

MANIDHANAHEYAM FREE IAS ACADEMY – TNPSC GROUP II & IIA

UNIT – I-BIOLOGY

Health and Hygiene

1. Vitamins – Sources, Deficiency disorders and Symptoms

Vitamins	Sources	Deficiency disorders	Symptoms
Fat Soluble Vitamins			
Vitamin A (Retinol)	Carrot, papaya, leafy vegetables, fish liver oil, egg yolk, liver, dairy products	Xerophthalmia Nyctalopia (Night blindness)	Dryness of Cornea Unable to see in the night (dim light) Scaly skin
Vitamin D (Calciferol)	Egg, liver, dairy products, Fish, synthesized by the skin in sunlight	Rickets (in children)	Bow legs, defective ribs, development of pigeon chest
Vitamin E (Tocopherol)	Whole wheat, meat, vegetable oil, milk	Sterility in rats, Reproductive abnormalities	Sterility
Vitamin K (Derivative of Quinone)	Leafy vegetables, soyabeans, milk	Blood clotting is prevented	Excessive bleeding due to delayed blood clotting
Water Soluble Vitamins			
Vitamin B1 (Thiamine)	Whole grains, yeast, eggs, liver, sprouted pulses	Beriberi	Degenerative changes in the nerves, muscles become weak, paralysis

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Vitamin B2 (Riboflavin)	Milk, eggs, liver, green vegetables, whole grains	Ariboflavinosis (Cheilosis)	Irritation in eyes, dry skin, inflammation of lips, fissures in the corners of the mouth
Vitamin B3 (Niacin)	Milk, eggs, liver, lean meat, ground nuts, bran	Pellagra	Inflammation of skin, loss of memory, diarrhoea
Vitamin B6 (Pyridoxine)	Meat, fish, eggs, germs of grains and cereals, rice polishings	Dermatitis	Scaly skin, nervous disorders
Vitamin B12 (Cyanocobalamin)	Milk, meat, liver, pulses, cereals, fish	Pernicious anaemia	Decrease in red blood cell production, degeneration of spinal cord
Vitamin C (Ascorbic acid)	Leafy vegetables, sprouts, citrus fruits like goose berry (Amala), lemon, orange	Scurvy	Swollen and bleeding gums, delay in healing of wounds, teeth and bones malformed

2. Minerals - Sources Functions and Deficiency disorders

Minerals	Sources	Functions	Deficiency disorders
Macronutrients			

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Calcium	Dairy products, beans, cabbage, eggs, fish	Constituent of bones and enamel of teeth, clotting of blood and controls muscle contraction.	Bone deformities, poor skeletal growth, osteoporosis in adults.
Sodium	Common salt	Maintains fluid balance and involved in neurotransmission.	Muscular cramps, nerve impulses do not get transmitted.
Potassium	Banana, sweet potato, nuts, whole grains, citrus fruits	Regulates nerve and muscle activity.	Muscular fatigue, nerve impulses do not get transmitted.
Micronutrients			
Iron	Spinach, dates, greens, broccoli, whole cereals, nuts, fish, liver	Important component of haemoglobin.	Anaemia
Iodine	Milk, Seafood, Iodised salt	Formation of thyroid hormones.	Goitre

3. Protein Energy Malnutrition (PEM)

Absence of certain nutrients in our daily diet over a long period of time leads to deficiency diseases. This condition is referred as Malnutrition. Deficiency of proteins and energy leads to severe conditions like: Kwashiorkar and Marasmus.

Kwashiorkar: It is a condition of severe protein deficiency. It affects children between 1-5 years of age, whose diet mainly consists of carbohydrates but lack in proteins.

Marasmus: It usually affects infants below the age of one year when the diet is poor in carbohydrates, fats and proteins.

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4. Immune responses

The immune responses may be primary or secondary.

Primary immune response

The primary immune response occurs when a pathogen comes in contact with the immune system for the first time. During this, the immune system has to learn to recognize the antigen, produce antibody against it and eventually produce memory lymphocytes. The primary immune response is slow and short-lived.

Secondary immune response

The secondary immune response occurs when a person is exposed to the same antigen again. During this time, immunological memory has been established and the immune system can start producing antibodies immediately. Within hours after recognition of the antigen, a new army of plasma cells are generated. Within 2 to 3 days, the antibody concentration in the blood rises steeply to reach much higher level than primary response. This is also called as “booster response”.

S.No	Primary Immune Response	Secondary Immune Response
1	It occurs as a result of primary contact with an antigen.	It occurs as a result of second and subsequent contacts with the same antigen.
2	Antibody level reaches peak in 7 to 10 days.	Antibody level reaches peak in 3 to 5 days.
3	Prolonged period is required to establish immunity.	It establishes immunity in a short time.
4	There is rapid decline in antibody level.	Antibody level remains high for longer period.
5	It appears mainly in the lymph nodes and spleen.	It appears mainly in the bone marrow, followed by the spleen and lymph nodes.

5. Autoimmune diseases

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Autoimmunity is due to an abnormal immune response in which the immune system fails to properly distinguish between self and non-self and attacks its own body. Our body produces antibodies (auto antibodies) and cytotoxic T cells that destroy our own tissues. If a disease-state results, it is referred to as auto-immune disease. Thus, autoimmunity is a misdirected immune response. Autoimmunity is evidenced by the presence of auto antibodies and T cells that are reactive with host antigens. When the cells act as antigens in the same body, they are called autoantigens.

Autoimmune diseases in human can be divided into two broad categories, namely organ-specific and non-organ-specific (systemic) autoimmune diseases. In organ-specific disease, the autoimmune process is directed mostly against one organ. The autoantibodies may block the functions performed by the organs. Examples include Hashimoto's thyroiditis, Graves' disease (thyroid gland) and Addison's disease (adrenal glands). In non-organ specific (systemic) disorders, autoimmune activity is widely spread throughout the body. Rheumatoid arthritis and multiple sclerosis are example for systemic disorder.

