agMOOCs

Fat Soluble Vitamins 3

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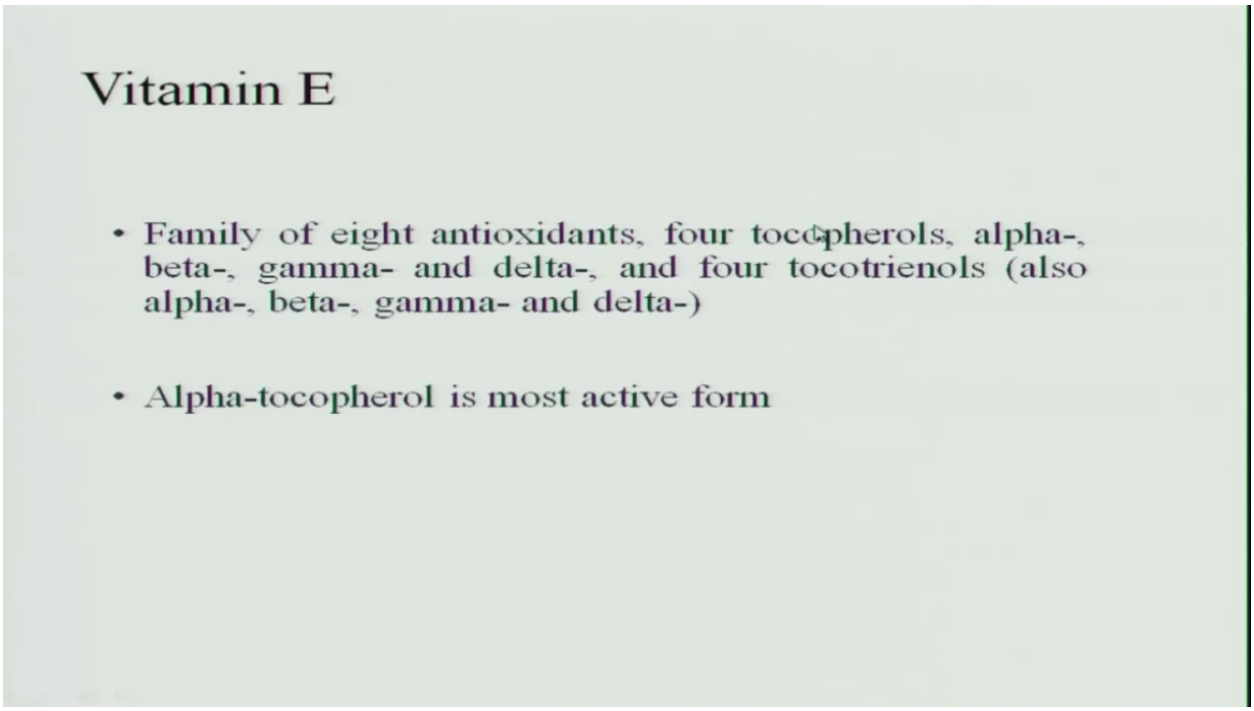
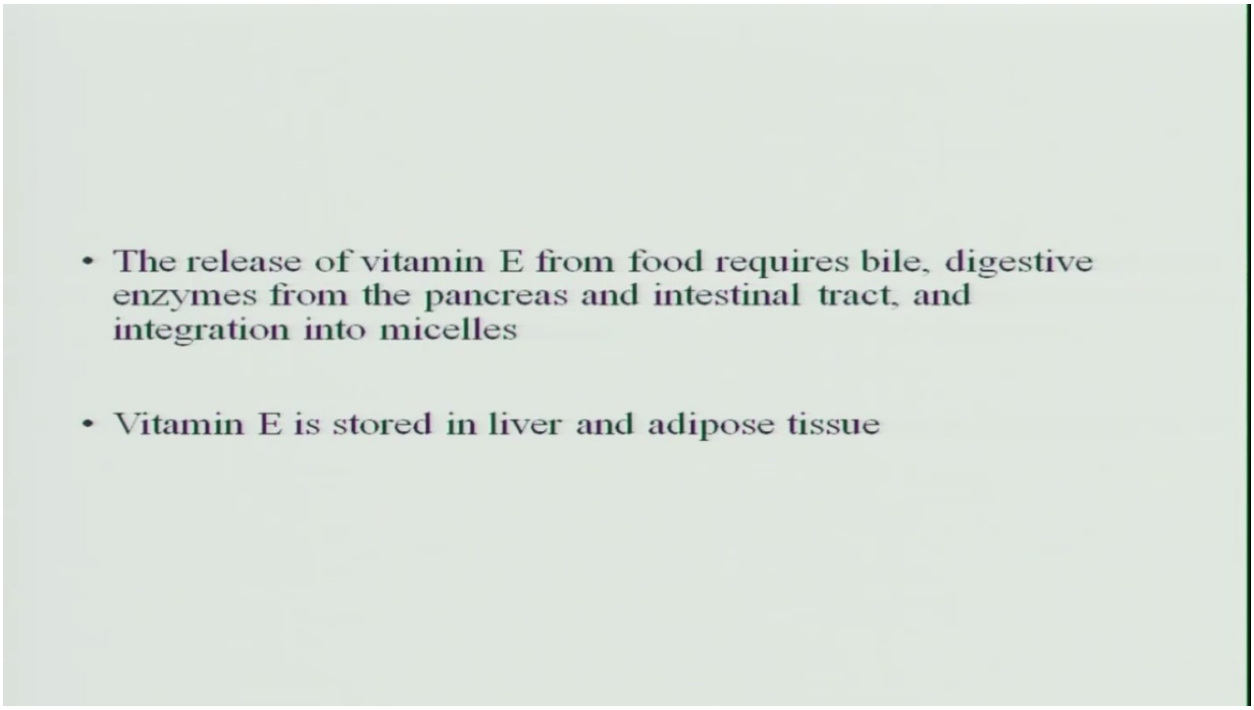
Welcome back. So we have started with the fat soluble vitamins and have seen the functions, sources, deficiency and excess intake of the vitamin A and vitamin D which is important for our body. The remaining vitamins that is vitamin E and K we will be dealing in this class.

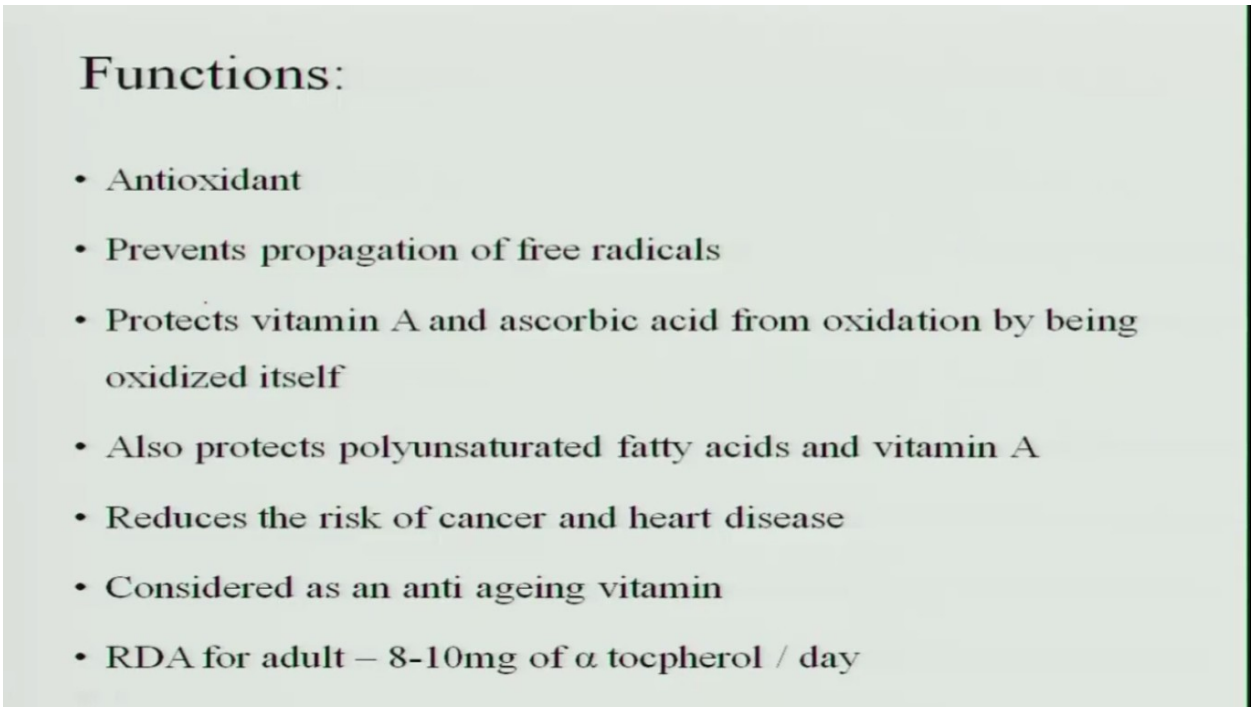


Vitamin E it is a family of eight antioxidants, four tocopherols that is Alpha, Beta, Gamma and Delta and four tocotrienols again Alpha, Beta, Gamma and Delta. The main active form among these is Alpha tocopherol.

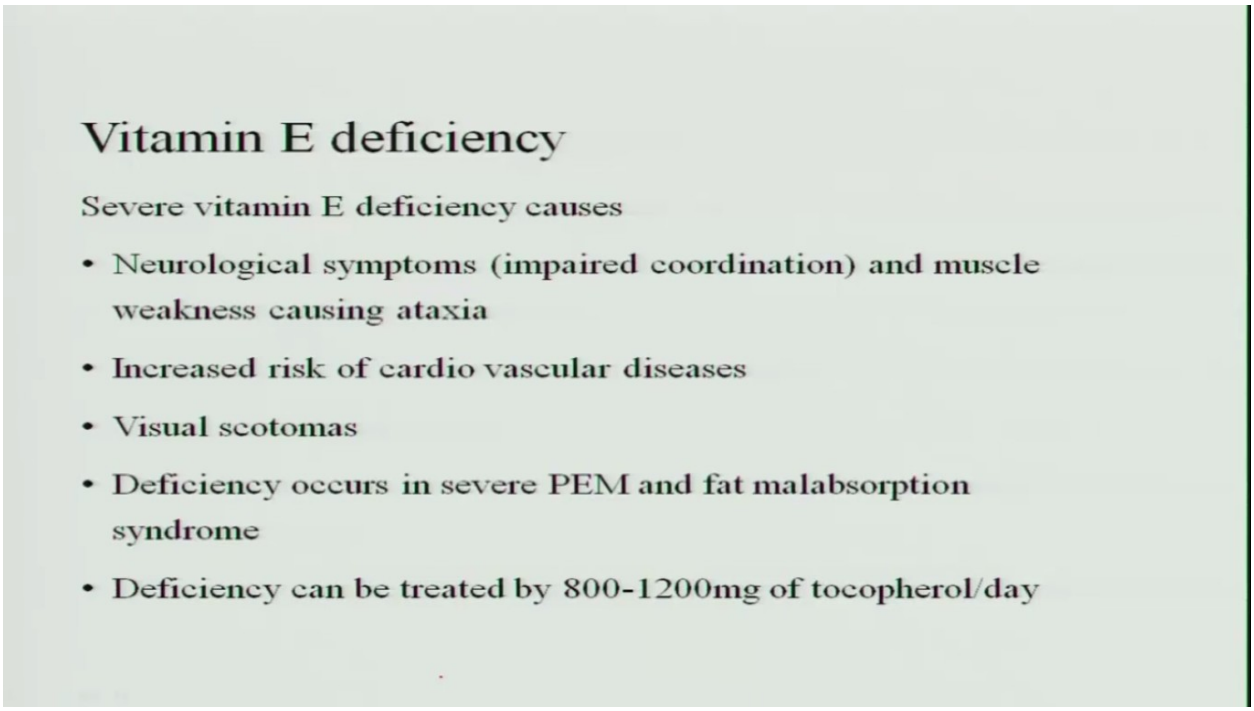


So release of vitamin E from the food requires bile and the digestive enzymes which are released from the pancreas and intestinal tract and integration into the micelles. The release of vitamin E from the food requires bile and digestive enzymes from the pancreas and intestinal tract and integration into the micelles. Fat is transported in the form of micelles therefore it is integrated into the micelles and Vitamin E is stored in the liver and adipose tissue.

Now the dietary sources of vitamin E are it is present in all the polyunsaturated plant oils and leafy vegetables. Then wheat germ; all the grains which have germ contain vitamin E and whole grains, liver, yolk, nuts especially almonds and seeds especially the sunflower seeds. These are rich sources of vitamin E.

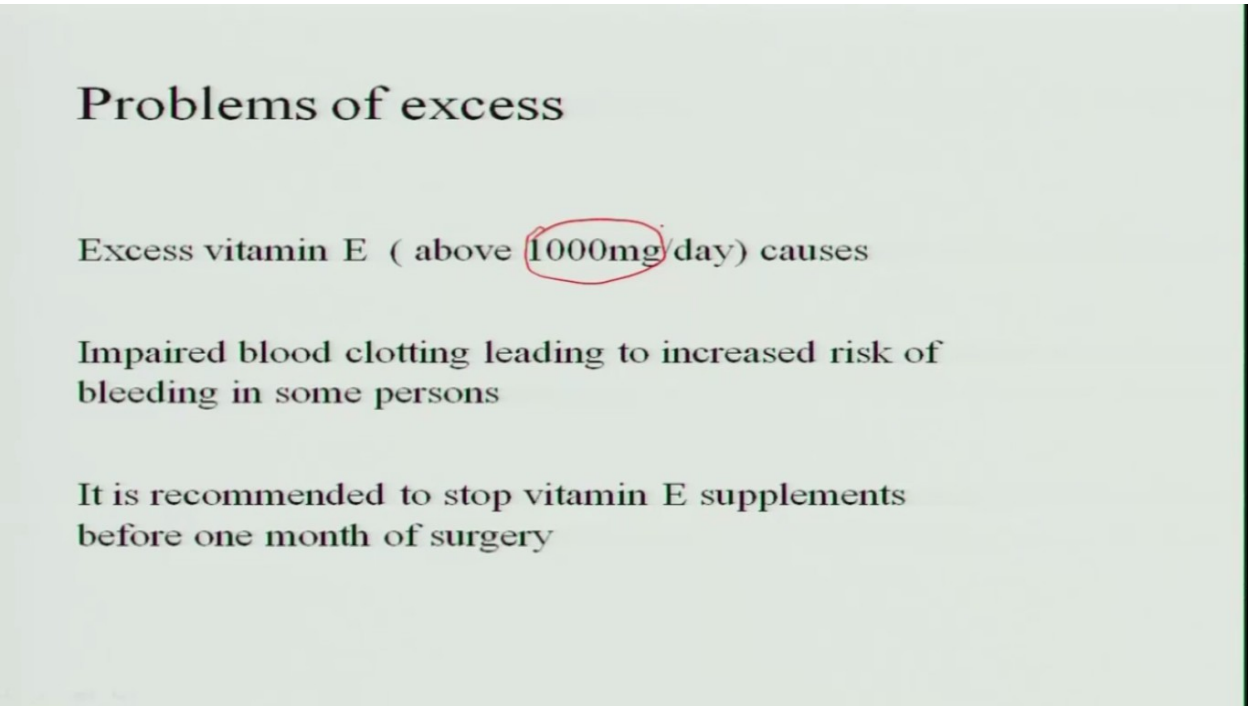


Now the functions of vitamin E the main function is it acts as an antioxidant. Then it prevents the propagation of free radicals because of the activity as antioxidant. Then protects vitamin A and ascorbic acid from the oxidation being by oxidizing itself. Then also protects the polyunsaturated fatty acids and vitamin A in the body. Reduces the risk of cancer and heart disease and it is mainly considered as an anti-aging vitamin and the requirement for this vitamin for an adult is 8 to 10 milligrams of alpha-tocopherol per day.

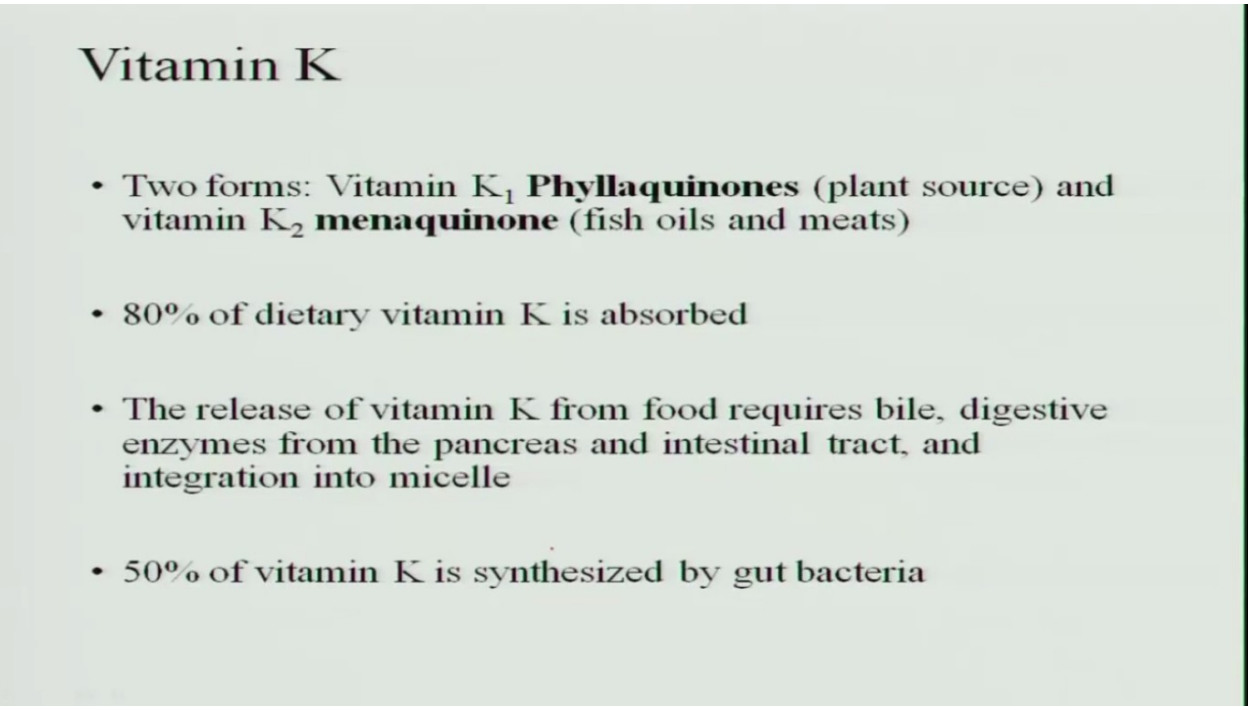


Now deficiency of vitamin E also causes some symptoms. So when there is severe vitamin E deficiency one or two days of deficiency will not cause any symptoms because vitamin E is stored in the liver. Therefore severe vitamin D deficiency will cause neurological symptoms like impaired coordination and muscle weakness causing ataxia. Then the increased risk of cardiovascular disease, visual scotomas and deficiency occurs in severe protein energy malnutrition and fat malabsorption syndrome because fat is imp required for the transport of vitamin E. then deficiency can be treated by giving them 800 to 1,200 milligrams of tocopherol per day.

This is how the eye the scotoma in the eye looks like in vitamin E deficiency. The skin becomes dry and wrinkled and that is why it is called as an anti-aging vitamin. The liver disease also is caused because of vitamin E deficiency because it is stored in the liver and it is used as an antioxidant and protects so many other nutrients against oxidizing.



Then problems of excess. Excess vitamin E that is above 1000 milligrams this when I say when you are deficient take 800 to 1,200 milligrams but under normal conditions if the vitamin E is taken about 1000 milligrams per day it causes impaired blood clotting leading to increased risk of bleeding in some persons and it is recommended to stop vitamin E supplements before one month of surgery because so that it does not lead to over bleeding.



The next fat-soluble vitamin is vitamin K and there are two forms of vitamin K; again the plant source of vitamin K is white K1 Phyllaquinones and the Menaquinone is found in fish oils and meats which is called as vitamin K2. So 80% of the vitamin K which is taken in is absorbed by the body and the release of vitamin K from the food requires again just like any other fat-soluble vitamin it requires bile, digestive enzymes from the pancreas and intestinal tract and also it is integrated into the micelles as it is a fat-soluble vitamin. 50% of the vitamin K is synthesized by the gut bacteria. We have many beneficial bacteria in the body. So vitamin K also is one of the nutrient that is synthesized by the gut bacteria.

Functions

- Essential for the formation of blood clotting proteins
- Plays a role inborn metabolism and formation

RDA :

FAO/WHO (2004) suggested 55µg/day for adults

The functions of vitamin K it is essential for formation of blood clotting proteins. Then it is also important in the inborn metabolism and formation. There are some inborn errors of metabolism in an infant. So it plays a role in the inborn metabolism. Then recommended dietary allowance is FAO/ WHO in 2004 has suggested that 55 micrograms of vitamin K is essential for an adult.

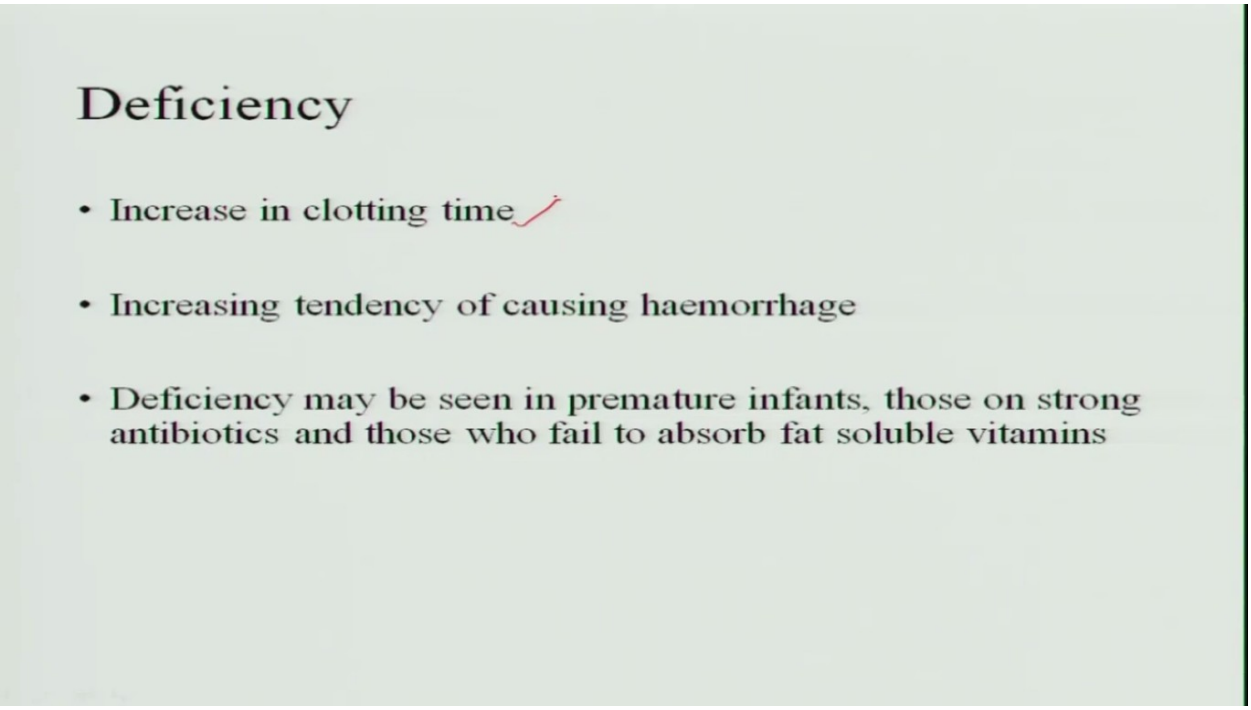
Vitamin K is used for

- Anticoagulant drug overdose
- Reduces excessive menstrual flow
- Essential for blood clotting / haemorrhage and bleeding
- Haemorrhagic disease in new born babies
- Inhibiting some cancer tumors
- Overcoming inability to absorb vitamins

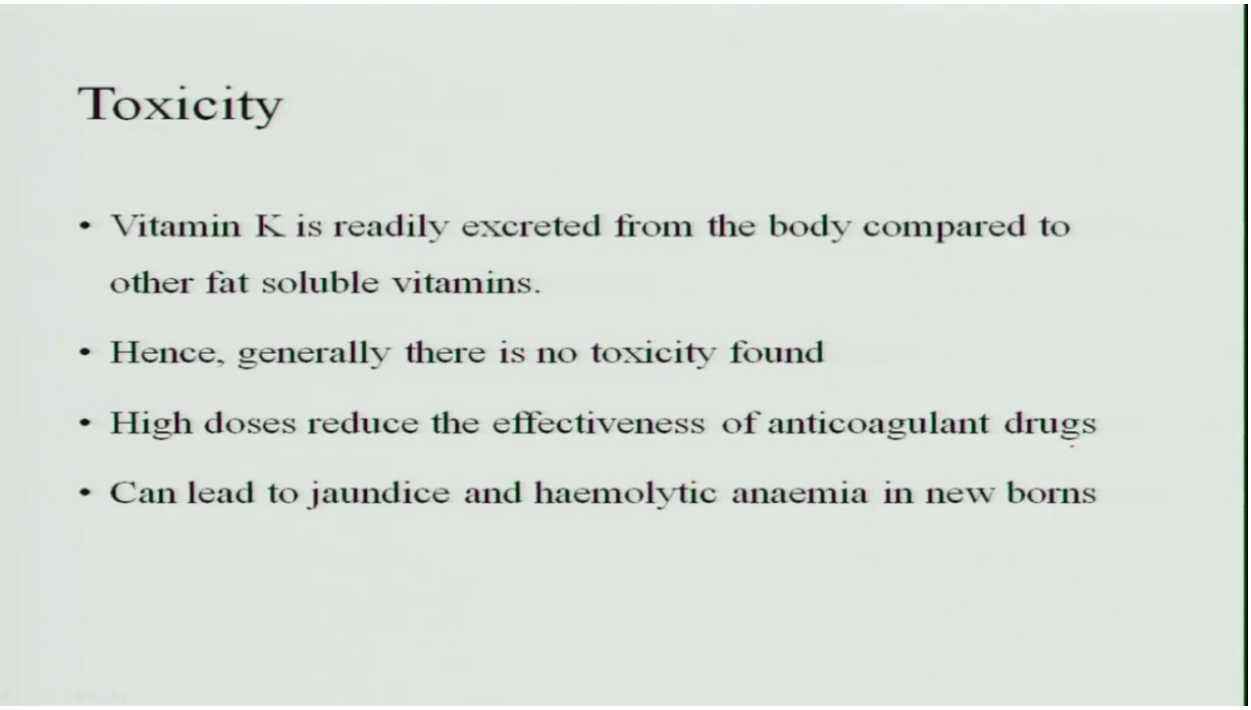
Now this vitamin K is used for anticoagulant drug overdose then, because it is important for blood clotting. So anticoagulant drug overdose requires vitamin E for controlling the coagulation. Then it reduces the excessive menstrual flow. Then essential for blood clotting and hemorrhage and bleeding. Then hemorrhagic diseases in newborn babies also is caused because of vitamin K deficiency and inhibiting some cancer tumors and overcoming the inability to absorb vitamins you can use vitamin K as in and in infants the bleeding during the delivery is inhibited by giving an injection of vitamin K to the pregnant woman so that there is no excessive loss of blood during the delivery of the baby.

Dietary sources are are liver, green leafy vegetables, and broccoli, peas, then green beans and milk. So these are all vitamin K is widely available in the vegetables.

So we can see that vitamin K benefits of blood clotting and it is also a clotting champion. Vitamin K is called as a clotting champion because it is very important for blood clotting. It converts the prothrombin into the thrombin which is required for blood clotting.



Now deficiency of vitamin K. It increases the clotting time. Then increases the tendency of causing hemorrhage and deficiency may be seen in premature infants those who are on strong antibiotics and those who fail to absorb fat soluble vitamins. So since it is a fat-soluble vitamin if there is no absorption of vitamin K then the clotting of blood is delayed. Therefore the bleeding time increases.



Similarly like the other fat soluble vitamins there is toxicity with vitamin K intake also. So vitamin K is readily excreted from the body compared to other fat soluble vitamins. So generally there is no toxicity found but high doses reduce the effectiveness of anticoagulant drugs. So suppose if a patient requires an anticoagulant drug and he has very high dose of vitamin K it interferes with the anticoagulation. And it can lead to jaundice and hemolytic anemia in new borns.

So you can see the bleeding occurs because of vitamin K deficiency and it cannot be stopped and a baby with hemorrhage disease can bleed from different places and it may be fatal.

Therefore vitamin K and vitamin E both are very important fat soluble vitamins which are called as the anti-aging vitamin and the anti-clotting vitamin so these two are very important and we have seen what are the food sources, what happens when it is excess and what happens when the vitamins are deficient in our food.

Thank you.