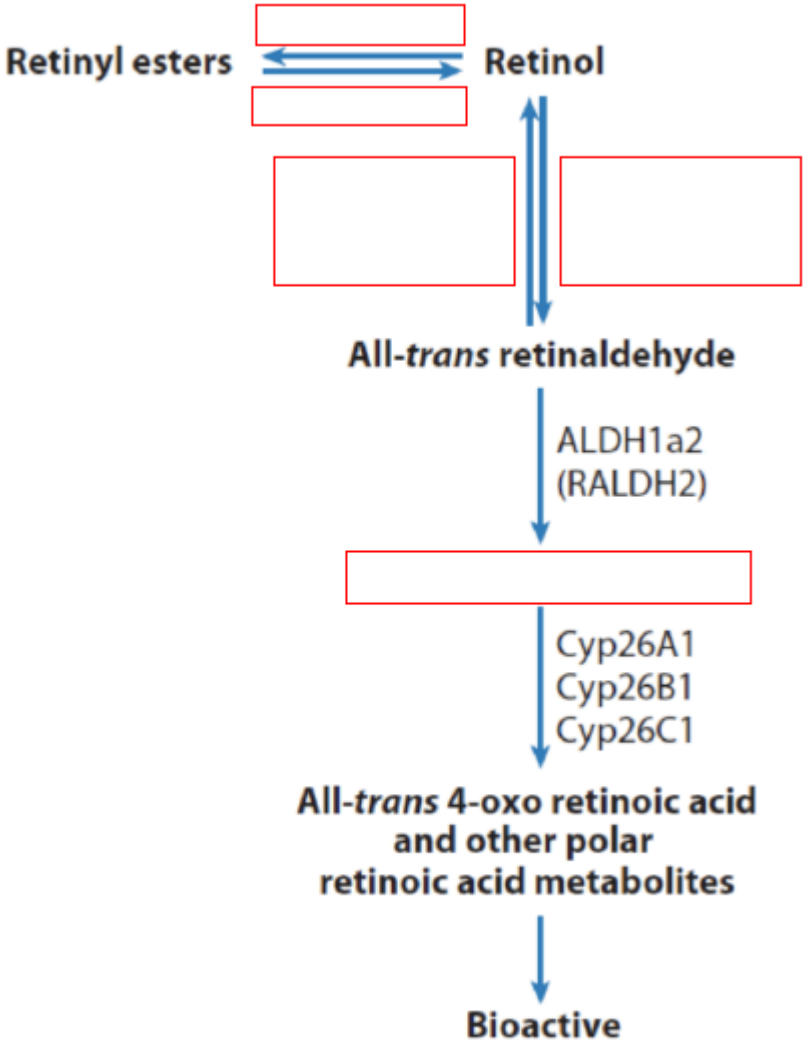
MEDCHEM 562 - 2014
Fat Soluble Vitamins Problem Set

1. Fill out the blanks in the table below.

Vitamin	Physiological Function	Deficiency symptoms	Toxicity
A			
D			
E			
K			

2. What are the key structural requirements for vitamin A activity of the retinol series of compounds?

3. Fill in the boxes for the pathway below:

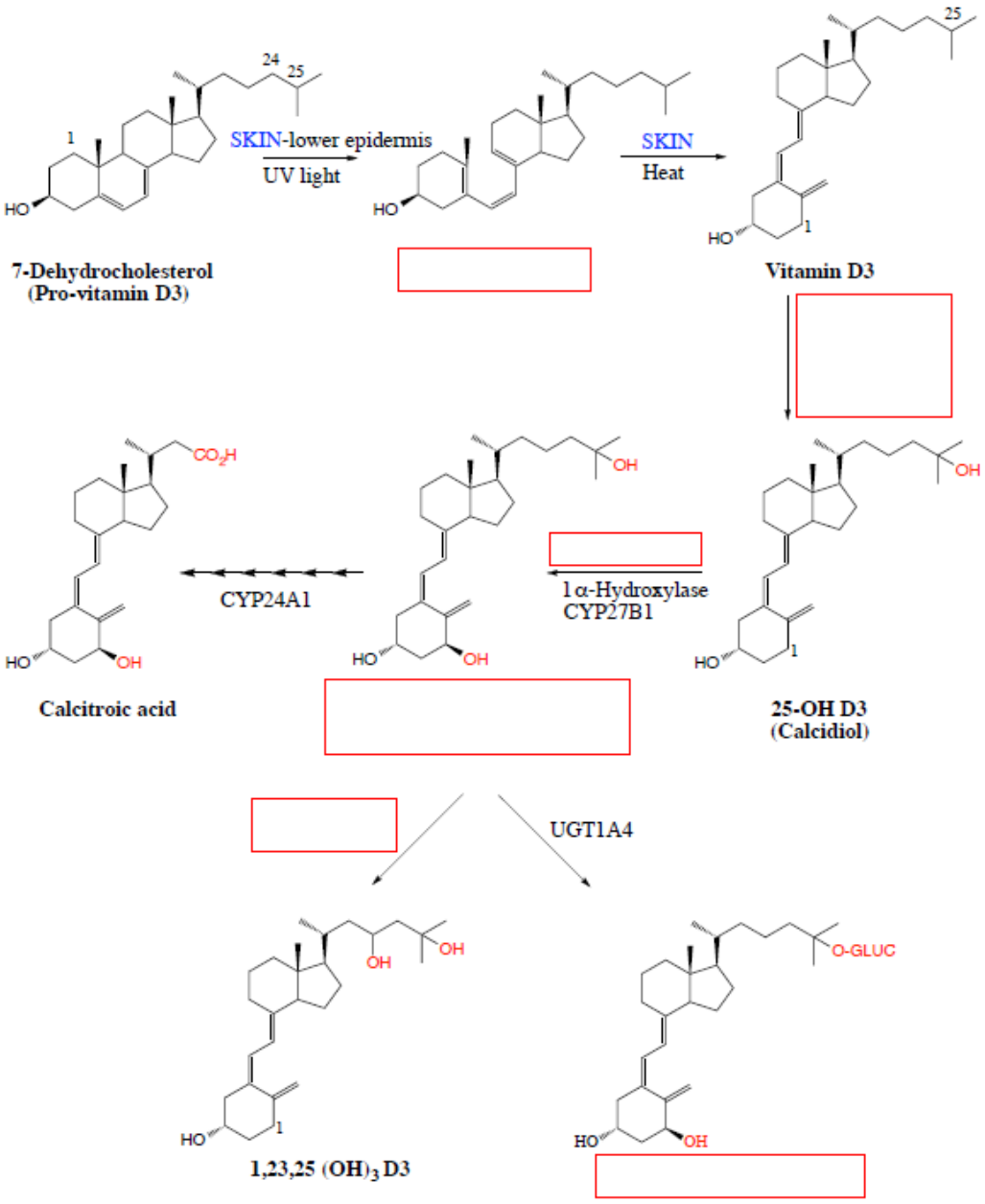


4. Which sense does this pathway play a part in? Identify two symptoms of vitamin A deficiency.

5. Name three good dietary sources of Vitamin A:

6. “Vitamin D” is technically not a Vitamin. Explain.

7. Fill in the blanks on this diagram:

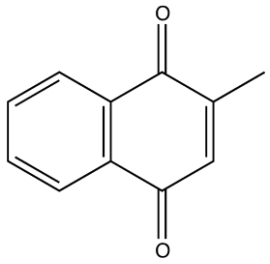


8. Where in the body is Vitamin D converted to its active form enzymatically?

9. How is Pre-Vitamin D3 converted to Vitamin D3? Show this reaction.

10. A patient is worried about hypervitaminosis A because he/she eats a diet high in carrots. Should he/she be concerned by vitamin A produced by the cleavage of β-carotene (found in carrots)? Why or why not?

11. Menadione is shown below: By what other name is it known?



12. Menadione itself has no intrinsic vitamin activity, but can be activated by reaction with what endogenous constituent? What is the product of this reaction?

13. Why is Vitamin K's cofactor activity so crucial?

14. How exactly does warfarin exert its anticoagulant effects?

15. Explain how vitamin E can function as an antioxidant Vit. E? Show how is it regenerated.

16. Explain why, from a chemical standpoint α-tocopherol is a more potent antioxidant than ɣ-tocopherol.

17. Which is the most toxic of the reactive oxygen species? Show how it can be generated from superoxide anion and hydrogen peroxide. What is the name of this reaction?

18. Show how lipid hydroperoxides are detoxified by the glutathione pathway.

19. Which minerals and vitamins are critical to the proper functioning of the glutathione pathway?