USANA Technical Bulletin

Epstein Barr Virus

Description

- The Epstein Barr virus (EBV) is a member of the herpes family of viruses. It is mainly spread by the oropharyngeal (nose and mouth) route, although it can also be transmitted by blood transfusions.[1] It has the capability to remain in a dormant state in the body. When EBV comes in contact with human B cells it attaches to the cell membrane and eventually takes control of the cell DNA, reprogramming it to make copies of the virus. Most people fully recover from EBV with no lasting effects. [2]

Types

- Acute EBV (also called infectious mononucleosis) is characterized by flulike symptoms, including sore throat, nasal congestion, low-grade fever, malaise, and swollen neck glands, in more severe cases there can be spleen and liver involvement. Symptoms can range from mild to severe depending on the age when infected.
- Chronic EBV (recurrent mononucleosis) is characterized by symptoms that can become much more severe. Patients sometimes experience peripheral nerve pain, numbness, seizures, paralysis and even encephalitis. Much of this damage is produced by the body's own antibody-producing cells, not by the EBV virus. Even in such extreme cases, complete recovery is possible.[3]

Prevention and Management

- Treatment is usually supportive, unless there are complications, and should include rest during the acute phase; because EBV can affect the spleen and increase the risk of rupturing the spleen, heavy lifting and contact sports should be avoided for about two months.[3]
- The immune system defends the body against microorganisms including the Epstein Barr virus. Optimal immune function requires a healthy lifestyle; eating a balanced diet, drinking plenty of fluids, and getting adequate fiber. Vitamins and minerals that are associated with immune function may help modulate the body's response to EBV and other microorganisms.[4]
- Copper is important in the prevention of infection and plays a role in the function of T-cells.[5]
- Selenium is an essential trace element necessary for the body's antioxidant defense, especially for cellular immunity.[6]

- Zinc is important for proper function of the thymus gland, thymus hormones, and cellular immunity.[7]
- Vitamin A deficiency is associated with impaired immunity and infectious disease.[6]
- Vitamin E protects against infection and is linked to stimulatory effects on the immune system.[9]
- Vitamin C enhances destruction of viruses and bacteria.[8]
- Cell-mediated immunity is impaired by a folic acid deficiency.[9]
- B6 (pyridoxine) is essential for normal maintenance of T-cell function.[10]
- B5 (pantothenic acid) stimulates the immune system.[8]

Abstracts

Thorley-Lawson DA, Miyashita EM, Khan G. Epstein-Barr virus and the B cell: that's all it takes. Trends Microbiol 1996 May;4(5):204-208. Recent experiments demonstrate that a much broader range of B cells harbor Epstein-Barr virus (EBV) in vivo than was previously expected from in vitro studies. In this review it is argued that EBV persists in vivo by integrating its biology with that of the normal B cells within which it resides, and that the B cell provides all the environments necessary for EBV to maintain its life cycle.

Hannigan BM. Diet and immune function. Br J Biomed Sci 1994 Sep;51(3):252-259. Adequate human nutrition is essential to maintain all normal physiological functions including defense of the self. Controversy exists about the precise constituents of diets optimal for all stages in the human life-span. Dietary composition may also need to be altered under such stressful conditions as infection or recovery from major surgery. Understanding how specific nutrients can alter immune responses may add to the quality of human lives by minimising the impact of disease morbidity and mortality. Dietary modification also offers hope of new therapeutic regimens for human diseases.

Corman LC. The relationship between nutrition, infection, and immunity. Med Clin North Am 1985 May;69(3):519-531. The importance of nutrition in every aspect of human physiology slowly is being appreciated clinically. However, it is clear that immune function is highly dependent on the nutritional status of the individual. That status, in turn, is dependent on the nutritional intake and the metabolic machinery of the individual.

Dreizen S. Nutrition and the immune response -- a review. Int J Vitam Nutr Res 1979;49(2):220-228. This compacted overview of the nutrition-immune response connection underscores the role of nutrition as a deterrent to infection. Malnutrition enhances the propensity to and heightens the intensity of infections by weaknening the various host defense mechanisms. Thus: 1. Deficiencies of vitamin A, niacin, riboflavin, folic acid, vitamin B12, pyridoxine, ascorbic acid, iron and protein disrupt the tissue barriers to infection. 2. Protein-calorie, folate, iron, pyridoxine and zinc deprivations markedly depress the cell-mediated immune system. 3. Deficiencies of protein, pyridoxine, folic acid, pantothenic acid, thiamine, biotin, riboflavin, niacin-tryptophan, vitamin A and ascorbic acid inhibit humoral antibody formation in mammalian systems. 4. Vitamin A lack prevents the formation of lacrimal, salivary and sweat gland lysozymes. 5. Complement, properdin, interferon and transferrin concentrations are reduced in those nutritional deficiencies that interfere with protein synthesis. 6. Protein-calorie, iron and folate deficiencies impair phagocytosis by interfering with phagocyte microbial killing power or with phagocyte production. 7. Protein, ascorbic acid and zinc deficiencies retard wound healing that prevents spread of infectious lesions.

References

[1] Diseases. 2nd ed. Springhouse (PA):Springhouse Corporation; 1993 p 164.
[2] Stoff JA and Pellegrino CR. Chronic Fatigue Syndrome. New York:HarperPerennial 1990. p 15-20.
[3] The Merck Manual. Rahway (NJ):Merck Research Laboratories; 1992. p 2281-2285.
[4] Somer E. The Essential Guide to Vitamins and Minerals. New York:HarperPerennial 1992. p 128-129.
[5] Harbige LS. Nutrition and immunity with emphasis on infection and autoimmune disease. Nutr Health 1996;10(4):285-312.
[6] Badmaev V, Majeed M, Passwater RA. Selenium: a quest for better understanding. Altern Ther Health Med 1996 Jul;2(4):59-62.
[7] Dreizen S. Nutrition and the immune response-a review. Int J Vitam Nutr Res 1979;49(2):220-228.
[8] Leibovitz B, Siegel BV. Ascorbic acid, neutrophil function, and the immune response. Int J Vitam Nutr Res 1978;48(2):159-164.
[9] Dhur A, Galan P, Hercberg S. Folate status and the immune system. Prog Food Nutr Sci 1991;15(1-2):43-60.
[10] Ha C, Miller LT, Kerkviet NI. The effect of vitamin B6 deficiency on cytotoxic immune responses of T cells, antibodies, and natural killer cells, and phagocytosis by macrophages. Cell Immunol 1984 May;85(2):318-329.