

## **Importance of Vitamin A to the Immune System**

### **Vitamin A**

Vitamin A is necessary for normal growth of most cells of the body and especially for normal growth and proliferation of the different types of epithelial cells. Vitamin A deficiency causes epithelial structures to become stratified and keratinised, which can lead to malabsorption of nutrients due to their (nutrients) inability to cross less permeable membranes.

### **Immune System**

Vitamin A is important in fighting infections, because it is essential in maintaining the epithelial and mucosal surfaces and their secretions. Intact and healthy mucosal surfaces form a primary host defence system that helps the body defend itself against invading pathogens. Vitamin A also enhances and stimulates other immune processes including increased efficiency and production of white blood cells, increased antibody response, and induction of anti-tumor activity. Levels of vitamin A beyond the amount of a maintenance dose increase these beneficial effects. Vitamin A also exerts antiviral properties and helps prevent the immunosuppression caused by stress such as transport of calves.

### **Epithelial and mucosal tissue integrity**

Vitamin A plays an essential role in the maintenance of epithelial and mucosal surfaces and their secretions. Epithelial surface integrity and mucosal surface secretions (many of which are immune enhancing) constitute an important host defence mechanism against infectious diseases.

### **Cellular growth and development**

Vitamin A is necessary in the synthesis of many glycoproteins, some of which may control cellular differentiation. Deficiency of vitamin A produces a loss of normal stimuli for cellular growth and differentiation. At the cellular level, the effects of vitamin A deficiency are most readily seen in those differentiating tissues that have a rapid turnover rate, i.e., epithelial cells of the oral cavity, respiratory tract, urinary tract, ducts of secretory glands, and the large intestine.

### **Immune Functions**

Vitamin A and carotenoids have been shown to stimulate and/or enhance numerous immune processes, including induction of cell-mediated cytotoxicity against tumors, natural killer cell activity, and lymphocyte blastogenesis enhancing humoral and cell-mediated immunity, mononuclear phagocytosis, and antibody response.