

Fat or Lipid Metabolism Based on the Qur'an and Hadith

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Abstract: The purpose of this article is to determine fat or lipid metabolism based on the Al-Qur'an and hadith. To examine these objectives the authors use library research methods or library techniques. Based on the research results it can be concluded that lipid metabolism consists of catabolic and anabolic processes. Lipid metabolism includes triglyceride metabolism, cholesterol metabolism and lipoprotein metabolism. Differences in lipid metabolism are a risk factor for atherosclerosis, which is the root cause of coronary heart disease and stroke. Knowledge of lipid biochemistry and lipid metabolism is valuable in understanding the role of unsaturated fatty acids in diet and health. Islam requires its adherents to seek knowledge and develop knowledge. The knowledge possessed by a person continues to grow along with the times and the disclosure of natural secrets.

Keywords: Alqur'an and Hadist, Lipid, Metabolism

A. Introduction

Lipid metabolism is the synthesis as well as the breakdown of lipids present in cells, which involves the breakdown or storage of fat for energy. Fat is obtained from digesting food and absorbed or synthesized through the liver of animals. Lipogenesis is a stage or process of synthesizing this fat. Most of the lipids found in a person's body from food are triglycerides and cholesterol. Other types of lipids found in the body are fatty acids and membrane lipids (Supriyanti and Poedjadi 2007). Lipid metabolism is often thought of as the process of digestion and absorption of dietary fats; However, there are two ways an organism can use fat for energy: consumed fat and stored fat. Vertebrates and humans use both methods of using fat as a source of energy for organs such as the heart to keep things going. Because lipids are hydrophobic molecules, they need to be dissolved before metabolism can begin. Lipid metabolism often starts with hydrolysis, which occurs with the help of various enzymes in the digestive system. Lipid metabolism occurs also in plants, although the process is different compared to animals. The second step after hydrolysis is the uptake of fatty acids into the intestinal wall epithelial cells. In epithelial cells, fatty acids are packaged and transported throughout the body (Wikipedia).

The relationship between chemistry and Al-Quran Science is very relevant. This can be seen, for example, from the stage of digestion of food in the body which cannot be separated from these two sciences. Lipids in food mostly consist of fat, therefore what is most discussed in this paper is lipid metabolism. Metabolism has a very valuable role when converting food substances such as glucose, amino acids, and fatty acids into compounds needed for life stages such as energy sources (ATP). Metabolic processes that occur in all body tissues where occur in the same conditions or reaction conditions require physico-chemical and chemical conditions that do not differ much from one another (Suarsana 2012). Fat is considered by many to be a dietary component that must be consumed as much as possible. However, this is not beneficial for health because a certain amount of fat, usually around 30% of total energy, is needed to carry out its role in the body properly. As found in the Al-Quran Al-An'am verse 145:

قُلْ لَا أَجِدُ فِي مَا أُوحِيَ إِلَيَّ مُحَرَّمًا عَلَى طَاعِمٍ يَطْعَمُهُ إِلَّا أَنْ يَكُونَ مَيْتَةً أَوْ دَمًا مَسْفُوحًا أَوْ لَحْمَ خِنزِيرٍ فَإِنَّهُ رِجْسٌ أَوْ فِسْقًا أُهِلَّ لِغَيْرِ اللَّهِ بِهِ فَمَنْ اضْطُرَّ غَيْرَ بَاغٍ وَلَا عَادٍ فَإِنَّ رَبَّكَ غَفُورٌ رَحِيمٌ ١٤٥

Meaning: 145. Say: "In the form of what I received in the revelation that was revealed to me, something that is unlawful for people who want to eat it, unless the food is carrion, or flowing blood or pork - because in fact all that is dirty - or animals that slaughtered in the name of other than Allah. Whoever is in a state of compulsion, while he does not want it and does not (also) exceed the limit, then verily your Lord is Forgiving, Most Merciful " (Departemen Agama 1989).

Saturated fats are found in animal products (meat and milk) while unsaturated fats are found in grains, nuts and vegetable oils. Sources of cholesterol are egg yolks, offal, and dairy products. Allah SWT also says in QS. Al Mu'minun (23): 20

وَشَجَرَةً تَخْرُجُ مِنْ طُورِ سَيْنَاءَ تَنْبُتُ بِالذَّهْنِ وَصَبِغٍ لِلْأَكْلِيِّينَ ٢٠

Meaning: 20. and a tree of wood comes out of Thursina (olive tree), which produces oil, and eats food for those who eat it. (Departemen Agama 1989)

Lipids are a heterogeneous group of compounds related to fatty acids. Lipids that exist in the body can be stored as a producer of energy. Lipids have the most basic composition which can be composed of hydro-carbon and oxygen with non-special properties, namely not being soluble in water, but soluble in organic solvents such as benzene, ether, chloroform. In Fats, the amount of oxygen is only a few or not many, lipids include fats, oils, steroids, waxes and related compounds (Almatsier 2002).

Lipids serve as a source of energy; heat insulator in the spare subcutaneous tissue energy (triglycerides); adrenal precursor hormones and gonadal steroids and bile acids cholesterol. Lipid is an important food element not only because high energy value but also because of the fat-soluble vitamins essentials contained in natural food fats. In the body, fat functions as an efficient source of energy directly and potentially, when stored in adipose tissue. The fat content in nerve tissue is high. Combination of fat and Protein (lipoprotein) is an important cell element, present in both cell

membranes and mitochondria in the cytoplasm which function as a means of transporting lipids in the blood.

Lipids are valuable parts of the diet not only because of their high energy value but also because of the essential fat-soluble vitamins contained in natural dietary fats. In the body, fat has a role as an efficient energy source openly and potentially, when stored in adipose tissue. Lipids have a role as heat insulators in the subcutaneous tissue and around certain organs and act as electrical insulators allowing the rapid propagation of waves of depolarization along myelinated nerves. The fat content in nerve tissue is high. The combination of fat and protein (lipoprotein) is a valuable cell element, found in both cell membranes and mitochondria in the cytoplasm which have a role as a means of transporting lipids in the blood.

B. Methods

The writing method or technique used is a literary method or technique. The method of literature or literature review or literature study is an activity that is required in research or research, especially research or academic research which has the main objective of developing theoretical aspects as well as aspects of practical benefits (Sukardi 2003). The author obtains data information through various references from books, journals, articles, internet websites, as well as the Al-Quran and its translations.

C. Results and Discussions

Definition of Lipid Metabolism

One of the chemical processes that occur in the body is the metabolic process. In relation to the Greek word metabolism means change. In the process of metabolism requires quite a lot of energy because in the process of metabolism will make various kinds of chemical reactions (Supriyanti and Poedjiadi 2007). Metabolism is the many chemical reactions that occur in organisms, including those that occur at the cellular level. In general, metabolism has two directions of organic chemical reaction trajectories, namely: 1) Catabolism is a reaction that breaks down molecules of organic compounds to obtain energy; 2) Anabolism is a reaction that has organic compounds from certain molecules, to be absorbed by body cells.

Lipid metabolism means the process of forming or breaking down anlipids which has events in organisms, including occurring at the cellular level involving the role of enzymes. Proteins, carbohydrates and fats are examples of energy sources used in metabolic processes. There are even some animals that use fat as a reserve when their main energy core has run out. which energy can be used at any time. Lipid or fat metabolism is a process in which fatty acids that enter the body are digested and then broken down as energy and later stored in a person's body for energy use in the future.

Lipid metabolism is a process of digestion, absorption, transport, use and excretion of lipids in living organisms. The lipids we get as the main energy source is from neutral lipids, namely triglycerides (esters between glycerol with 3 fatty acids). In summary, the products of lipid digestion are fatty acids and glycerol, besides that there are also those that are still in the form of monoglycerides. Because it dissolves in water, glycerol enters the portal circulation (portal vein) to the liver.

Because it has a longer carbon chain, fat is used as the best source of cellular energy for metabolic processes, so that the energy stored is much greater. Before being used by cells to hydrolyze, fat is still in the form of fatty acids and glycerol, then glycerol is converted into 3-phosphoglyceraldehyde and enters the glycolysis pathway. Fatty acids are broken down into two carbon chains that enter the Krebs cycle as acetyl CoA. Through these pathways, one gram of fat provides more ATP than protein and carbohydrates. One gram of fat can produce 9 kcal of energy. Lipids are a group of organic compounds which tend to be insoluble in water and other polar solvents, but are soluble in organic solvents such as toluene or ether. Lipids consist primarily of the elements carbon, hydrogen and oxygen, but may also contain other elements. In general, lipids are poor conductors of heat, so that lipids in living bodies have a role in preventing body heat loss. Not only that, fat also has a role in protecting certain organs from damage caused by impact or shock. The most important role of lipid metabolism is as a source of energy and as a compound that dissolves vitamins A, D, E and K.

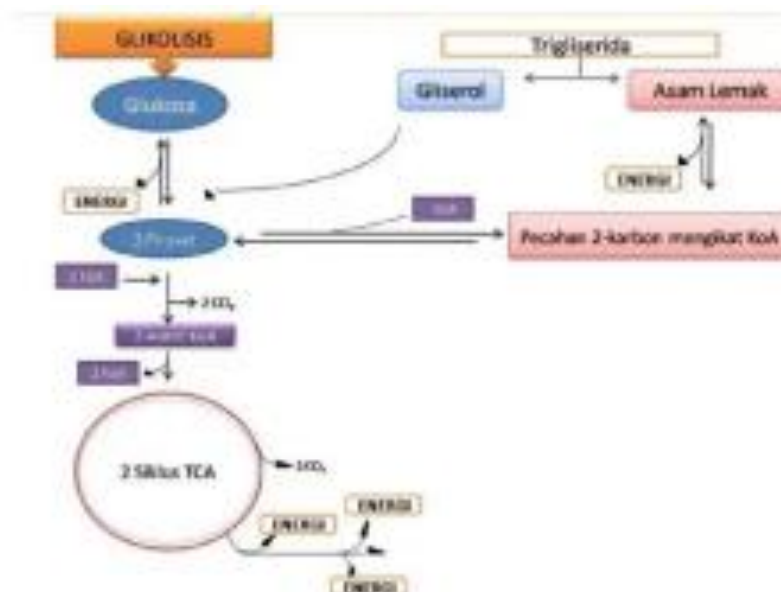


Figure 1. Lipid Metabolism Process

Lipids are organic compounds that are insoluble in water, which can be extracted from cells and tissues with non-polar solvents. The most abundant type of lipid is fat or

triacylglycerol (triglyceride), which is the main fuel reserve (chemical energy storage) for almost all organisms. At room temperature, fats exist as solid and liquid. Solid fats come from saturated fatty acids while liquid fats (oils) come from unsaturated fatty acids. Most saturated fats are produced by mammals, while unsaturated fats are produced by plants, poultry and marine animals. The presence of double bonds between carbon atoms (C=C) causes unsaturated fats (oils) to oxidize faster than saturated fats, and this oxidation process produces an odor (Siregar and Makmur 2020).

The use of fat by the body for energy is as valuable as the use of carbohydrates. Triglycerides are the form of fat stored for energy and are the most abundant form in food and tissue (Linder 1992). A number of carbohydrates eaten are converted into triglycerides which are then stored and used as triglycerides for energy. So more than half of the total energy used by cells is supplied by fatty acids which come from triglycerides or not openly from carbohydrates (Wijayanti 2017).

Lipid metabolism in the body is an estimate of liver privilege has the ability to completely oxidize fatty acids. Adipose tissue has active metabolic properties to modify the role of the liver which central and unit in lipid metabolism is an important concept. Function Main Role of the Liver In Lipid Metabolism: The liver carries out the following main functions on lipid metabolism: 1) The liver facilitates the digestion and absorption of lipids through the production of cholesterol-containing bile and bile salts synthesized in the liver denovo or uptake of cholesterol and lipids; 2) The liver has active enzyme systems for the synthesis and oxidation of fatty acids and for the synthesis of triacylglycerols and phospholipids; 3) Liver converts fatty acids into ketone bodies (ketogenesis); 4) The liver plays an integral role in the synthesis and metabolism of plasma lipoproteins.

The Process of Metabolism in the Al-Qur'an/Hadith

Living bodies are composed of non-living molecules. If the components of living things are isolated and examined one by one, their molecules are the same as those found in inanimate objects. However, living organisms have special properties that are not shown by a collection of inanimate objects (Azhar 2017).

The theory suggests that the occurrence of a living process is due to the chemical interaction of the elements as follows; carbon (C), oxygen (O), nitrogen (N), hydrogen (H), sulfur/sulphur (S) and a few of the other supporting elements. The elements mentioned above interact in such a way as to form inorganic compounds and biomolecular compounds more complex ones such as proteins, nucleic acids, vitamins, carbohydrates and lipids with their metabolic processes to form unique and complicated combinations that have their own reproductive capacity so that they become life.

Even though the material that makes up a person's body is quite cheap in terms of price, it is so balanced and perfect, as Allah says in the Qur'an Surah Al-Infithaar: 6-8;

يَأْتِيهَا الْإِنْسَانُ مَا غَرَّكَ بِرَبِّكَ الْكَرِيمِ ٦ الَّذِي خَلَقَكَ فَسَوَّلَكَ فَعَدَلَكَ ٧ فِي أَيِّ صُورَةٍ مَا شَاءَ رَكَّبَكَ ٨

Meaning: "O people, what has deceived you (to act disobediently) against your Lord, the Most Gracious. Who has created you then perfected your events and made your (body structure) balanced, in whatever form He wants, He arranged your body".

Processes and chemical reactions in the body can occur at temperatures that are not high properly and perfectly. The chemical reactions in the body include several processes, namely; the formation, breakdown and exchange of substances accompanied by changes in energy and use them for the activities of living organisms, is called metabolism. Once balanced and perfect one's body as mentioned in Q.S. At-Tiin: 4.

In the bodies of living organisms open chemical processes to open life which is different from chemical processes in general, chemical reactions in the bodies of organisms are unique and can open to conditions that are impossible for chemical reactions outside the body. This disorder is caused by a metabolism that is supported by quite complex compounds such as biomolecules and enzymes, which work together with various inorganic substances in the body. This shows the power of the Supreme Creator that needs to be studied.

Lipid metabolism has many biological functions, namely storing energy and It functions as a component of cellular membranes and lipoproteins. It's just, mostly Lipid or fat form is a complex molecule that must undergo a process metabolism before use. Lipid metabolism allows the body's organs to use energy or store energy in adipose or body fat. Organs the body, such as the heart, spleen, brain, and others, uses these energies in order keep working fine.

D. Conclusion

Lipids are a heterogeneous group of compounds that are related to fatty acids. Lipids consist of carbon, hydrogen and a small amount of oxygen and are insoluble in water and soluble in nonpolar solvents such as ether, chloroform and benzene. Lipids are classified as simple lipids (fats, waxes). Mixed lipids (phospholipids, glycolipids, other mixed lipids) and lipid derivatives (fatty acids, glycerol, steroids). Lipids are valuable dietary elements and are required not only for their high energy value but also for their fat-soluble vitamins. Meanwhile, fat in the body has a role as an energy source and heat insulator in the subcutaneous tissue and an electrical insulator that allows the rapid propagation of depolarization waves along myelinated nerves. Lipid metabolism consists of catabolic and anabolic processes. Lipid metabolism includes triglyceride metabolism, cholesterol metabolism and lipoprotein metabolism. Abnormalities in lipid metabolism are risk factors for atherosclerosis, which is the origin of coronary heart disease and stroke. Knowledge of lipid biochemistry and lipid

metabolism is valuable in understanding the role of unsaturated fatty acids in diet and health. Islam requires its adherents to seek knowledge and develop knowledge. Knowledge possessed by a person continues to grow along with the times and the disclosure of natural secrets. The Al-Qur'an applies to all ages, even many things that cannot be understood by someone today, as well as many things that have begun to be understood over time, as the word of Allah in Q.S. Shaad: 87-88. Then everyone is valuable to know the basics of natural science, because starting from oxygen gas for breathing, food and medicines needed, the environment and natural disasters, to electrical energy, everything is related to natural science. Without the power of knowledge how could someone understand the universe to see the greatness of Allah swt. Therefore, increasing one's resources in Islamic society is a must.

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