

## Chapter 1 : BSCI Lecture Notes - Origin of Agriculture

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This is a sub category of lipids known as steroids. Cholesterol is a vital component of cells as a part of cell membranes, as well as being used to synthesized several of the human sex and other hormones. It is synthesized in the liver from saturated fatty acids, or absorbed in the intestine from eggs, butter, cheese and meat. Plant sources do not contribute dietary cholesterol directly, and in fact contain unsaturated fats, which are known to lower blood cholesterol levels. Because cholesterol is insoluble in the blood, it is transported by molecules called lipoproteins. LDL forms of cholesterol can be taken up by cells lining the arteries resulting in excess cholesterol blockages of the arteries, and a restriction of blood flow. This can lead to a heart attack if the coronary arteries are involved. What levels of cholesterol should you maintain? Indications of low risk: These are the most commonly agreed upon observation for cholesterol levels that best accommodate the maintenance of a healthy heart. Indications of medium-high risk: Any of these traits indicates medium risk of heart disease. Indications of high risk: Any of these traits indicates high risk of heart disease. If your cholesterol levels indicate medium or high risk, you should consult your physician. Most people can control their cholesterol levels through a healthy low-fat diet and regular exercise. Some people will require medicines to control their cholesterol levels. Carbohydrates are grouped together as sugars and starches, but also are classified as to how many sugar units are present in the molecule see Lecture 4. Glucose- The basic building block of all carbohydrates, and the most abundant of all the sugars. A single glucose molecule is called a monosaccharide. It is the form of sugar that is transported in the blood to all the cells in the body. Cellular respiration converts glucose into energy necessary for life. Fructose and galactose are also common monosaccharides with basically the same composition. Disaccharides- when two monosaccharides are joined together, they make up a disaccharide. One glucose unit and one fructose unit together make up the disaccharide called sucrose. This is the form of sugar found on the dinner table. These disaccharides are broken down into monosaccharides in order to be used by the body. Polysaccharides- These are also known as complex sugars, contain hundreds or thousands of individual sugar units, usually glucose. There are three forms of polysaccharides important for human nutrition. The arrangement, number and way the glucose units are joined together is what distinguishes one from the other. Starch- This is the storage form of glucose found in plants. It is found in the seeds, fruits, tubers potato and roots. The majority of starch in the human diet comes from wheat, rice and corn as grain crops, potato, sweet potato, and cassava the underground crops, and beans and peas, the legumes. Our body breaks down starch to glucose by enzymes in the saliva, and small intestine. Glycogen- This is the storage form of glucose in the human body found mainly in the liver and skeletal muscles. Excess glucose in the blood from food is converted into glycogen and stored. During exercise this glycogen is converted back into glucose to be used for energy. This is why athletes practice "Carbo loading" before an athletic event. They eat excess amounts of starch foods to build up muscle glycogen. Fiber- This is derived from plant sources and is mainly comprised of cellulose, lignin, hemicellulose and pectin. It is not digestible, but provides bulk. Cellulose is again formed from glucose, but humans do not have the proper enzymes to digest it. Foods with fiber include grains, legumes, fruits, and vegetables. Dietary fiber comes in two types: Proteins This is a group of large molecules that perform many functions in the body. One type of protein is insulin , a hormone produced by the pancreas to regulate the metabolism of glucose and other carbohydrates. They are constructed from smaller building blocks called amino acids see Lecture 4. Usually there are 20 naturally occurring amino acids that are used in protein synthesis. In order to successfully synthesize proteins the human body requires the presence of all 20 of the amino acids. However, the human body can only synthesize 11 of the Nine others absolutely must be obtained from the diet. These are called the essential amino acids. These amino acids cannot be stored by the body, so must be continually taken in via the diet. Lack of any of these can result in serious protein deficiency diseases. Complete Proteins- These proteins contain all the essential amino acids. Proteins obtained in the diet from animal sources are complete. Those

obtained from plant sources are incomplete, deficient in one or more essential amino acids. In order to get all the essential amino acids from plant sources it is necessary to combine different plant sources. For example, beans and corn, the traditional diet of the Mexican Indians provides all the essential amino acids. Protein digestion requires the use of proteins in the form of digestive enzymes. For proteins in your diet, see proteins for athletes. Molecules that are essential for the normal functioning of certain enzymes in many metabolic pathways of the body. These are called coenzymes. Others are directly involved in the synthesis of essential compounds in the body. For a food guide to vitamins and minerals, see this nutritional science course at Cornell. This vitamin is very important in the formation of visual pigments in the retina of the eye. Each pigment is made up of a protein molecule, and a form of vitamin A called retinal. These pigments are present in the photoreceptor cells of the eye. Night blindness is one of the earliest signs of Vitamin A deficiency. Vitamin A is necessary for the maintenance of epithelial tissues that line both internal and external body surfaces, an area equal to one fourth of a football field. It also helps the body fight infections and helps sustain the immune system. Food sources of vitamin A is animal liver and is in the form of retinol. Plant sources provide beta-carotene found abundantly in many yellow, orange and dark green fruits and vegetables. Beta-carotene, when split into two molecules, forms retinol in the body. Unsplit, beta-carotene is an antioxidant. Vitamin A deficiency can reduce the health of the skin and epithelial tissues, affect digestion and absorption of nutrients, cause infections, and stop bone growth. They are water soluble and can be leached out of food during preparation if food is prepared in water. Thiamine Vitamin B1 is part of the coenzyme thymine pyrophosphate, which is involved in the breakdown of carbohydrates by the body. Since its role is metabolic, the main signs of deficiency are fatigue, depression, mental confusion etc. Good dietary sources of thiamine include meat, especially pork and liver, whole grains, seeds, nuts and legumes. Niacin Vitamin B3 collectively this includes two compounds, nicotinic acid and nicotinamide. Without these reactions in the body, release of energy from food breakdown cannot occur and cellular death results. The most common ailment due to niacin deficiency is called pellagra, the symptoms are referred to as the 4 Ds: In the early years of this century, death was surprisingly common in the southern states. Its cause was discovered by Dr. Joseph Goldberger in , one of the first efforts of what would eventually become The National Institutes of Health. Food sources rich in niacin include meat, poultry, fish, eggs, nuts, seeds and legumes. Vitamin B12 Cobalamin - This vitamin does not occur naturally in any food of plant origin, but only occurs in animal sources, where it is widely available. It is made from bacteria and is only present in foods that contain the bacteria or from animals that have ingested the bacteria. Vitamin B12 is involved in energy release from food, and nucleic acid synthesis. The most common cause of deficiency is pernicious anemia characterized by the production of improperly formed red blood cells. Symptoms include fatigue and weakness. Vitamin C or ascorbic acid is obtained from fresh fruits and vegetables. Since they are water soluble, they can be leached out of food during preparation. The most important role of vitamin C is in the synthesis of collagen, a connective tissue that holds body cells and tissues together. Collagen is the most abundant protein in the body, and is found in bones, teeth and cartilage. For centuries, sailors on long ocean voyages contracted Scurvy, a disease that could cause bleeding of the gums and under the skin, fatigue, brittle bones and even sudden death due to internal bleeding. It is now known that scurvy is caused by vitamin C deficiency, and is directly traced to the body's inability to make collagen. The primary function of Vitamin D is the regulation of calcium and phosphorus levels, especially for normal bone development.

### Chapter 2 : Study Notes Nutrition and Dietetics | NUT - Introduction to Nutrition and Dietetics | Thinkswap

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*Human Nutrition Human Dietary Needs The human diet must provide the following: calories; enough to meet our daily energy needs. amino www.nxgvision.com are nine, or so, "essential" amino acids that we need for protein synthesis and that we cannot synthesize from other precursors.*

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