Summary :

Vitamins	Organic compounds present in small quantities in different types of food - Help in various biochemical processes in cell - Most act as coenzymes - Important for growth and maintaining good health. – Essential - Non-caloric - Required in very small amounts.
Classified Based on Solubility	**Water-Soluble Vitamins :** • ascorbic acid (vitamin C) • thiamin (vitamin B_1) • riboflavin (vitamin B_2) • niacin • pyridoxine (vitamin B_6C • biotin • pantothenic acid • Folate • cobalamin (vitamin B_{12}) **Fat-Soluble Vitamins** : (A, D, E, and K) = KADE • Stored in the liver and adipose tissue. • Excess may accumulate and cause toxicity. • Cases of toxicity with vitamin A and D have been reported. • Do not need to be consumed each day due to storage in the body. • Absorbed slowly with fats. • Diseases due to deficiency are rare as large amounts are stored in the body.
Vitamin A	• Essential role in vision and normal cell differentiation • Deficiency can cause of blindness in the developing world • Large doses over a prolonged period of time can produce intoxication and eventually lead to liver disease • Excessive carotenoids intake can result in yellowing of the skin, but appears to be harmless
	1- from animal source : Three preformed compounds called retinoids that are metabolically active and found in animal products : • retinol – alcohol form (can be converted to other forms) • retinal or retinaldehyde – aldehyde form (essential in vision) • retinoic acid – acid form (for skin and bone growth)
	1- from plant source : (can yield retinoids when metabolized in the body). • Carotenoids (β-carotene) : One molecule of b-carotene can be cleaved into two molecules of retinal in the intestine • cryptoxanthin can yield retinoids when metabolized in the body
Vitamin A function	Vision - Gene transcription - Immune function - Embryonic development and reproduction - Bone metabolism - Skin health - Antioxidant activity – Growth - Maintenance of epithelial cells.
Role of Vitamin A in Vision	• Visual cycle and color vision. • Dark Adaptation time.
Vitamin A Deficiency and Diseases	• Nyctalopia (night blindness): patient cannot see in low light or near darkness conditions. • Xerophthalmia: dryness of the conjunctiva and cornea. • Bitot's spots : localized increased thickness of the conjunctiva. • Keratomalacia: prolonged xerophthalmia leads to drying and clouding of cornea. • Complete blindness (in severe deficiency).