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Water Soluble Vitamins:
Learning Objectives

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1. Identify the water-soluble and fat-soluble vitamins

2. Describe the purpose of the Dietary Reference Intakes (DRIs) for vitamins.

3. Name five factors that can affect the nutritional vitamin status of an individual.

4. List the vitamins that are most consistently low in our adult female and male population.

5. Each vitamin has critical physiological functions. Name three consequences of inadequate dietary folate and identify the biochemical pathway that is involved.

6. Identify two medical outcomes related to inadequate vitamin intake of folate and B_{12}.

Water Soluble Vitamins:
Answers to Learning Objectives

1. **Identify the water-soluble and fat-soluble vitamins.**
   Water soluble vitamins: B vitamins: thiamin (B_1), riboflavin, niacin, B_6 (pyridoxine), folate, B_{12} (cobalamin), pantothenic acid, biotin; vitamin C
   Fat soluble vitamins: vitamins A, D, E, K

2. **Describe the purpose of the Dietary Reference Intakes (DRIs) for vitamins.**
   Dietary Reference Intakes (DRIs) are reference values that are quantitative estimates of nutrient intakes to be used for planning and assessing diets for apparently healthy people. The Recommended Dietary Allowance is one of the DRIs and is the dietary intake level that is sufficient to meet the nutrient requirement of nearly all (97-98%) healthy individuals in a particular life stage and gender group.

3. **Name five factors that can affect the nutritional vitamin status of an individual.**
   a. Dietary intake
   b. Digestion/Absorption/Excretion
   c. Nutrient-drug and nutrient-nutrient interactions
   d. Metabolic activity and increased demands, including growth, pregnancy, lactation
   e. Disease and stress

4. **List the vitamins that are most consistently low in our adult female and male population.**
   Males: vitamin E and folate
   Females: vitamin A, B_6, folate and vitamin E

5. **Each vitamin has critical physiological functions. Name three consequences of inadequate dietary folate and identify the biochemical pathway that is involved.**
   a. The main metabolic consequence of folic acid deficiency is alteration of DNA metabolism. This results in changes in cellular nuclear morphology, especially in those cells with the most rapid multiplication rates – red blood cells, leukocytes, and epithelial cells of the stomach, intestine, vagina, and uterine cervix.
   b. Increased risk of cancer due to inadequate methylation of DNA
   c. Neural tube defects during pregnancy
   d. Increase in serum homocysteine due to inadequate conversion to methionine
   e. Development of megaloblastic anemia

6. **Name two medical outcomes related to inadequate intake of vitamin B_{12}.**
   a. Megaloblastic anemia

b. Neurologic changes, dementia