Frequently asked questions:

1. Explain the role of Lipids as energy store

Ans: Lipids are the concentrated fuel reserve of the body. Fat is the primary form in which energy is stored in the body. Essential Fatty acids are found in skin phospholipids and within adipocytes in adipose tissue serving as energy stores. Fat is stored to the extent of 90% largely in the form of globules of Triglycerides.

2. How essential fatty acids are useful in growth and development?

Ans: The essential fatty acids play a role in fetal growth and early human development. There are significant associations between dietary intakes of arachidonic acid (AA) and docosahexaenoic acid (DHA) with birth weight, head circumference and placental weight. The fetus depends completely on the maternal source of linoleic acid (LA), alpha-linolenic acid (ALA), AA and DHA. Infant obtains these poly unsaturated fatty acids through breast milk.

3. What is the role of dietary fatty acids in preventing coronary heart disease?

Ans: Dietary fatty acids modify the concentrations of plasma triglycerides and lipoprotein cholesterol fractions. This modification affects coronary heart disease (CHD) risk significantly. High intake of specific fatty acids- linoleic acid, alpha-linolenic acid, EPA and docosahexaenoic acid lowers the risk of CHD and CHD events. The Long Chain (LC) n-3 PUFA provided from fish and other seafood's lower serum triglucerides. Further, poly unsaturated fatty acids influence peripheral glucose utilization, insulin action, decrease adiposity. Therefore, they are called as anti atherogenic. The lipid lowering and other physiological effects of individual members of the ply unsaturated fatty acids vary widely. As compared to linoleic acid, alpha-linolenic acid is more beneficial. It helps in prevention of inflammation and accumulation of fatty material in blood vessels (atherosclerosis) and clotting of blood (thrombosis). The long chain n-3 PUFA of fish oils have greater antiatherogenic, antithrombotic and anti-inflammatory effects than alpha-linolenic acid of plant foods.

4. What are the non-glyceride components of fats and their effect on nutrition and health?

Ans: The non-glyceride components of fats from animal foods contain cholesterol and fat soluble vitamins (A, E, D). The components from Plant foods and vegetable oils contain, in

addition to fat soluble vitamins (E, D, K and carotenoids), plant sterols and a wide range of other chemical compounds. Plant sterols and some of the unique non-glyceride components (oryzanols and sesame lignans) lower serum LDL cholesterol. Vitamin E, carotenoids, sesame lignans and oryzanols have antioxidant effects. Non-glyceride components in combination with antioxidant have beneficial role in reducing excess cholesterol in body. Natural antioxidants present in these plant sterols and vegetable oils have positive benefits to reduce dyslipidemia and other disorders.

5. How different types fats can be chosen for maintaining good health?

Ans: An ideal quality fat for good health is the one, which maintains a balance. It gives a ratio of PUFA/SFA of 0.8-1.0, and LA/ALA of 5-10 in the total diet. The appropriate balance of these fatty acids is necessary to maintain with cereal-based diets. Hence, the choice of cooking fat should be as follows:

- Use of more than one source of fat/oil has advantage of providing a variety of minor components in the diet.
- Regular consumption of oils and foods rich in ALA (Eg: Rapeseed, Mustard, Soyabean).
- Eating fish provides long chain n-3 PUFA.
- Part of visible fat and/or invisible fat from animal foods may be substituted by whole nuts and legumes. These foods have good proportion of ALA
- The plant oils in addition contain certain useful substances such as lignans (sesame oil), sterols, tocopherols (vitamin E) oryzanole (rice bran oil), and carotenoids. All of these reduce cholesterol and reduce oxidant damage due to ageing, inflammation which occur in chronic diseases.
- Vanaspati: High intake of SFAs and TFAs may increase the risk of heart disease. Therefore, it is essential to limit the intake of vanaspati. The intake of TFAs should not exceed 1% of energy intake.
- Avoid foods prepared in partially hydrogenated vegetable oils (PHVO-processed, premix, ready to eat and fast foods). Consume low fat milk and dairy foods. Moderate consumption of beef, mutton.
- Consume whole nuts but total energy and fat calories should be within the recommended limits

6. Discuss the role of lipids as bactericidal activity.

Ans: The essential fatty acids are involved in the bactericidal activity against common pathogens like staphylococci, streptococci and pneumococci. They are known to be very much involved in the membrane composition of immuno competent cells such as T cells and B cells. The homologous of these fatty acids are known to have bactericidal effect. They have the ability to disrupt cell wall membranes by their detergent effect.

7. How lipids are important in modulating membrane structure?

Ans: Lipids are integral components of cell membranes. They play significant role in membrane fluidity and lipid protein interactions. Lipid protein interactions alter activity of membrane-related transport systems, ion channels, membrane bound enzymes and cellular receptors for hormones and neurotransmitters.

8. How are Lipids are important in maintain healthy skin?

Ans: The major fatty acid of the epidermis is arachidonic acid. It constitutes about nine percent apart from linoleic and other homologous. LA serves in the epidermis regulating barrier function. It maintains the integrity of the skin and fragility of mitochondrial membranes. All the skin functions and maintenance of membrane stability are done mostly by n-6 fatty acids.

9. Justify the importance Essentiality of linoleic acid in Infants.

Ans: Essentiality of linoleic acid was reported by Hansen and colleagues in 1963. Infants were fed on milk formulas that had lower than recommended levels of linoleic acid for 3months. The amounts of linoleic acid varied from 0.1%-7.3% of total calorie needs. Infants who were fed with lowest amount of linoleic acid developed dry, thick, flaking skin and suffered from retarded growth. The clinical symptoms disappeared when large amount of LA was provided.

10. What is Phrynoderma? How lipids are useful in treating this disease?

Ans: Essential fatty acids are required for the maintenance of normal human skin. Non-availability of essential fatty acids to skin causes a disease called as **Phrynoderma** or toad skin.

This disease is characterised by horny popular eruptions on the limbs, back and buttocks. Phrynoderma can be cured by essential fatty acids along with vitamin A and B complex group.

11. Why is atherosclerosis?

Ans: High blood low-density lipoprotein will deposit cholesterol in the inner walls of the arteries that feed the heart and brain. It can form plaque (thick, hard deposit) that can narrow the arteries and make them less flexible. This condition is known as atherosclerosis.

12. Discuss about Lipid Hypothesis.

Ans: Atherosclerotic plaques can rupture and stimulate clot formation in blood vessels to completely block blood flow. In the heart, this causes heart attacks (also called myocardial infarctions, or MIs). In the brain, this causes strokes (also called cerebral vascular accidents, or CVAs). The existence of such a link has come to be known as the lipid hypothesis.

13. Explain the role of cholesterol in atherogenic fatty plaque.

Ans: Cholesterol is a major component of atherogenic fatty plaque. The levels of cholesterol in body is dependent on LDL and HDL concentrations. High blood levels of LDL cholesterol result in accumulation of lipids in the cells. HDL scavenges excess cholesterol from the tissues to the liver for degradation. Maintaining low serum levels of LDL and high levels of HDL supports wellness, the concept of "good" and "bad" cholesterol. The "good" form is the cholesterol associated with HDL. The "bad" form is the cholesterol transported as LDL. Cholesterol and especially cholesteryl ester are major components of fatty plaque.

14. What are the sources of trans fatty acids and its effect on human health.

Ans: Major sources of TFAs in the diet are chemically hydrogenated margarine, shortening, commercial frying fats, high-fat baked goods, and salty snacks containing these fats. It is observed that TFAs have a negative effect on human health. Higher intakes of TFAs are associated with increased risk for CHD, cancer and other chronic diseases (including type 2 diabetes and allergies). It is recommended that dietary consumption of hydrogenated and SFAs should be reduced.

15. What are the adverse effects of essential fatty acid deficiency?

Ans: Deficiency of EFA can increase the risk for CHD. EFA deficiency adversely affects:

- Reproduction and lactation
- > Integrity of the cell membranes and cells
- Regular functioning of certain enzyme systems
- > Transportation of cholesterol
- ➢ Water balance
- ➢ Growth and development
- > Production of energy by oxidation of fatty acids