been more important to ensure the optimal development, functioning and maintenance of our immune system through life. Appropriate nutrition at all life stages can really help us maximize our immune health and potential. Indeed any kind of nutritional inadequacy or sustained imbalance can jeopardize the performance of our immune system. New evidence points to the negative effects of our typical “western” diets high in saturated fat, calories and low in micronutrients on “immunocompetence”. It seems that the metabolic problems that these typical diets create contribute to the alterations in immune responsiveness of both the “innate” and “acquired” components of our immune system.

Nutrients can act in various ways to assure the appropriate immune response; by supporting the function of key immune organs such as the thymus, by acting as fuel for immune cells, by protecting the health of the first line defenses such as skin and mucosa, by enhancing T-cell and B-cell activities and the efficiency of the antigen-antibody response, by providing the signaling molecules involved in the inflammatory response, and even by regulating the production of antibacterial proteins. Thus it is not surprising that there is a very close positive relationship between nutritional status and immunity. However, new roles of nutrients in the coordinated response of our immune system are constantly being discovered, and “immunonutrition” remains a very challenging but exciting area of science.

Nutrition and Immunity

Apart from the vital role in defending us against invasion by pathogens, our immune system must develop and retain the ability to recognize and react appropriately to our own tissue antigens or “self”, to armless environmental antigens, or to our own gut bacteria. Breakdown in mechanisms acting to provide tolerance may lead to inappropriate immunologic activity such as autoimmunity, allergic reactions to food or environmental antigens, and inflammatory reactions to our gut bacteria.

In many cases these conditions develop in infancy or early childhood, but then may set the pattern of immune response through life. Exposure to specific diet components such as probiotics and the very long chain n-3 polyunsaturated fatty acids (PUFA) seems to be important in setting and modifying immune balance.

Many elements of the immune system response including immune balance, change with aging. In part these changes are linked to low grade inflammation, and strategies which reduce inflammation can be beneficial .

Hence, nutrition, along with other lifestyle factors such as exercise, can help preserve immune function. Nutrients such as vitamin E, zinc and carotenoids have particularly well-documented effects in supporting immune response in the elderly.

Despite all the recent scientific advances in “immuno nutrition” and the powerful effects of specific nutrients and phytonutrients it is important to remember that appropriate intakes of all nutrients are essential to ensure optimal development, balance and performance of our immune system through life. After all, our immune system is the foundation of our health.

References:

- *Wolowczuk et al. Feeding our immune system: Impact on metabolism. Clinical and Development Immunology Volume 2008, DOI:10.1155/2008/639803*
- *Calder et al. Early nutrition and immunity-progress and perspectives. British Journal of Nutrition 96, 774-790 (2006)*
- *Fülöp et al. Immunosupportive therapies in aging. Clinical Interventions in Aging 2, 33-54 (2007)*

IMMUNE PREPAREDNESS IS THE KEY

Tips from the SAB

The nutrient groups and products mentioned here are essentially the same basic recommendations we make for anyone in pursuit of optimal health, vitality and long life. That’s because optimal health and optimal immune capacity are closely inter-related; so much so that it essentially impossible to separate them.

Like all things to do with health, it is best that we take action every day to protect and strengthen ourselves and our immune systems against all forms of disease. It is much harder and much less effective to wait until you have a problem and try to boost your immune system after the fact.

Focus on maximizing your immune system and protecting your health every day with these three basic steps:

- Eat a healthy diet rich in colorful fruits and vegetables, whole grains and fresh fish.
- Practice good personal hygiene.
 - Wash your hand regularly.
 - Try to capture any coughs or sneezes in a tissue or handkerchief and ask others to do the same.
 - As much as possible stay some distance from people who are known to have, or thought to have the H1N1 flu.
- Supplement your diet to assure an abundance of immune boosting nutrients each and every day.
 - Our ProVitality products; Tre-en-en Grain Concentrates, Carotenoid Complex & Omega-III Salmon Oil Plus...for whole food nutrition.
 - Formula IV or Formula IV Plus...for vitamin and mineral support.
 - Vitamin-C and Zinc...for added immune strength

Research Updates

Folic Acid and Iron

Important for Maternal & Baby Health

Global data shows that about 40% of all women are anemic, and many women in developing countries do not receive the micronutrients they need despite international policies for prenatal iron-folic acid supplementation. This is an alarming statistic, as the results of a study conducted by the Johns Hopkins Bloomberg School of Public Health show that folic acid and iron supplement intake during pregnancy could reduce infant mortality by as much as 31%. Additionally, the prevalence of low birth weight can be reduced by 16% and the prevalence of maternal anemia decreased by 50%.

This randomized, double-blind, controlled study was conducted with almost 5,000 pregnant women from rural Nepal. "To our knowledge this is the first time the long-term effects of maternal iron-folic acid supplementation on childhood survival have been examined," said lead researcher Parul Christian."

Christian P, et al. Antenatal and postnatal iron supplementation and childhood mortality in rural Nepal: a prospective follow-up in a randomized, controlled community trial. Am J Epidemiol. 2009 Nov 1;170(9):1127-36. Epub 2009 Sep 24.

Soy Isoflavones

Bone Health

According to the World Health Organization, osteoporosis is one of the biggest global healthcare problems. In fact, the National Osteoporosis Foundation in the USA reported that by 2010, about 12 million people over the age of 50 are expected to have osteoporosis and another 40 million to have low bone mass.

In a recent randomized, double-blind, placebo-controlled study published in the American Journal of Clinical Nutrition, over 400 postmenopausal women experienced a significant reduction in the loss of whole body bone mineral density (BMD) after supplementation with soy-germ derived isoflavones. This coincides with previous data that demonstrated the association between soy isoflavones to increases in BMD, and the recent large study in the Archives of Internal Medicine (2005, Vol. 165, pp. 1890-1895) that found a 48% decrease in fractures for menopausal women with high soy consumption.

Wong WW, et al. Soy isoflavone supplementation and bone mineral density in menopausal women: a 2-y multicenter clinical trial. Am J Clin Nutr. 2009 Nov;90(5):1433-9. Epub 2009 Sep 16.

Green Tea and Stress Support

According to data from the World Health Organization, more than 450 million people worldwide suffer from stress, with associated costs estimated at €20bn in Europe (WHO) and \$200bn in the US (International Labor Office). A new study conducted on over 42,093 Japanese individuals, found that drinking five cups of green tea per day could reduce the incidence of psychological distress by as much as 20%. Researchers concluded that "green tea consumption was inversely associated with psychological distress even after adjustment for possible confounding factors." This data coincides with a previous study from Japan which reported that green tea extracts could offset the signs of physical and mental fatigue associated with modern stressful lives.

Hozawa A, et al. Green tea consumption is associated with lower psychological distress in a general population: the Ohsaki Cohort 2006 Study. Am J Clin Nutr. 2009 Nov;90(5):1390-6. Epub 2009 Sep 30.

Pomegranate Prostate Benefits

Pomegranate, rich in the antioxidant punicalagins, has been associated with improved cardio health, joint health, and more recently, prostate cancer protection. Worldwide, half a million men are diagnosed with prostate cancer every year, and it has caused over 200,000 deaths. Researchers from the University of Mississippi investigating the action of pomegranate juice actives in prostate cancer chemoprevention suggests that the anti-prostate cancer effects may be related to stopping an enzyme in the liver that processes environmental carcinogens.

"It is also well-known that prostate cancer typically possesses long latency periods and develops in older men; therefore, cancer chemoprevention by dietary supplement-based intervention is a desirable form of chemotherapy," wrote the researchers. "Pomegranate juice consumption, thus, may be of considerable advantage in prostate cancer chemoprevention, not only in patients with a genetic predisposition toward prostate cancer but also in patients undergoing cancer therapy."

Kasimsetty SG, et al. Effects of Pomegranate Chemical Constituents/Intestinal Microbial Metabolites on CYP1B1 in 22Rv1 Prostate Cancer Cells. Journal of Agricultural and Food Chemistry, 2009; 57 (22): 10636-10644

Research Updates

More News on D

Emerging science continues to validate the importance of supplementation with Vitamin D. A recent study published in the journal *Clinical Endocrinology* reported that low blood levels of vitamin D have again been linked to lower rates of survival in the elderly, in all-cause mortality and mortality from heart disease. The data was accumulated from 614 people and found that those with the lowest average vitamin D levels (30.6 nanomoles per litre) were found to be at a 124 and 378 per cent increased risk of all-cause mortality and cardiovascular mortality, respectively.

The results of this study coincide with similar findings published in *Nutrition Research* by scientists at the Johns Hopkins University and a study published in the *Archives of Internal Medicine*. Researchers have proposed mechanisms that range from controlling inflammatory compounds, regulating immune health and blood pressure, to reducing arterial hardening.

Research also suggests that vitamin D may also protect against cancer, infections, autoimmune and vascular diseases.

Pilz S, et al. Vitamin D and mortality in older men and women. Clin Endocrinol (Oxf). 2009 Nov;71(5):666-72. Epub 2009 Feb 18.

New Research on the Gut Microbiome

Researchers at Rush University Medical Center in Chicago recently received funding from the US Department of Defense to study the mechanism of microbial cells in the human gut, and to understand how they can affect health and disease, including breast cancer. This is the first study hypothesize that the gut microbiome, passed from mother to child, may be another factor previously overlooked in genetic risk models of the disease. "We know high fat foods change bacterial composition in the intestines and a high fat diet is a risk factor for breast cancer. No one knows how high fat causes breast cancer and we postulate that the effects of high fat may be through alterations in bacterial metabolism by either affecting exposure to carcinogens or the amount of estrogen exposure," explains lead researcher, Mutlu. "If we can identify a set of bacteria associated with breast cancer or a set of bacteria that appears to be protective from breast cancer, then we can try to manipulate the GI bacteria either with new probiotics/prebiotics or other functional foods," she said.

Processed Foods Affect Mood

The results of recent study that examined data provided by 3486 participants (average age of 55 years) in London found that those reporting a high consumption of processed foods were more likely to experience depression in middle age than those with the highest intake of whole foods such as fruits, vegetables and fish. The processed foods they looked at included processed meats, chocolate, sweetened desserts, fried foods, refined cereals and high-fat dairy products.

Although there limitations to this study, overall the research offers valuable insight into the role foods play in mental and cognitive health. Some of the underlying hypotheses proposed include:

- 1) The high folate content in cruciferous and leafy vegetables, and dried legumes. Previous studies have linked folate to brain chemistry.
- 2) High fish intake. The association between omega-3 fatty acids and cognitive health.
- 3) Antioxidants present in fruit, as protector nutrients of the brain.
- 4) Synergistic effect of several nutrients in the diet as a whole
- 5) Some research has even linked the conditions of heart disease and inflammation, especially as a result of the highly processed western diet, to depression.

Akbaraly TN, et al. Dietary pattern and depressive symptoms in middle age. Br J Psychiatry. 2009 Nov;195(5):408-13.

Green Tea Oral Health

Findings from a recent study in Texas suggest that green tea extracts could help protect against the development of mouth cancers in people with risk signs of the disease. The study is a phase II dose-finding trial, and it followed 41 people with oral leuoplakia receiving the placebo, or one of 3 doses of the extract. Almost 60% of the people taking the higher doses had a clinical response.

"While these are encouraging findings, much more research must be done before we can conclude that green tea may prevent oral or any other type of cancer. It's also important to remind people that this trial enrolled very few participants..." cautioned the researchers.

Tsao AS, et al. Phase II randomized, placebo-controlled trial of green tea extract in patients with high-risk oral premalignant lesions. Cancer Prev Res (Phila Pa). 2009 Nov;2(11):931-41.