

MedChem 402 Final Exam part B

1. (18 pts) Oxidative stress is thought to part of the cause of age-related macular degeneration that can result in blindness in older people. A special antioxidant vitamin mixture called the AREDS formula has shown benefit in careful studies in slowing progression of age-related macular degeneration. The Bausch and Lomb PreserVision AREDS product formula is:

Vitamin A (as beta carotene)	28,640 IU
Vitamin C	425 mg
Vitamin E (dl-alpha-tocopheryl acetate)	400 IU
Zinc (zinc oxide)	70 mg
Copper (cupric oxide)	1.6 mg

(12) For each of the vitamins, indicate any possible medical risks that might be associated with daily consumption of this product for many years. Be specific with an explanation.

Ans: vitamin A as beta carotene has no risk except for possible yellow skin. One could mention the small increased risk for lung cancer in smokers.

Vit C. The dose is a little high but well below the UL of 2g. One could mention a possible risk of kidney stones or increased pro-oxidant activity

Vit E. The dose is a little high but well below the UL of 2300IU for the racemate. One could mention an increased risk of bleeds with warfarin (but it is unlikely at this dose).

(6) Would there be a vitamin overdose risk of taking daily a general multivitamin (e.g. Centrum Silver) along with the AREDS formula? Explain and be specific.

The DV values in a “general” multivitamin would add little on a percentage basis to the amounts in the AREDS formula. There is little risk and in fact use of a Centrum like formula for this person should be encouraged.

Multiple Choice Questions (use “standard answer sheet” and a number 2 pencil)(32 pts)

1. A long term course of tetracycline could a) lower phytonadione levels **b) lower menaquinone levels** c) raise osteocalcin levels d) all of the above.
2. Riboflavin can be essential for the inactivation of reactive oxygen species because of which enzyme being a flavoprotein a) glutathione peroxidase **b) glutathione reductase** c) glucose-6-phosphate dehydrogenase d) superoxide dismutase
3. Vitamin A deficiency results in a) urate acidurea **b) xerophthalmia** c) lack of osteocalcin d) increased hip fractures.
4. Natural vitamin E is **a) d-alpha tocoferol** b) l-alpha tocopherol c) rac-alpha tocopherol d) dl-delta tocopherol
5. What is FALSE about vitamin K a) facilitates hydrogen abstraction of some glutamate containing peptides b) it decreases the risk of hip fractures c) it is low at birth **d) it is extensively stored**
6. Night blindness is caused by low rhodopsin. Rhodopsin undergoes a photochemical reaction to yield opsin and a) retinol **b) retinal** c) 11-cis-retinal d) 11-cis- retinol
7. Low serum calcium would result in **a) decreased parathyroid hormone** b) increased parathyroid hormone c) decreased 25-hydroxycholecalciferol d) increased 24, 25-dihydroxycholecalciferol
8. The UL for natural vitamin E is about a) 100 IU b) 400 IU **c) 1500 IU** d) 2600 IU
9. The calcium supplement most appropriate for an 80 year old female with osteoporosis would be a product containing **a) calcium citrate** b) calcium carbonate c) calcium carbonate plus vitamin D d) oyster shell calcium

10. Appropriate vitamin D supplementation for a renal failure patient would best be a) 25-hydroxycholecalciferol b) 1-hydroxycholecalciferol **c) 1,25-dihydroxycholecalciferol** d) ergosterol
11. Vitamin E reacts with oxygen to form an inactive a) lactam b) hydride c) free acid **d) quinone**
12. Daily doses of over 400 IU of vitamin E have been shown to a) decrease scar formation **b) increase walking distance in intermittent claudication** c) slightly increase the risk for prostate cancer in smokers d) slightly increase the risk for blood clots.
13. The DV for vitamin D can be achieved by a) taking 1ml of cod liver oil **b) drinking 1 liter of milk** c) eating 3 ounces of broccoli d) eating 3 ounces of lean pork
14. A diet rich in oily fish would be especially rich in what two vitamins a) vitamins C and K b) vitamins E and A c) vitamin D and folic acid **d) vitamins D and A**
15. Hypervitaminosis A is characterized by **a) severe headache** b) kidney stones c) cardiomyopathy d) bleeding
16. A vitamin E deficiency is characterized by a) rash b) peripheral neuritis **c) anemia** d) bleeding