

- 7) What two classes of enzymes use Vitamin B₁₂ as a cofactor? What are their main functions?

- 8) How is Vitamin B₁₂ absorbed? In cases of B₁₂ deficiency, what are the major routes of administration and what are the rationalizations for each?

- 9) What type of chemical reactions is Coenzyme A (CoASH) used for and what vitamin is converted to Coenzyme A?

- 10) What vitamin deficiency can be induced by consumption of raw egg whites? Why? (Bonus: How do biochemists leverage this effect for research?)

- 11) How to check vitamin B12 deficiency?

- 12) What disease commonly occurred in the "corn belt" of the US in the 1900's? What could have remedied this situation?

- 13) What enzymatic reactions does biotin mostly participate in?

- 14) What are the major functions of Vitamin C in the cell? Which stereoisomer can serve as a co-factor of enzymes?

15) What Nobel Prize winner claimed that mega-dosing (multiple grams/day) of Vitamin C was “How to Live Longer and Feel Better”? Do you agree or disagree with the efficacy of high intake of Vitamin C in prevention of disease?

16) How to check folate deficiency?

17) Why do alcoholics frequently suffer from folate deficiency?

18) The tolerable Upper Limit dose is the:

- a. highest dose of a vitamin at which no toxicity or insufficiency is observed.
- b. the lowest doses of a vitamin at which benefits are observed with supplementation.
- c. 1.2 times the RDA.
- d. none of the above.

19) If the EAR for a vitamin is 0.5 mgs/day then the RDA is:

- a. 0.6 mg/day
- b. 0.5 mg/day
- c. 0.75 mg/day
- d. 1.0 mg/day
- e. none of the above

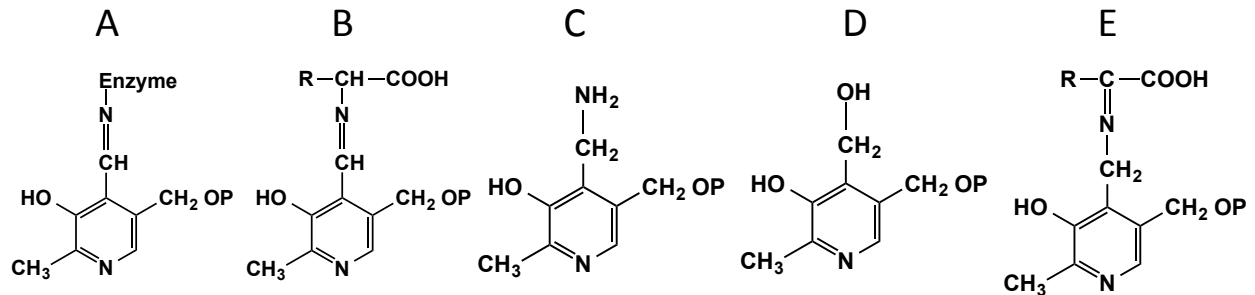
20) Which of the following statement is false?

- Vitamin C is not well retained in our body
- Overdosing of vitamin C likely causes toxicity
- Overdose of vitamin A likely causes toxicity
- Vitamin B1 and C needs regular replacement

21) Rice polishings containing which vitamin and is responsible for beriberi resulting from overconsumption of polished rice in Ancient Asia?

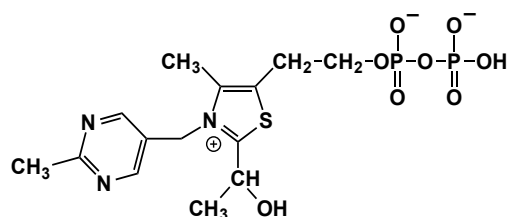
- Vitamin C
- Vitamin A
- Vitamin B1
- Vitamin D

22) Which imine form of pyridoxal below yields an amino acid upon hydrolysis [$P = HPO_3^-$]:



23) Which of the following are possible fates for the hydroxyethyl TPP form of thiamine:

- decarboxylation to yield CO_2 and pyruvate
- deprotonation to a carbanion followed by attack at an aldehydic carbon to transfer two carbons to a sugar
- attack by ethanol to reduce systemic ethanol levels and benefit alcoholics
- reduce dehydroascorbate back to vitamin C



24) Which vitamin need is proportional to calorie intake?

- a. Riboflavin
- b. Folic acid
- c. Thiamin
- d. B12

25) Tryptophan is the biosynthetic precursor to which vitamin? _____ And which vitamin is involved in this transformation? _____

- a. Thiamin
- b. Riboflavin
- c. Pyridoxal
- d. Folic acid
- e. B12
- f. Niacin

26) Match the test for deficiency of a vitamin, with the vitamin:

_____ Vitamin B₂

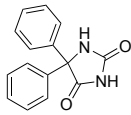
_____ Vitamin B₁₂

- a. urine methylmalonic acid level
- b. transketolase assay in red blood cells
- c. erythrocyte glutathione reductase activity
- d. erythrocyte transaminase activity

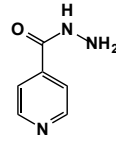
27) To lower the plasma level of homocysteine, the best way is to supplement with:

- a. Thiamine
- b. Thiamine, riboflavin and B₆
- c. Vitamin B₆, folic acid and cobalamin
- d. Thiamine, riboflavin and niacin

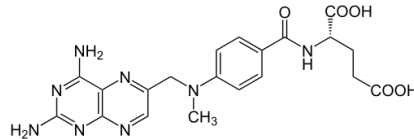
28) In principle, which drugs or vitamins below could possibly result in iatrogenic Vitamin B₆ deficiency if used chronically, based on the structures shown:



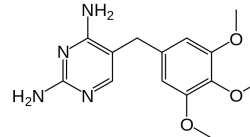
a. Phenytoin



b. Isoniazid



c. Methotrexate



d. Trimethoprim

29) Choose the correct description about Leucovorin:

- a. is contraindicated in levo-DOPA therapy
- b. can cause vitamin B₆ deficiency
- c. can allow ordinarily lethal dose of methotrexate to be used against tumor
- d. act as an antibiotic by inhibiting bacterial DHFA reductase

30) An elderly patient with pernicious anemia and low gastric HCl would most likely benefit from:

- a. oral supplements containing vitamin B₁₂.
- b. oral supplements containing vitamin B₉.
- c. IM injections of vitamin B₁₂.
- d. transdermal patches of containing vitamin B₆.

31) Please write the products for the following transformations and specify which vitamins participated as a cofactor.

