

Chemistry of Natural Products (CHEM-479)

Online Lectures (Vitamins-D+E+K)

Dr Abdul Rauf Raza

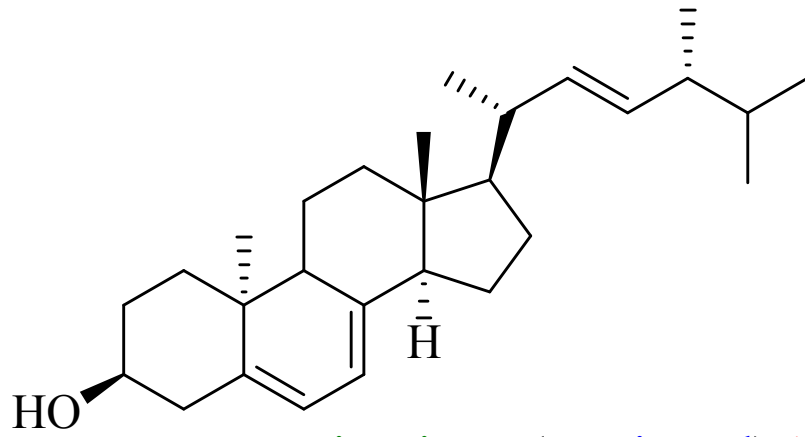
(Associate Professor)

Department of Chemistry
University of Sargodha, Sargodha

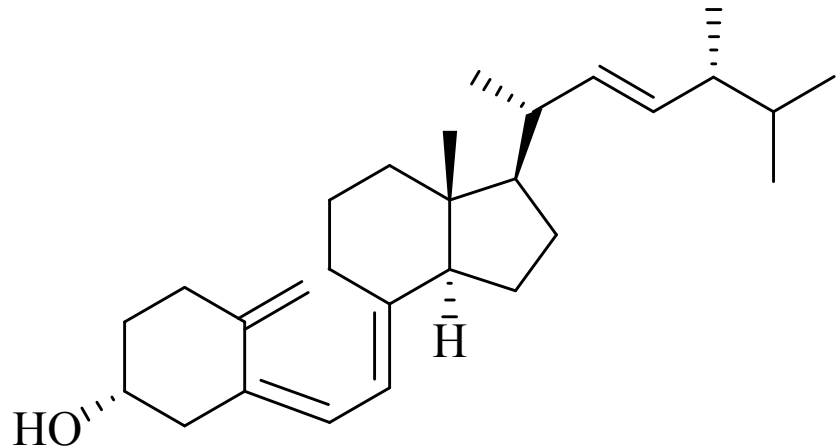
Classification of Vitamin-D

1. Vitamin D₁ (Ergocalciferol **1**, Lamisterol **2** in 1:1)
2. Vitamin D₂ (Ergocalciferol **1**)
3. Vitamin D₃ (Cholecalciferol **3**)
4. Vitamin D₄ (22-Dihydroergocalciferol **4**)
5. Vitamin D₅ (Sitocalciferol **4**)

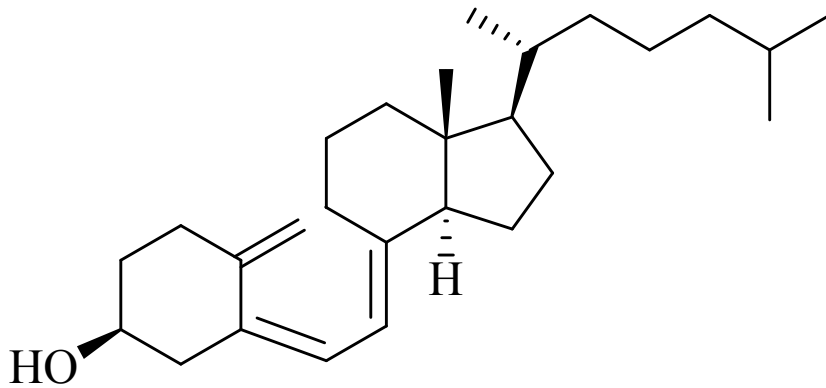
Vitamin-D



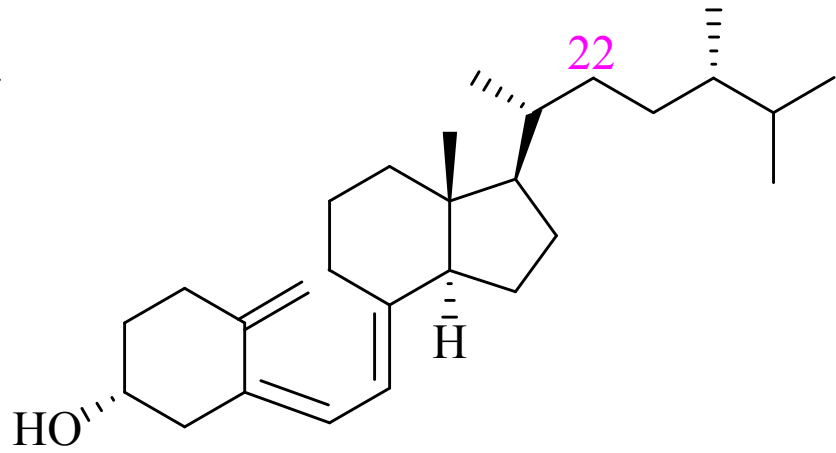
Vitamin D₁ (Lamisterol) **1**



Vitamin D₂ (Ergocalciferol) **2**

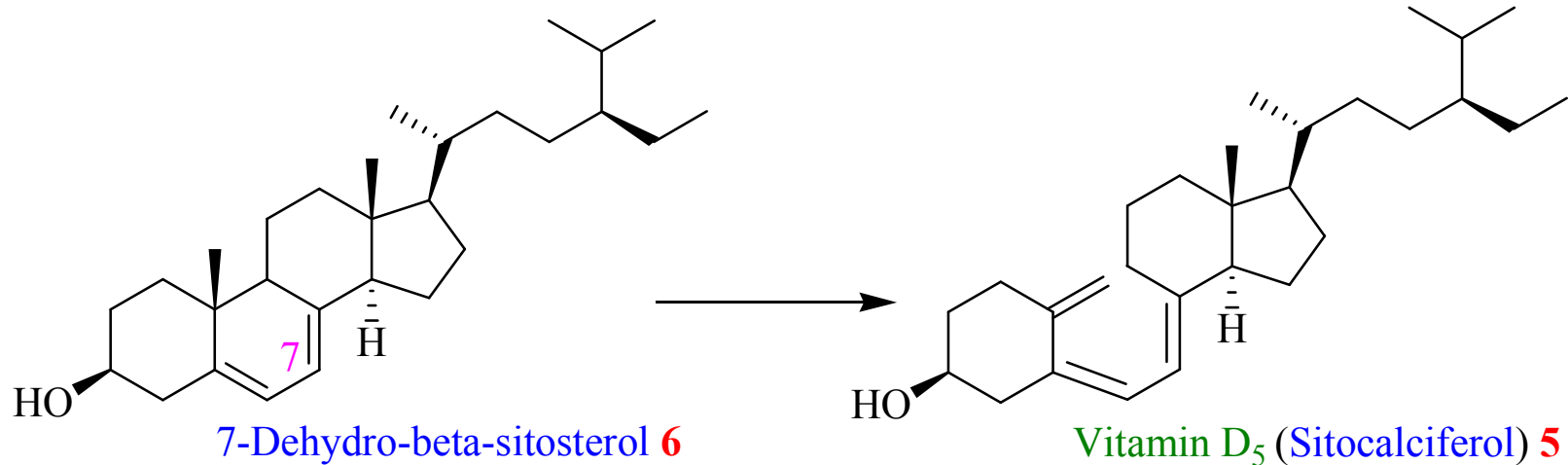


Vitamin D₃ (Cholecalciferol) **3**



Vitamin D₄ (22-Dihydroergocalciferol) **4**

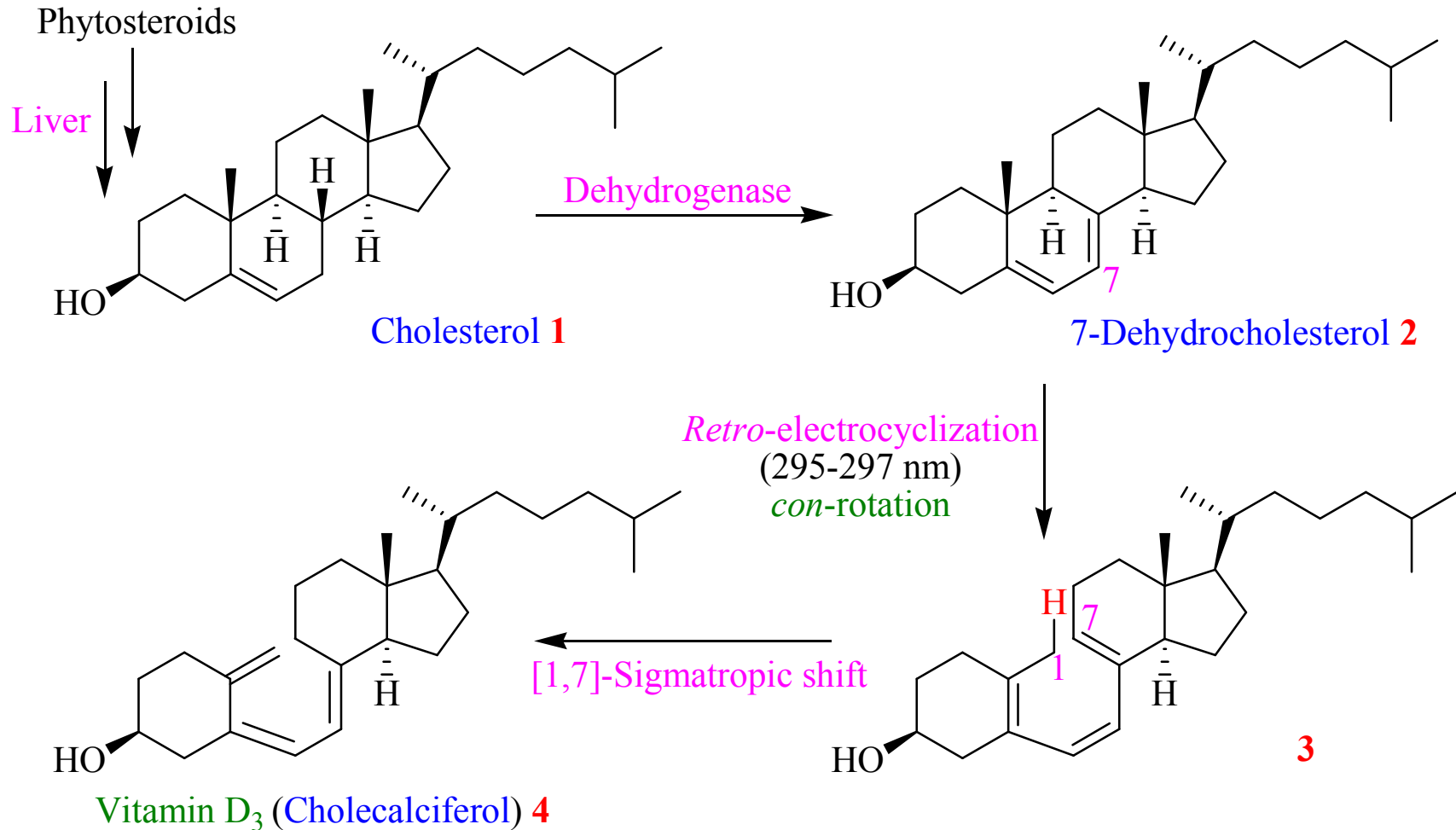
Vitamin-D



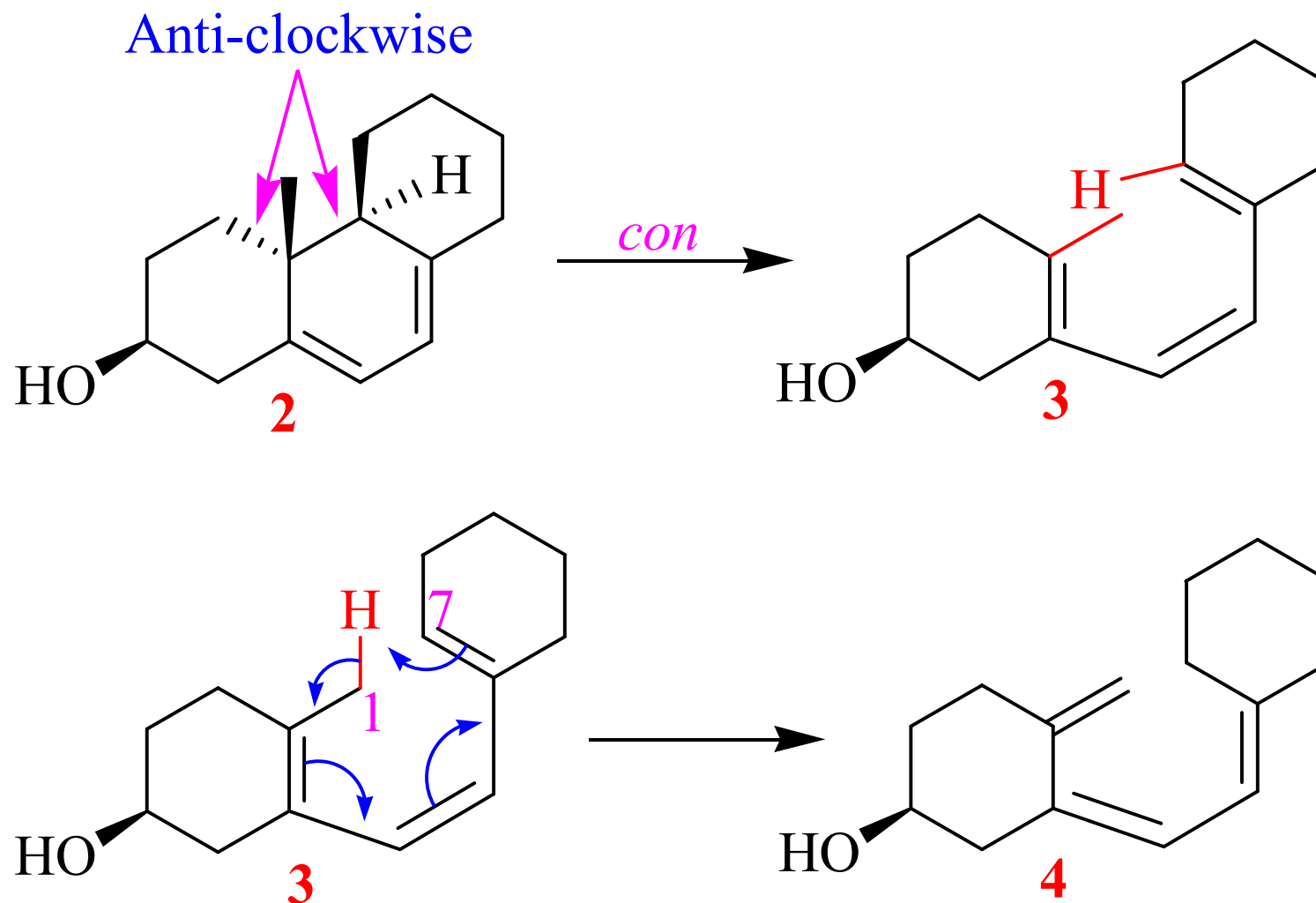
Function

- Regulated the Ca²⁺ and P levels in blood
- Promotes bone formation and mineralization
- Affects immune system by promoting phagocytosis (Anti-tumor activity)
- Deficiency causes rickets in children osteomalacia in adults

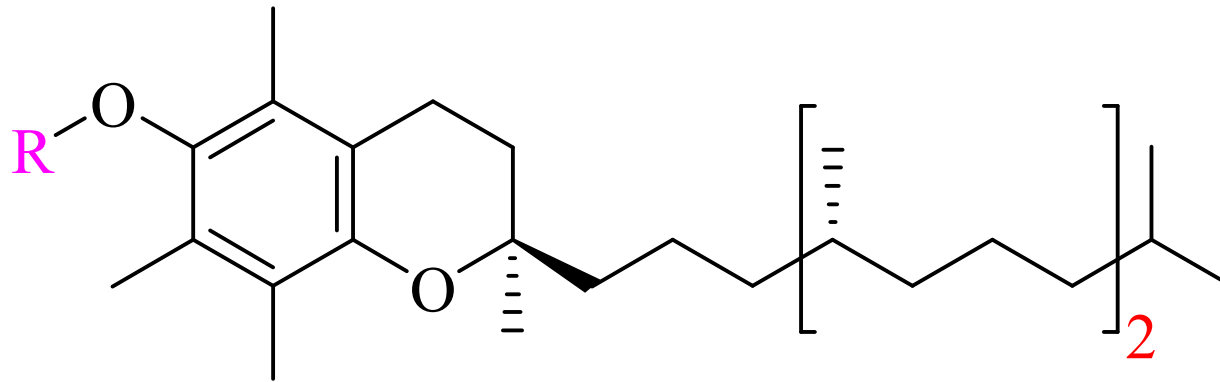
Biosynthesis of Vitamin-D₃



Mechanism of biosynthesis

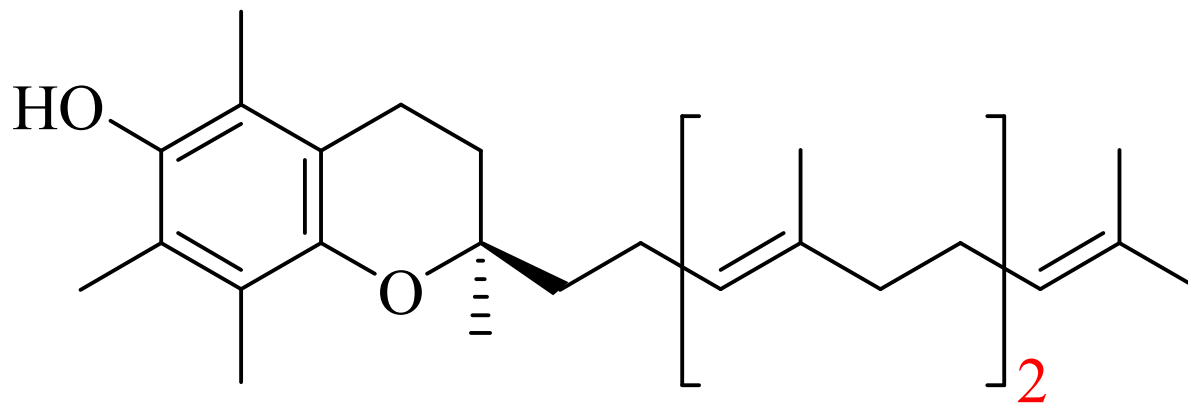


Vitamin-E



R = H, alpha-tocopherol

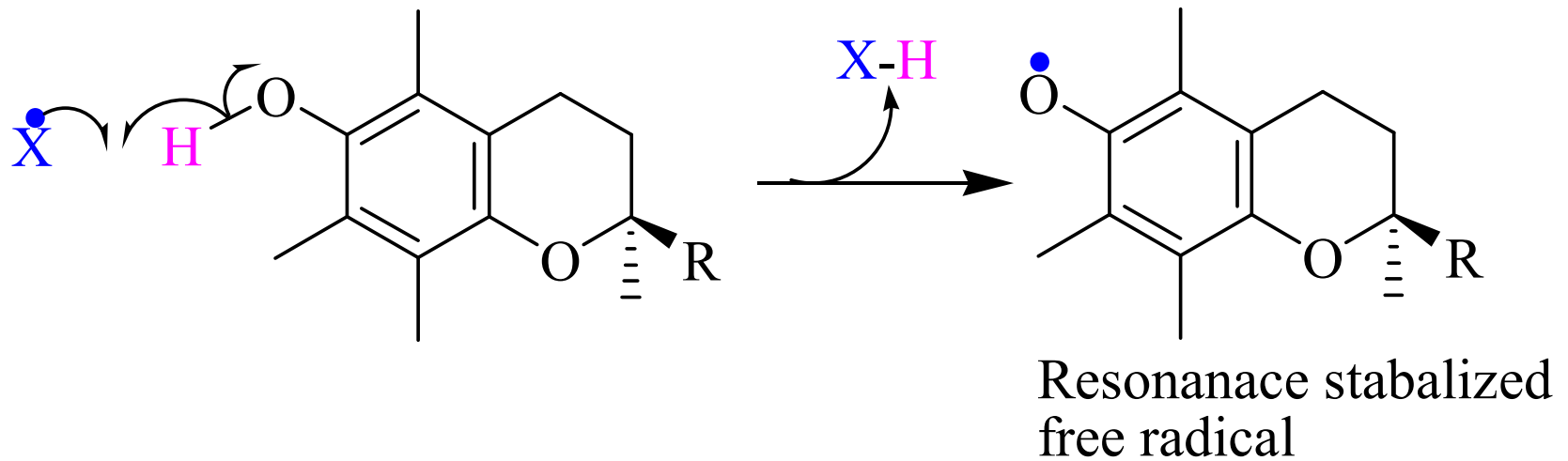
R = Ac, alpha-tocopheryl acetate



Trocotrienol

Role of Vitamin-E

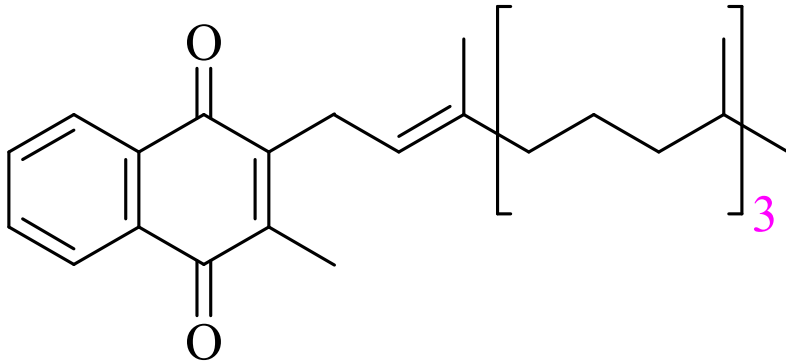
- Anti-oxidant (prevents cancer)
- Prevents cataracts
- Repairs DNA



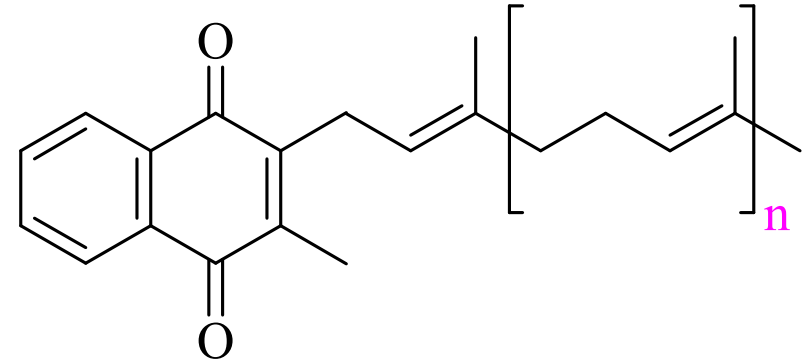
RDA of Vitamin-E

	Source	Amount	Vit-E (mg)	% RDA
1	Wheat germ oil	1 TS	20.3	135
2	Roasted almond	1 Oz	7.4	49
3	Sunflower oil	1 TS	6.0	40
4	Hazelnut/peanut oil	1 TS	6.0	40

Vitamin-K



Vitamin-K₁ (Phylloquinone)
Produced by animals

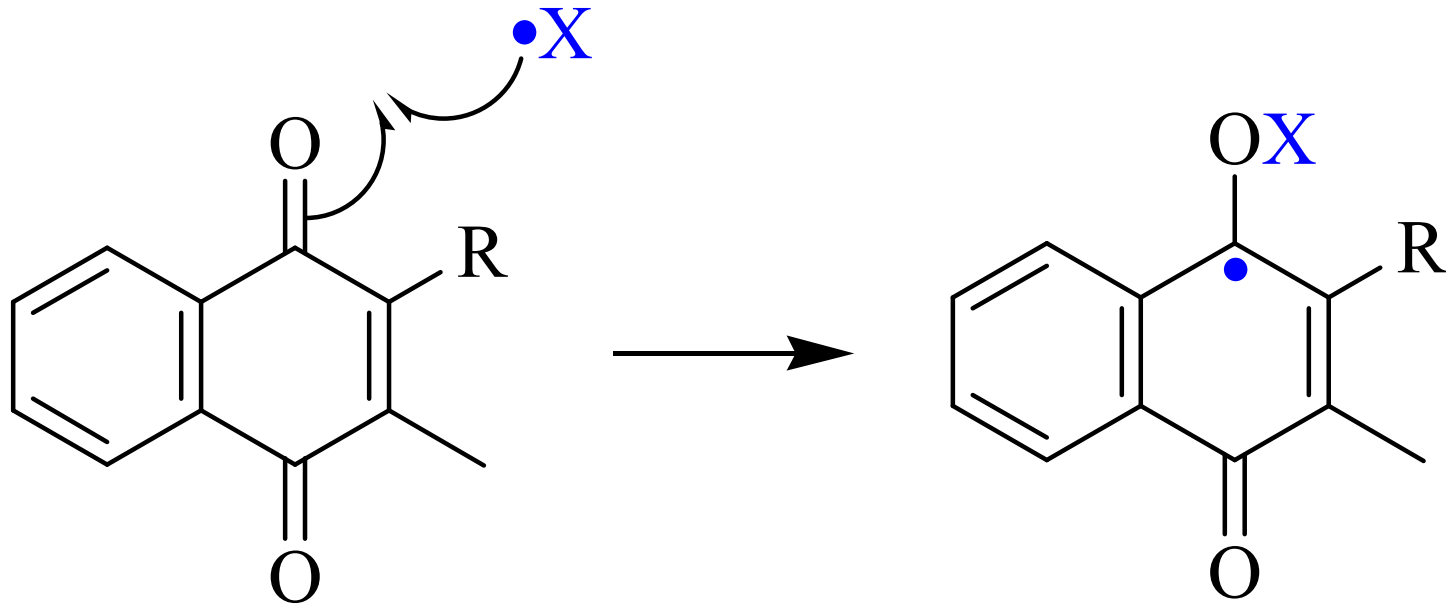


Vitamin-K₂ (Menaquinone)
Produced by bacteria in intestine

Vitamin-K = Koagulation (German word) = Coagulation, Precipitation

RDA = 120 microg / day

Mechanism of action



Vitamin-K₁ or K₂

Resonance stabilized
free radical