

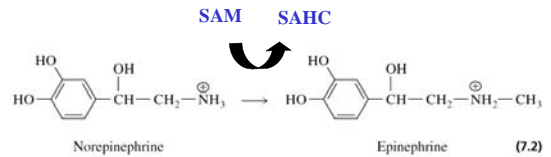


## Coenzyme Classification

- There are two classes of coenzymes
- (1) \_\_\_\_\_ are altered during the reaction and regenerated by another enzyme
- (2) \_\_\_\_\_ remain bound to the enzyme during the reaction, and may be covalently or tightly bound to enzyme

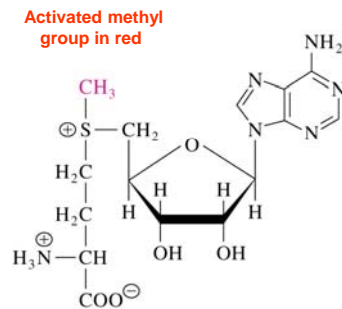


**Example: SAM donates the methyl group for the synthesis of the hormone epinephrine from norepinephrine**

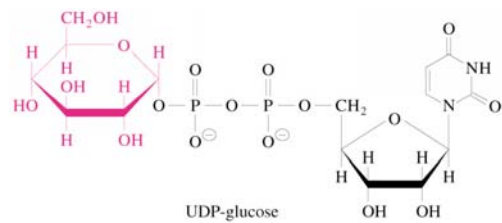


**Fig 7.5 S-Adenosylmethionine (SAM)**

**SAM is the donor of methyl groups for most biosynthetic reactions**



**UDP-sugar: activated form of sugars used as substrate in many biosynthetic reactions**



**Nucleotide-sugars are cosubstrates in many glycosylation reactions**

### Vitamin-Derived Coenzymes

- \_\_\_\_\_: required for synthesis of some coenzymes, must be obtained from nutrients
- Animals rely on plants, meat, & microorganisms for vitamin sources
- Most vitamins must be enzymatically transformed to the coenzyme (e.g. some water soluble vitamins)
- **BE SURE TO LEARN WHICH VITAMINS ARE PART OF WHICH COENZYMES (Table 7.2)**

### Box 7.2 Vitamin C: a vitamin but not a coenzyme

- A reducing reagent for hydroxylation of collagen
- Deficiency leads to the disease scurvy
- Most animals (not primates) can synthesize Vit C

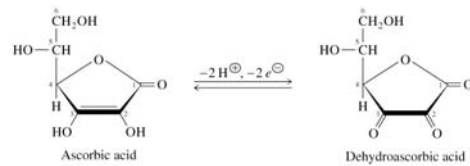


Table 7.1 Vitamins, nutritional deficiency diseases

<u>Vitamin</u>	<u>Disease</u>
Ascorbate (C)	Scurvy
Nicotinic acid (B <sub>3</sub> )	Pellagra
Riboflavin (B <sub>2</sub> )	Growth retardation
Pantothenate (B <sub>5</sub> )	Dermatitis in chickens
Thiamine (B <sub>1</sub> )	Beriberi
Pyridoxal (B <sub>6</sub> )	Dermatitis in rats
Biotin	Dermatitis in humans
Folate	Anemia
Cobalamin (B <sub>12</sub> )	Pernicious anemia

### Some vitamins are Lipid Vitamins

- Four lipid vitamins: A, D, E, K
- All contain rings and long, aliphatic side chains
- All are highly hydrophobic
- The lipid vitamins differ widely in their functions