

Sources of Energy

VOCABULARY¹ in context. Match the following definitions with words from the reading passage below, then give an appropriate translation in French.

1. Something consumed to produce energy, especially a material such as wood, coal, gas, or oil; Nutritive material metabolized by a living organism : _____
2. The entire material or physical structure of an organism; The physical part of a person : _____
3. A group of organic compounds that includes sugars, starches, celluloses, and gums and serves as a major energy source in the diet. These compounds contain only carbon, hydrogen, and oxygen, usually in the ratio 1 : 2 : 1 : _____
4. A class of neutral lipids consisting of various triglycerides; Mixtures of solid or semisolid triglycerides. Numerous compounds of carbon, hydrogen, and oxygen that are glycerides of fatty acids, [...] are a major class of energy-rich food, and are soluble in organic solvents (as ether) but not in water. : _____
5. A group of complex organic macromolecules that contain carbon, hydrogen, oxygen, nitrogen, and usually sulfur and are composed of one or more chains of amino acids. They are fundamental components of all living cells and include many substances, such as enzymes, hormones, and antibodies, that are necessary for the proper functioning of an organism. They are essential for the growth and repair of tissue and can be obtained from foods such as meat, fish, eggs, milk, and legumes : _____
6. The usual food and drink of a person : _____
7. For the most part; chiefly. Principally. : _____
8. A plant cultivated for an edible (nutritious) part : _____
9. Substances (such as) fats that are generally slippery, combustible, viscous, liquid or liquefiable at room temperatures, soluble in various organic solvents such as ether but not in water : _____
10. The edible flesh (tissue) of animals : _____
11. Cold-blooded aquatic vertebrates of the superclass Pisces : _____
12. Relating to milk : _____
13. To take in; assimilate (especially a liquid) : _____
14. The flow (circulation) of blood through the circulatory system : _____
15. A monosaccharide sugar, $C_6H_{12}O_6$. It is the principal circulating sugar in the blood and the major energy source of the body : _____
16. The process of using or being used : _____
17. To change (something) into another form, substance, state, etc.; transform : _____

18. A polysaccharide, $(C_6H_{10}O_5)_n$, that is the main form of carbohydrate storage and occurs primarily in the liver and muscle tissue. It is readily converted to glucose as needed by the body to satisfy its energy needs : _____
19. To reserve; stock; To deposit : _____
20. A large, reddish-brown, glandular organ located in the upper right portion of the abdominal cavity that secretes bile and is active in the formation of certain blood proteins and in the metabolism of carbohydrates, fats, and proteins : _____
21. A class of water-soluble crystalline carbohydrates, including sucrose and lactose, having a characteristically sweet taste and classified as monosaccharides, disaccharides, and trisaccharides : _____
22. 1. To deal with ; 2. To satisfy (a need, for example) ; fulfill : _____
23. The food served and eaten at one time : _____
24. 1. To move from a lower to a higher position; 2. To increase in size, volume, or level : _____
25. To produce and discharge a substance, especially from the cells of specialized glands. : _____
26. A polypeptide hormone that is secreted by the islets of Langerhans, helps regulate the metabolism of carbohydrates and fats, especially the conversion of glucose to glycogen, and promotes protein synthesis and the formation and storage of neutral lipids. : _____
27. Proteins functioning as biochemical catalysts : _____
28. 1. During the time that. 2 On the condition that : _____
29. To continue in the same state or condition : _____
30. Existing in great quantity or ample supply. Syn. abundant : _____
31. 1. To drop or come down freely under the influence of gravity. 2. To lessen (diminish) in amount or degree : _____
32. The formation of a chemical compound through the combination of simpler compounds or elements. : _____
33. To decompose chemically : _____
34. A polypeptide hormone secreted by alpha cells in the pancreas that initiates a rise in blood sugar levels by stimulating the breakdown of glycogen by the liver. : _____
35. To create. To cause to exist. : _____
36. Relating to particular aspects, features, or details : _____
37. A signal to answer or correspond to another : _____
38. 1. Sugar in the form of glucose in the blood. 2. The concentration of glucose in the blood, measured in milligrams of glucose per 100 milliliters of blood. : _____
39. Becoming greater or larger : _____
40. Quantity : _____
41. To be without or in need of : _____
42. To assign for a specific end, use, or purpose : _____

¹ Les définitions du vocabulaire à réviser sont données en italique et numérotées en gras.

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43. To use jointly or in common : _____

44. Different from : _____

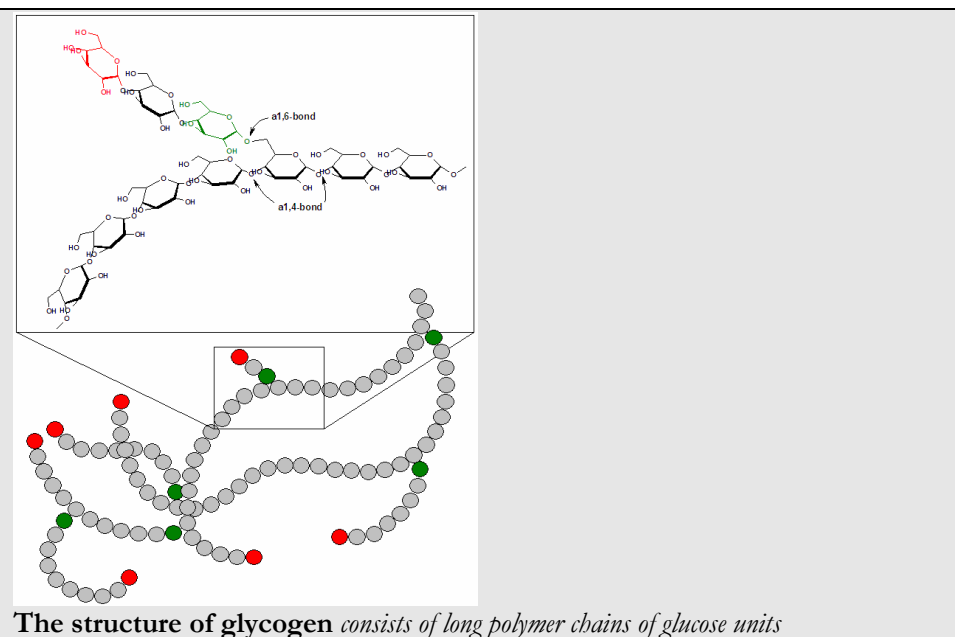
The fuels of the body are carbohydrates, fats and proteins. These* are taken in the diet. They* are found mainly in cereal grains, vegetable oils, meat, fish and dairy products.

Average caloric² values for 1g :

Carbohydrates	4 Cal
Fats	9 Cal
Proteins	4 Cal

Carbohydrates

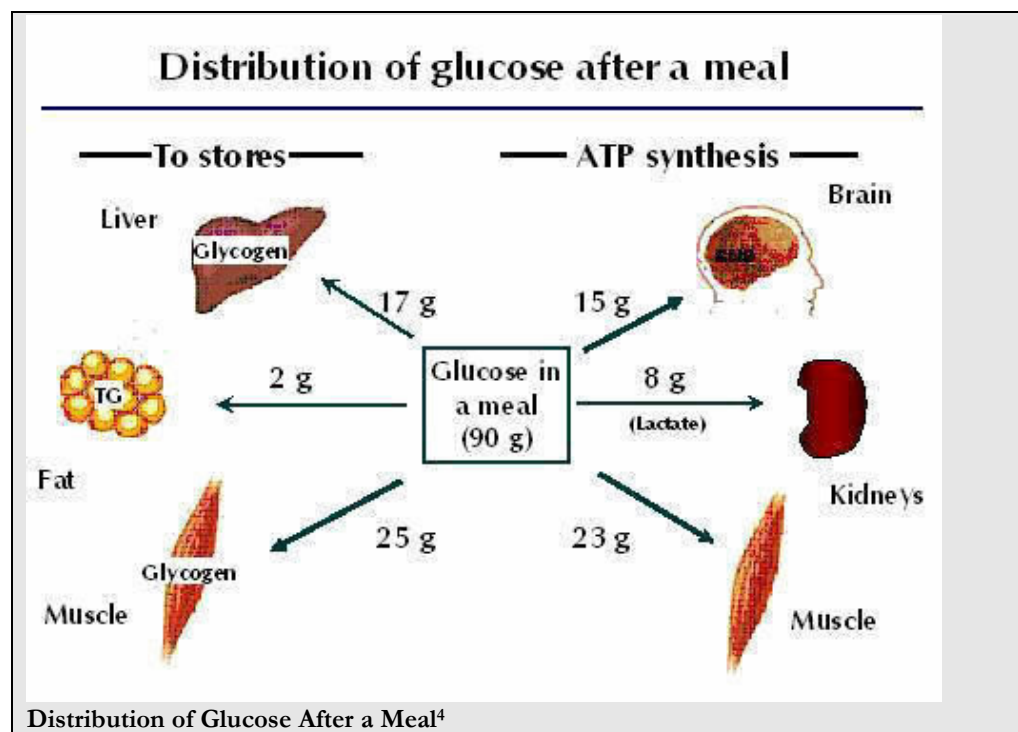
Carbohydrates are the principal source of energy in most diets. They* are absorbed into the bloodstream in the form of glucose. Glucose not needed for immediate use is converted into glycogen and stored in the liver.



² NB. The "calorie" we refer to in food is actually a kilocalorie (abbr. kcal). 1 kilocalorie is the same as 1 Calorie (upper case C). A kilocalorie is the amount of heat required to raise the temperature of 1 kilogram of water one degree Celsius.

Glycogen forms an energy reserve that can be quickly mobilized to meet a sudden need for glucose. As a meal containing carbohydrates is eaten and digested, blood glucose levels rise, and the pancreas secretes insulin. Insulin acts on the hepatocytes (liver cells) to stimulate the action of several enzymes, including glycogen synthase which converts glucose molecules one by one into glycogen. Glucose molecules are added to the chains of glycogen as long as both insulin and glucose remain plentiful. After a meal has been digested and glucose levels begin to fall, insulin secretion is reduced, and glycogen synthesis stops. Several hours after a meal, glycogen begins to be broken down to be converted again to glucose. Glucagon is another hormone produced by the pancreas, which* in many respects serves as a counter-signal to insulin. When the blood sugar begins to fall below normal (hypoglycemia), glucagon is secreted in increasing amounts, causing the liver to convert stored glycogen into glucose and release it* into the bloodstream.

Muscle cells lack the ability to pass glucose into the blood, so the glycogen they* store internally is destined for internal use and is* not shared with other cells, unlike* liver cells.³



³ <http://en.wikipedia.org/wiki/Glycogen>

Distribution of Glucose After a Meal (continued)

An average meal contains about 90 grams of glucose. This glucose will either be utilized as an immediate energy substrate for ATP synthesis or will be stored as glycogen or fat.

Around 15-18% of the ingested glucose goes to nourish the brain during the absorptive period. Note that there is no storage form of glucose in the CNS; all of the glucose that is taken up is "burned". The brain is, therefore, extremely sensitive to reduced blood glucose levels.

The liver stores excess glucose as glycogen, readying a buffer for blood glucose during the coming post-absorptive period. Little glucose is normally converted to fat, although overeating carbohydrates (sucrose and fructose) can lead to fat production and storage.

Skeletal muscles dominate, accounting for about 50% of the total glucose uptake. Approximately half of this is stored as glycogen, the rest is used as an immediate energy substrate.

cereal – fruits and – and – products

A typical diet ...

2. **The metabolism & absorption of carbohydrates.** → ...

converted -- and -- bloodstream -- either -- immediately -- or else -- liver an -- in the form

Carbohydrates ...

***What do the following words refer to ?**

- "These* are taken in the diet. They* are found mainly in cereal grains, ... and dairy products."* → "These" and "they" refer to ...
- "They* are absorbed into the bloodstream in the form of glucose"* → "They" refers to ...
- "which* in many respects serves as a counter-signal to insulin"* → "Which" refers to...
- "and release it* into the bloodstream"* → "It" refers to...
- "the glycogen they* store internally is destined for internal use"* → "They" refers to...
- "and is* not shared with other cells"* → The subject of "is not shared" is...
- "unlike* liver cells"* → Liver cells are different from... insofar as⁵...

3. **"Glycogen" The mechanism by which blood sugar levels are regulated.** → ...

form in which -- stored -- produced -- and in -- in response to -- when -- levels -- When -- low -
- pancreas -- break down -- in order to prevent

Glycogen is...

True or False ? (Explain)

- Glycogen stored in the liver and muscles can be released when the blood sugar concentration goes down.*
- Living in English-speaking countries is a risk factor for obesity.⁶*
- "Malnutrition" means not having enough food to develop or function normally.*

Questions : (1) Ask questions about the following points, then (2) let someone else answer in a complete sentence (3) using as many of the suggested terms as possible.

WHAT SORTS – HOW (×2) – WHAT

1. **Typical composition of the diet.** → ...

⁴ <http://www.medbio.info>

⁵ NB. insofar as = to the extent that... / *dans la mesure où*

⁶ Cf. infra "Super Size Me / Malnutrition", p. 15

Fats

VOCABULARY in context. Match the following definitions with words from the reading passage below, then give an appropriate translation in French.

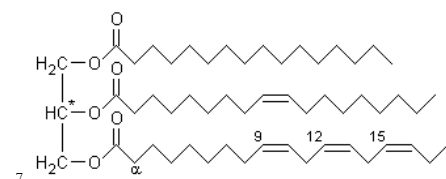
45. A type of connective tissue that contains stored cellular fat : _____
46. Of or relating to the diet : _____
47. A naturally occurring ester of three fatty acids and glycerol that is the chief constituent of fats and oils. : _____
48. To make into an assembled unit : _____
49. One of the microscopic particles of fat occurring in chyle and in the blood, especially after a meal high in fat. : _____
50. To eject or expel (a substance), cf. secrete: _____
51. The interconnected system of spaces and vessels between body tissues and organs by which lymph circulates throughout the body. : _____
52. After a long time, finally, in the end : _____
53. One or the other : _____
54. In a prompt, timely manner; promptly. Without difficulty : _____
55. Present and ready for use ; accessible : _____
56. More than is usual, more than necessary : _____
57. To receive into the body; incorporate : _____
58. Containing nothing; unoccupied : _____
59. A period of such abstention : _____
60. A syrupy, sweet, colorless or yellowish liquid, $C_3H_8O_3$, obtained from fats and oils and used as a solvent, an antifreeze, a plasticizer, and a sweetener : _____
61. 1. A large group of monobasic acids, especially those found in animal and vegetable fats and oils, having the general formula $C_nH_{2n+1}COOH$: _____
62. A class of simple, water-soluble proteins that can be coagulated by heat and are found in egg white, blood serum, milk, and many other animal and plant tissues. : _____
63. To be the source of. To produce; specif., a) to give or furnish as a natural process or as the result of cultivation b) to give in return; produce as a result : _____
64. Short for adenosine triphosphate. An organic compound, $C_{10}H_{16}N_5O_{13}P_3$, that is composed of adenosine and three phosphate groups. It serves as a source of energy for many metabolic processes. : _____
65. The muscle of the heart, consisting of anastomosing transversely striated muscle fibers formed of cells united at intercalated disks; the myocardium. : _____
66. A muscle that is connected at either or both extremities with a bone and consists of elongated, multinucleated, transversely striated, skeletal muscle fibers, together with connective tissues, blood vessels, and nerves. : _____

67. The portion of the central nervous system that is enclosed within the cranium, continuous with the spinal cord, and composed of gray matter and white matter. It is the primary center for the regulation and control of bodily activities, receiving and interpreting sensory impulses, and transmitting information to the muscles and body organs. It is also the seat of consciousness, thought, memory, and emotion. Also called encephalon. : _____
68. To be dependent on, as for support or maintenance : _____
69. A ketone-containing substance that is an intermediate product of the metabolism of fatty acids. Ketone bodies tend to accumulate in the blood and urine of individuals affected by starvation or uncontrolled diabetes mellitus. : _____
70. A state of extreme hunger resulting from lack of essential nutrients over a prolonged period : _____
71. 1. The process of taking food into the body. 2. The substances, or the quantities thereof, taken in and utilized by the body. : _____

Fats make up the second largest source of energy in most diets. They* are stored in adipose tissue and round the principal internal organs. Dietary fat is digested and then re-synthesized into triglycerides⁷ and packaged into lipoprotein particles known as chylomicrons, which are released in the lymphatic system and then into the blood. Eventually, they* bind to the membranes of adipose cells or muscle, where they* are either stored or oxidized for energy.⁸

Whereas carbohydrates provide a readily available source of energy, lipids function primarily as an energy reserve⁹, as converting fat to energy is a slower* process¹⁰. If excess carbohydrate is taken in, this* can be also converted into fat and stored. The stored fat is utilized when the liver is empty of glycogen (e.g. during physical exercise, or after a period of fasting).

When required*, the stored triglycerides are released from the adipose tissue, a process* which is stimulated by adrenaline and glucagon, the same hormones which stimulate release of stored glycogen as glucose. Fats are broken down in the body to release glycerol and free fatty acids. The glycerol can be converted to glucose by the liver and thus used as a source of energy.¹¹ When released* from



Example of an unsaturated fat triglyceride. Left part : glycerol, right part from top to bottom : palmitic acid, oleic acid, alpha-linolenic acid, chemical formula: $C_{51}H_{98}O_6$

⁸ http://en.wikipedia.org/wiki/Fatty_acid_metabolism

⁹ <http://www.elmhurst.edu/~chm/vchembook/620fattyacid.html>

¹⁰ <http://www.merck.com/mmhe/sec12/ch152/ch152b.html>

¹¹ http://en.wikipedia.org/wiki/Fat#Importance_for_living_things

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the adipose tissue, the fatty acids are transported attached to the major protein in the circulation, which is albumin.¹² Free fatty acids are an important source of fuel for many tissues since they* can yield relatively large quantities of ATP. In particular, heart and skeletal muscle prefer fatty acids. The brain cannot use fatty acids as a source of fuel; it* relies on glucose, or on ketone bodies.¹³ Ketone bodies are produced in the liver by fatty acid metabolism during starvation, or during periods of low carbohydrate intake.¹⁴

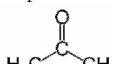
Energy Stores in Man¹⁵

Tissue Fuel	Reserve, grams	Starvation	Walking	Marathon
Fat	9000-15000	34 days	11 days	3 days
Muscle Glycogen	350	14 hours	5 hours	70 minutes
Liver Glycogen	80	3.5 hours	70 minutes	18 minutes
Blood/Extracellular Glucose	20	40 minutes	15 minutes	4 minutes
Body Protein	6000	15 days	5 days	1.3 days

*What do the following words refer to ?

- "They* are stored in adipose tissue and..." → "They" refers to ...
- "Eventually, they* bind to the membranes of adipose cells or muscle, where they* are either stored or oxidized for energy" → "They" refers to...
- "converting fat to energy is a slower* process" → The process of onverting fat into energy is slower that...
- "this* can be also converted into fat and stored" → "This" refers to ...
- "When required*" → "Required" refers to...
- "a process* which is stimulated by adrenaline and glucagon" → "Process" refers to...
- "When released* from the adipose tissue..." → "Released" refers to...
- "they* can yield relatively large quantities of ATP" → "They" refers to...
- "it* relies on glucose, or on ketone bodies" → "It" refers to...

¹² <http://www.unisanet.unisa.edu.au/08366/h&p2fat.htm>

¹³  **Acetone**, the simplest ketone. A *ketone* is either the functional group characterized by a carbonyl group (O=C) linked to two other carbon atoms or a chemical compound that contains this functional group.

¹⁴ http://en.wikipedia.org/wiki/Fatty_acid#Free_fatty_acids

¹⁵ www.medbio.info

True or False ? (Explain)

- Fats yield more energy than carbohydrates.
- In a healthy diet, most of the energy comes from fats.
- Fats and carbohydrates are first used for energy, and then stored if excess amounts are taken in.

Questions : (1) Ask questions about the following points, then (2) let someone else answer in a complete sentence (3) using as many of the suggested terms as possible.

HOW – WHEN – WHY – WHICH

5. Digestion and distribution of fats. → ...

down into -- then -- and -- lipoproteins -- which circulate -- and eventually

Fats are first ...

6. Conditions in which fats are stored and used for energy. The reasons for this. → ...

primarily -- since -- slower -- than -- used -- when -- insufficient -- for example -- or

Most of the time, fats are...

7. Tissues which can, or cannot, use fatty acids during hypoglycemia. → ...

like -- acids -- ATP -- cannot -- and -- therefore -- dependent on -- or -- metabolized from -- in extreme -- (e.g. --)

Whereas certain tissues,...

8. Make up one original question of your own relating to this section of the article, and write a 2-3 line answer to it using information either from the article or from outside sources.

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VOCABULARY in context. Match the following definitions with words from the reading passage below, then give an appropriate translation in French.

72. Development; An increase in size, number, or strength : _____
73. To make structural repairs; reconstruct, restore : _____
74. Most important; principal; chief : _____
75. An organic compound containing both an NH_2 group and a carboxylic acid group (COOH), especially any of the 20 compounds that have the basic formula $\text{NH}_2\text{CHRCOOH}$, and that link together by peptide bonds to form proteins : _____
76. Symbol N A nonmetallic element that constitutes nearly four fifths of the air by volume, occurring as a colorless, odorless, almost inert diatomic gas, N_2 , in various minerals and in all proteins. Atomic number 7; atomic weight 14 : _____
77. A water-soluble compound, $\text{CO}(\text{NH}_2)_2$, that is the major nitrogenous end product of protein metabolism and is the chief nitrogenous component of urine : _____
78. To separate and discharge (eliminate) waste matter from the blood, tissues, or organs : _____
79. The waste product secreted by the kidneys that is a yellow to amber-colored, slightly acid fluid discharged from the body through the urethra : _____
80. 1. Basic or indispensable; necessary; 2. Biochemistry a substance that is required for normal functioning but cannot be synthesized by the body and therefore must be included in the diet : _____
81. A protein containing the essential amino acids in the proportion required in the human diet. : _____
82. A protein having a ratio of essential amino acids different from that of the average body protein. : _____
83. A cereal grass (*Oryza sativa*) that is cultivated extensively in warm climates for its edible grain. : _____
84. Any of various edible seeds of plants of the family Leguminosae used for food : _____
85. Any of various annual cereal grasses of the genus *Triticum* of the Mediterranean region and southwest Asia, especially *T. aestivum*, widely cultivated in temperate regions in many varieties for its commercially important edible grain. : _____
86. A widely grown, usually tall annual cereal grass (*Zea mays*) bearing grains or kernels on large ears. : _____
87. To modify, especially to increase, the rate of a chemical reaction (without being consumed in the process). : _____
88. The chemical processes occurring within a living cell or organism that are necessary for the maintenance of life in which some substances are broken down

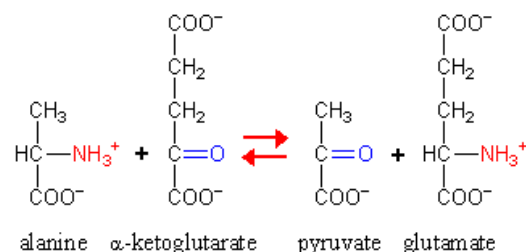
to yield energy for vital processes while other substances, necessary for life, are synthesized. : _____

Proteins are essential for the growth and rebuilding of tissue, but they* can also be utilized as a source of energy. In some diets, such as the diet of the Eskimo, they* even form the main source of energy. Through the process of digestion, proteins are broken down into free amino acids that can be used for protein synthesis.¹⁶ Proteins, unlike carbohydrates and fats, cannot be stored for future use. Excess protein is broken down and converted into sugars or fatty acids¹⁷. The liver removes nitrogen¹⁸ from the amino acids, so that they* can be burned as fuel, and the nitrogen is incorporated into urea, the substance that is excreted by the kidneys in the urine.¹⁹

Proteins are described as essential and nonessential proteins or amino acids. The human body requires approximately 20 amino acids for the synthesis of its proteins. The body can make only 12 of the amino acids – these are known as the nonessential amino acids because the body can make them and does not need to get them from the diet. There are 8²⁰ essential amino acids that are obtained only from food, and not made in the body. If the protein in a food supplies enough of the essential amino acids, it is called a complete protein. All meat and other animal products are sources of complete proteins. If the protein of a food does not supply all the essential amino acids, it is called an incomplete protein. Protein in foods such

¹⁶ <http://en.wikipedia.org/wiki/Protein>

¹⁷ Gluconeogenesis is the generation of glucose from non-sugar carbon substrates like pyruvate, lactate, glycerol, and amino acids. The vast majority of gluconeogenesis takes place in the liver. This process occurs during periods of fasting, starvation, or intense exercise and is highly endergonic (absorbing energy in the form of work).



Alanine (one of the simpler amino acids) loses its NH_3^+ (ammonia) group to become pyruvate, which can then be converted into glucose or fat.

¹⁸ **Aminotransferase (Transaminase)**

¹⁹ http://en.wikipedia.org/wiki/Protein_in_nutrition

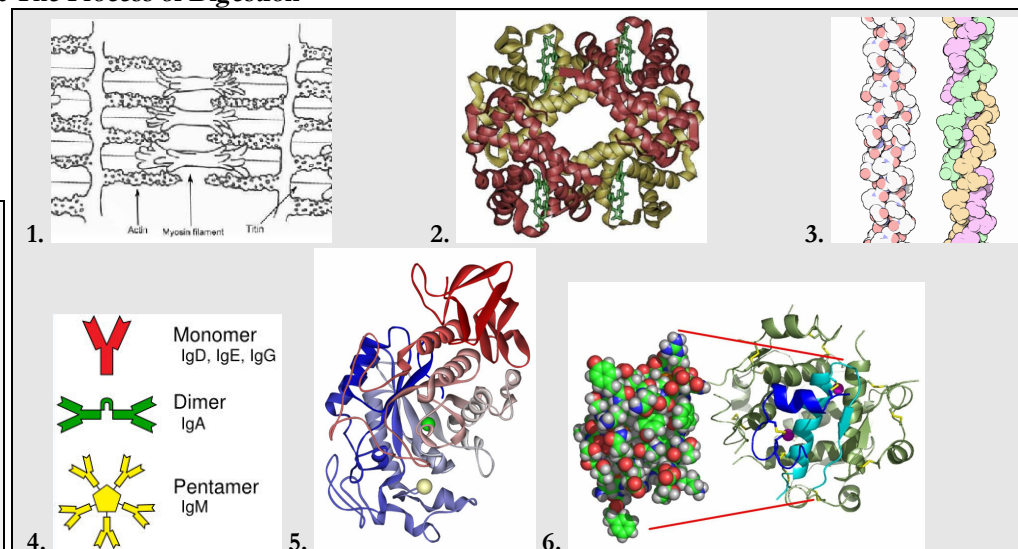
²⁰ Of the 20 standard amino acids, 8 are called essential amino acids because the human body cannot synthesize them from other compounds at the level needed for normal growth, so they must be obtained from food. The distinction between essential and non-essential amino acids is somewhat unclear, as some amino acids can be produced from others. Moreover, cysteine, tyrosine, histidine and arginine are semiessential amino acids in children, because the metabolic pathways that synthesize these amino acids are not fully developed. The amounts required also depend on the age and health of the individual.

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as grains, fruits, and vegetables are either low, incomplete protein or lack one of the essential amino acids. Plant proteins can be combined to include all of the essential amino acids and form a complete protein. Examples of combined, complete plant proteins are rice and beans, milk and wheat cereal, and corn and beans.²¹

Food ²²	Protein (grams)	Food	Protein (grams)
Beef, 3 oz	27.0	Pinto beans, ½ cup	7.0
Turkey breast, 3 oz	25.7	Egg, 1 large (64g)	6.3
Pork chop, 3 oz	24.5	Almonds, 1 oz	5.4
Chicken, 3 oz	23.6	Green peas, ½ cup	4.1
Tuna, 3 oz	21.7	Corn, ½ cup	2.2
Ham, 3 oz	17.7	Potatoes, ½ cup	1.2
Salmon, 3 oz	16.8	Green beans, ½ cup	1.0
Yogurt low-fat, 1 cup	10.7	Carrots, 1/2 cup	0.8
Skim milk, 1 cup	8.3	Apple	0

Proteins are essential parts of all living organisms and participate in every process within cells. Many proteins are enzymes that catalyze biochemical reactions, and are vital to metabolism. Other proteins have structural or mechanical functions.



1. Contractile proteins (actin, myosin, titin) in muscle, 2. Hemoglobin, 3. Collagen, 4. Antibodies, 5. Salivary amylase (ptyalin), 6. Insulin, monomer (active form) left and hexamer (stored form) right

Protein is the main component of muscles, organs, and glands. Every living cell and all body fluids, except bile and urine, contain protein. The cells of muscles, tendons, and ligaments are maintained with protein. Children and adolescents require protein for growth and development. Adults need to eat about 60 grams of protein per day (0.8 grams per kilogram of weight or 10 to 15% of total calories). If more protein is consumed than is needed, the body does not build more protein (or muscle). Instead, the body breaks the protein down and stores its components as fat.²³

Proteins vary in structure as well as function. They are constructed from **amino acids** and have distinct **three-dimensional shapes**. The structure of a protein determines its function. For example, collagen is long, stringy, strong, and resembles a rope. Hemoglobin on the other hand, is a globular protein that is folded and compact. Its spherical shape is useful for maneuvering through blood vessels.²⁴

Proteins are described as **essential** and nonessential proteins or amino acids. The human body requires approximately 20 amino acids for the synthesis of its proteins.²⁵ The body synthesizes some of them from components within the body, but it cannot synthesize nine of the amino acids—called essential amino acids. They must be consumed in the diet. They include histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine.

Protein Function²⁶

²³ <http://www.merck.com/mmhe/sec12/ch152/ch152b.html>

²⁴ <http://biology.about.com/od/molecularbiology/a/aa101904a.htm>

²⁵ <http://www.nlm.nih.gov/medlineplus/ency/article/002467.htm>

²⁶ <http://biology.about.com/od/molecularbiology/a/aa101904a.htm>

²¹ <http://www.nlm.nih.gov/medlineplus/ency/article/002467.htm>

²² <http://www.feinberg.northwestern.edu/nutrition/factsheets/protein.html>

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- **Antibodies** - are specialized proteins involved in defending the body from antigens (foreign invaders).
- **Contractile Proteins** - are responsible for movement. Examples include **actin** and **myosin**. These proteins are involved in muscle contraction and movement.
- **Enzymes** - are proteins that facilitate biochemical reactions. Examples include the enzymes lactase, **amylase** and **pepsin**.
- **Hormonal Proteins** - are messenger proteins which help to coordinate certain bodily activities. Examples include **insulin**, oxytocin, and somatotropin (a growth hormone that stimulates protein production in muscle cells).
- **Structural Proteins** - are fibrous and stringy and provide support. Examples include keratin in hair, or **collagen**, and elastin in tendons and ligaments.
- **Transport Proteins** - are carrier proteins which move molecules from one place to another around the body. Examples include **hemoglobin** and albumin.

*What do the following words refer to ?

- q. "they* can also be utilized as a source of energy. In some diets ... they* form the main source of energy" → "They" refers to ...
- r. "so that they* can be burned as fuel" → "They" refers to ...
- s. "for the synthesis of its* proteins" → "Its" refers to ...
- t. "because the body can make them* and does not need to get them* from the diet" → "Them" refers to ...
- u. "it* is called a complete protein" → "It" refers to ...
- v. "it* is called an incomplete protein" → "It" refers to ...

True or False ? (Explain)

- vii. Proteins are mainly used either for rebuilding tissue or for energy.
- viii. Proteins are essential in the diet because the body cannot synthesize them.
- ix. Excess proteins are converted into muscle.
- x. The structure of a protein determines its function.
- xi. The name "Eskimo" means "eaters of raw meat".

Questions : (1) Ask questions about the following points, then (2) let someone else answer in a complete sentence (3) using as many of the suggested terms as possible.

HOW (×2) – WHY – CAN – WHAT HAPPENS – WHAT – WHERE

9. *The importance of proteins for growth and energy. The reason for this.* → ...

essential for – (and also –) – not – main – in most – (except for –) – since – cannot

Although proteins ...

10. *The possibility of storing proteins. Unused amino acids.* → ...

proteins – unused – eventually – into – and – in the

Since the body ...

11. *The metabolism of proteins.* → ...

into -- which -- then -- synthesize

Proteins are first ...

12. *"Complete" proteins. Dietary sources of complete proteins.* → ...

essential -- i.e. -- obtained from -- or by+*v-ing* -- complementary

"Complete" proteins contain...

13. Make up one original question of your own relating to this section of the article, and write a 2-3 line answer to it using information either from the article or from outside sources.

The Process of Digestion

VOCABULARY in context. Match the following definitions with words from the reading passage below, then give an appropriate translation in French.

89. The process by which food is converted into substances that can be absorbed and assimilated by the body. It is accomplished in the alimentary canal by the mechanical and enzymatic breakdown of foods into simpler chemical compounds : _____
90. Material, usually of plant or animal origin, that contains or consists of essential body nutrients, such as carbohydrates, fats, proteins, vitamins, or minerals, and is ingested and assimilated by an organism to produce energy, stimulate growth, and maintain life; nourishment : _____
91. The body opening through which an animal takes in food. The cavity lying at the upper end of the alimentary canal, bounded on the outside by the lips and inside by the oropharynx and containing the tongue, gums, and teeth : _____
92. To bite and grind with the teeth; masticate : _____
93. To cause to separate into pieces; To divide into pieces : _____
94. By that means; in this manner : _____
95. The watery mixture of secretions from the oral glands that lubricates chewed food, moistens the oral walls, and contains ptyalin : _____
96. To make wet (humid) : _____
97. To take through the mouth and throat into the stomach : _____
98. A form of amylase in the saliva of human beings and some animals that catalyzes the hydrolysis of starch into maltose and dextrin : _____
99. A complex carbohydrate, $(C_6H_{10}O_5)_n$, found chiefly in plants, notably in corn, potatoes, wheat, and rice, and commonly prepared as a white, amorphous, tasteless powder : _____
100. A carbohydrate that cannot be decomposed by hydrolysis, especially one of the hexoses, having the general formula $C_6H_{12}O_6$; a monosaccharide : _____
101. The action of proteins functioning as biochemical catalysts : _____
102. The muscular, membranous tube for the passage of food from the pharynx to the stomach : _____
103. The opening from the esophagus into the stomach. : _____
104. The enlarged, saclike portion of the alimentary canal, one of the principal organs of digestion, located between the esophagus and the small intestine : _____
105. The surface of a body organ or part : _____
106. A material covering a surface; a single thickness; a stratum : _____
107. The viscous, slippery substance that consists chiefly of mucin, water, cells, and inorganic salts and is secreted as a protective lubricant coating by cells and glands of the mucous membranes : _____
108. To generate a substance from cells or bodily fluids : _____

109. Colorless, watery, acidic digestive fluid that is secreted by various glands in the mucous membrane of the stomach and consists chiefly of hydrochloric acid, pepsin, rennin, and mucin : _____
110. A clear, colorless, fuming, poisonous, highly acidic aqueous solution of hydrogen chloride, HCl, found in the stomach in dilute form : _____
111. 1. More exactly; more accurately 2. On the contrary : _____
112. A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, usually measured on a scale of 0 to 14 : _____
113. A digestive enzyme found in gastric juice that catalyzes the breakdown of protein to peptide : _____
114. The intoxicating agent in fermented and distilled liquors; used pure or denatured as a solvent or in medicines and colognes and cleaning solutions and rocket fuel : _____
115. Acetylsalicylic acid, a nonsteroidal antiinflammatory drug having analgesic, antipyretic, antiinflammatory, and antirheumatic activity; also an inhibitor of platelet aggregation. : _____
116. A bitter white alkaloid often derived from tea or coffee and used chiefly as a mild stimulant and in the treatment of certain kinds of headache. : _____
117. A thin layer of tissue that covers a surface, lines a cavity, or divides a space or organ. : _____
118. A moving curve or succession of curves in or on a surface; an undulation : _____
119. The shortening and thickening of functioning muscle or muscle fiber in action : _____
120. The lengthening of inactive muscle or muscle fibers : _____
121. The wavelike muscular contractions of the alimentary canal by which contents are forced onward (forward) : _____
122. To pass over or through a surface with a continuous movement : _____
123. To shake or agitate vigorously : _____
124. A very small piece or part; a tiny portion; the smallest possible amount : _____
125. The thick semifluid mass of partly digested food that is passed from the stomach to the duodenum : _____

The process of digestion begins when food is taken into the mouth. Chewing breaks the food into smaller pieces, thereby* exposing more surfaces to the saliva. Saliva itself has a double function. It* moistens the food, so facilitating swallowing, and it* contains ptyalin, which begins the conversion of starch into simple sugars.

Although enzymatic action begins in the mouth, the major processes of digestion do not occur until the food passes down the oesophagus and through the cardiac orifice into the stomach. The stomach has both a chemical and a physical function. The walls of the stomach, which* are protected by a layer of mucus, secrete gastric

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juices composed of several enzymes and hydrochloric acid. The acid itself does not break down food molecules, rather, the acid provides an optimum pH for the reaction of the enzyme pepsin, which begins the process of converting proteins into amino acids. A few lipid-soluble molecules such as alcohol, aspirin and caffeine are absorbed in the stomach by passing through the membrane of the stomach and entering the circulatory system directly. In addition, during these chemical reactions waves of contraction and relaxation, known as peristalsis, sweep the walls of the stomach. They* churn the food particles into a semi-solid mass known as chyme.

xiv. "Peristalsis" refers to the churning action of the stomach.

Questions : (1) Ask questions about the following points, then (2) let someone else answer in a complete sentence (3) using as many of the suggested terms as possible.

HOW – WHAT

14. *The importance of chewing and saliva in digestion.* → ...

by+V-ING – smaller – and – more – which – food – so that – more easily – and also – conversion – into – with

Chewing helps prepare ...

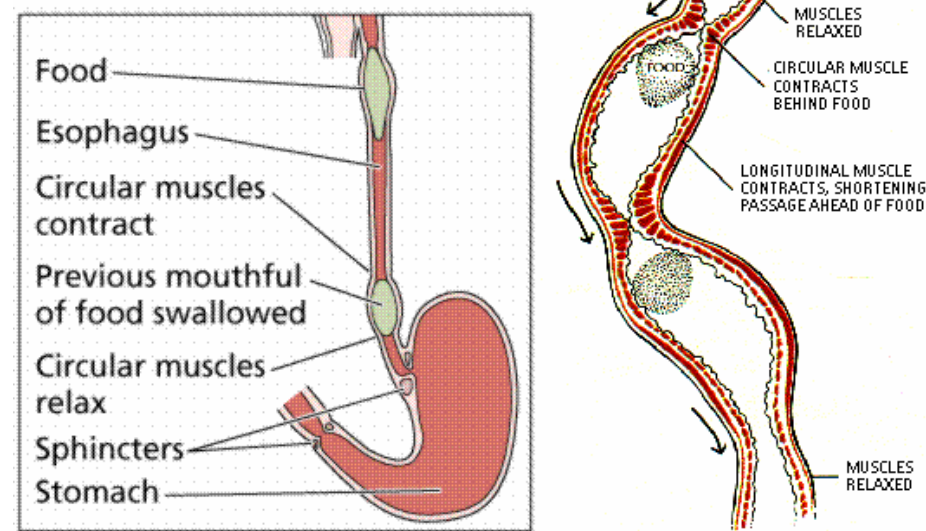
15. *The 2 functions of the stomach.* → ...

food – by – juices – including – acid – and – such as – which breaks – while – function – into – by

The chemical ...

16. Make up one original question of your own relating to this section of the article, and write a 2-3 line answer to it using information either from the article or from outside sources.

Peristalsis



*What do the following words refer to ?

- w. "thereby* exposing more surfaces to the saliva" → More surfaces are exposed to saliva by ...
- x. "It* moistens the food, ... and it* contains ptyalin," → "It" refers to ...
- y. "which are protected by a layer of mucus" → "Which" refers to ...
- z. "They* churn the food particles" → "They" refers to ...

True or False ? (Explain)

- xii. *Enzymatic action mainly occurs in the mouth.*
- xiii. *The major processes of digestion are accomplished by enzymes.*

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VOCABULARY in context. Match the following definitions with words from the reading passage below, then give an appropriate translation in French.

- 126.** The narrow, winding, upper part of the intestine where digestion is completed and nutrients are absorbed by the blood. It extends from the pylorus to the cecum and consists of the duodenum, the jejunum, and the ileum : _____
- 127.** The passage at the lower end of the stomach that opens into the duodenum : _____
- 128.** A small spherical mass, especially a small drop of liquid : _____
- 129.** In addition or furthermore : _____
- 130.** A bitter, alkaline, brownish-yellow or greenish-yellow fluid that is secreted by the liver, stored in the gallbladder, and discharged into the duodenum and aids in the emulsification, digestion, and absorption of fats. Also called gall : _____
- 131.** A small, pear-shaped muscular sac, located under the right lobe of the liver, in which bile secreted by the liver is stored until needed by the body for digestion : _____
- 132.** To mix mix two liquids that ordinarily do not mix well (such as oil and water) by making a suspension of tiny droplets of one liquid in the second liquid : _____
- 133.** To cause an acidic solution to become neutral by adding a base to it (or to cause a basic solution to become neutral by adding an acid to it) : _____
- 134.** A clear alkaline secretion of the pancreas containing enzymes that aid in the digestion of proteins, carbohydrates, and fats. : _____
- 135.** A long, irregularly shaped gland, lying behind the stomach, that secretes enzymes that aid in digestion into the duodenum and insulin, glucagon, and somatostatin into the bloodstream : _____
- 136.** A number or collection of varied things, especially of a particular group; an assortment : _____
- 137.** Having a pH greater than 7. Having a relatively low concentration of hydrogen ions. : _____
- 138.** An atom or a group of atoms that has acquired a net electric charge by gaining or losing one or more electrons. : _____
- 139.** To prepare, treat, or convert : _____
- 140.** To take effect; to proceed : _____
- 141.** Internal, interior : _____
- 142.** Exceptionally small; microscopic, minuscule : _____
- 143.** Resembling, similar to a hair (filament) : _____
- 144.** A minute projection arising from a mucous membrane, especially : One of the numerous vascular projections of the small intestine : _____
- 145.** One of the minute blood vessels that connect arterioles and venules. These blood vessels form an intricate network throughout the body for the interchange of

various substances, such as oxygen and carbon dioxide, between blood and tissue cells : _____

- 146.** A canal or other tube that contains or conveys (transports) lymph : _____
- 147.** Numerous minute intestinal lymph-carrying vessels that convey chyle from the intestine to lymphatic circulation and thereby to the thoracic duct : _____
- 148.** A very sweet sugar, $C_6H_{12}O_6$, occurring in many fruits and honey and used as a preservative for foodstuffs and as an intravenous nutrient : _____
- 149.** A monosaccharide, $CH_2OH(CHOH)_4CHO$, commonly occurring in lactose and in certain pectins, gums, and mucilages : _____
- 150.** A source of nourishment, especially an ingredient in a food. : _____
- 151.** A vein that conducts blood from the digestive organs, spleen, pancreas, and gallbladder to the liver. : _____
- 152.** Resembling milk in color not clear : _____
- 153.** A milky fluid consisting of lymph and emulsified fat extracted from chyme by the lacteals during digestion and passed to the bloodstream through the thoracic duct. : _____
- 154.** To become combined or united. : _____
- 155.** The main duct of the lymphatic system, ascending through the thoracic cavity in front of the spinal column and discharging lymph and chyle into the blood through the left subclavian vein. : _____
- 156.** A part of a major vein of the upper extremities or forelimbs that passes beneath the clavicle and is continuous with the axillary vein (a continuation of the axillary vein; joins the internal jugular to form the brachiocephalic vein) : _____
- 157.** In or through all parts; everywhere : _____
- 158.** The portion of the intestine that extends from the ileum to the anus, forming an arch and including the cecum, colon, rectum, and anal canal : _____
- 159.** Waste matter eliminated from the bowels; excrement : _____
- 160.** To make mention or reference. To use a name to designate : _____
- 161.** The longest part of the large intestine, extending from the cecum to the rectum. Water and electrolytes are absorbed, solidified, and prepared for elimination as feces. It also contains bacteria that help in the body's absorption of nutrients from digested material. : _____
- 162.** Continuing to be in the same place : _____
- 163.** 1. An unusable or unwanted substance or material 2. The undigested residue of food eliminated from the body; excrement. : _____

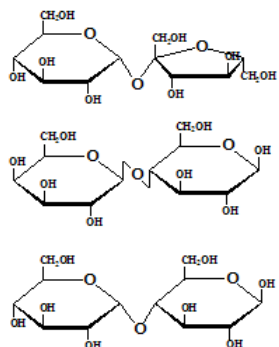
From the stomach, the chyme passes into the small intestine through the pyloric sphincter. Much undigested material is still present*. Proteins have not been completely broken down, starches are still being converted into simple sugars, and fats remain in large globules.

Digestible Disaccharides in Food

Sucrose
(Glucose-fructose)

Lactose
(Galactose-glucose)

Maltose
(Glucose-glucose)



Disaccharides :

1. Lactose, 2. Sucrose (saccharose), 3. Maltose

A disaccharide is a sugar (a carbohydrate) composed of two monosaccharides. It is formed when two sugars are joined together and a molecule of water is removed. For example, milk sugar (lactose) is made from glucose and galactose, whereas cane sugar (sucrose) is made from glucose and fructose.

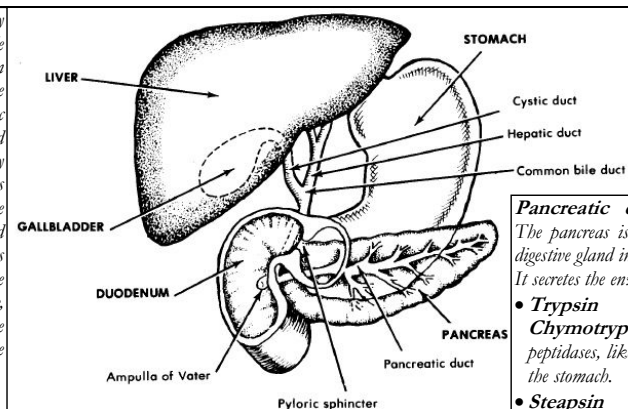
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As chyme enters the duodenum, it is further mixed with three different liquids :

- Bile, which is secreted by the liver and released by the gall bladder, emulsifies fats to allow absorption, neutralizes the chyme, and is used to excrete waste products. It is not an enzyme, however.
- Pancreatic juice, made by the pancreas, contains a variety of enzymes (cf. infra). Pancreatic juice is alkaline in nature due to the high concentration of bicarbonate ions. This is useful in neutralizing the acidic gastric acid, allowing for effective enzymic action.
- Intestinal enzymes of the alkaline mucosal membranes include maltase, lactase and sucrase, to process sugars. Trypsin and chymotrypsin, which break down proteins, are also added in the small intestine.

Bile Bile is produced by hepatocytes in the liver, while epithelial cells add a watery solution that is rich in bicarbonates. Bile then flows into the common hepatic duct, the common bile duct and finally the pancreatic duct to empty into the duodenum. If the duct is closed, bile instead flows into the gall bladder, where it is stored and concentrated. When food is released by the stomach into the duodenum in the form of chyme, the gallbladder releases the concentrated bile to complete digestion.

Bile acts as a detergent, helping to emulsify fats (increasing surface area to help enzyme action), and thus is important in the absorption of the fat-soluble vitamins D, E, K and A. Besides its digestive function, bile serves to eliminate the hemoglobin breakdown product (bilirubin) which gives bile its colour, and neutralises any excess stomach acid. Bile salts are also bacteriocidal to the invading microbes that enter with food.



Intestinal enzymes The jejunum and ileum secrete a juice called succus entericus which contains the following:

- **Sucrase** (invertase), which breaks down sucrose into glucose and fructose
- **Maltase**, which breaks down maltose into glucose.
- **Lactase**, which breaks down lactose into glucose and galactose
- **Intestinal lipase**, which breaks down fatty acids
- **Erepsin**, also a protein-digesting enzyme

Pancreatic enzymes

The pancreas is the main digestive gland in our body. It secretes the enzymes :

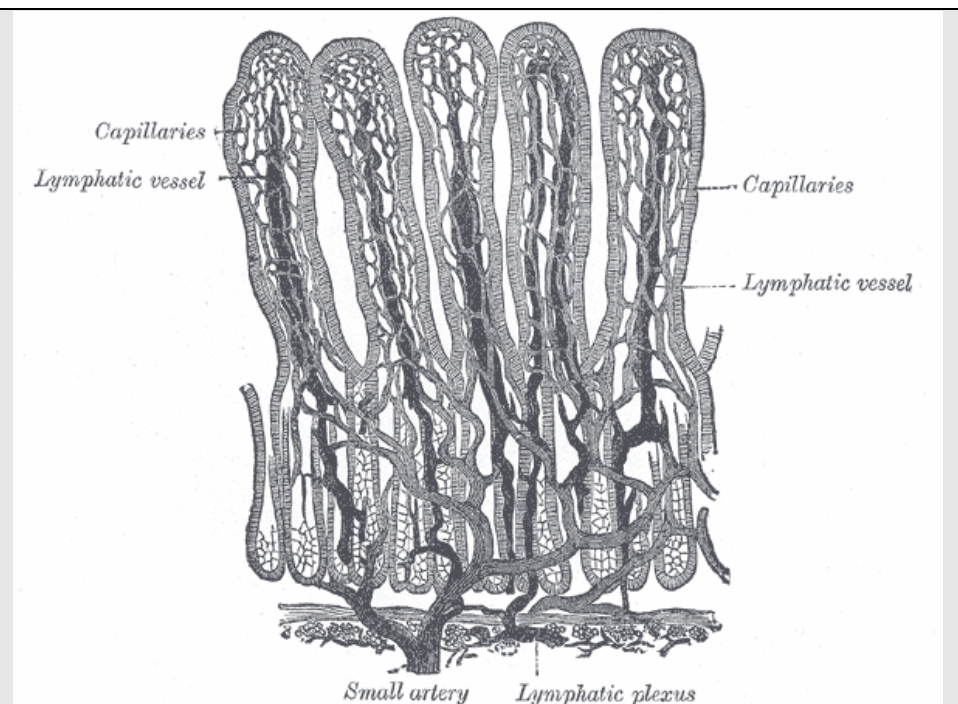
- **Trypsin** and **Chymotrypsin**, peptidases, like pepsin in the stomach.
- **Steapsin** (pancreatic lipase) which decomposes fats into glycerin and fatty acids.
- **Pancreatic amylase** which degrades most hydrocarbons, including starch and glycogen, but not cellulose.
- Several **nucleases** that degrade nucleic acids, like DNAase and RNAase

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Absorption of the products of digestion takes place mainly through the wall of the small intestine. Its* inner surface is covered with minute hair-like structures called villi. Each villus contains several blood capillaries and a specialized lymphatic vessel, known as a lacteal. Glucose, fructose, galactose and the amino acids are all absorbed directly into the blood by entering the blood capillaries inside the villi. The blood, which has absorbed nutrients, is carried away from the small intestine via the hepatic portal vein and goes to the liver for filtering, removal of toxins, and nutrient processing. Glycerol and the fatty acids, on the other hand, pass into the lacteals. The combination of fat and lymph in the lacteals is milky in appearance and is called chyle. Individual lacteals merge to form larger lymphatic vessels that transport the fats to the thoracic duct which empties into the left subclavian vein. At this point, the fats are in the bloodstream. They can be converted to lipoproteins (HDL, LDL or VLDL) in the liver or be transported to tissues throughout the body and stored in adipose cells as triglycerides.

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Foods which are still undigested pass on in a liquid state into the large intestine, and are now called faeces. The large intestine, an organ which is now more commonly referred to by its Greek name, the colon, is the last part of the digestive system. Its function is to absorb the remaining water from indigestible food matter, store this unusable food matter (wastes) and then eliminate the wastes from the body.



Villi of small intestine, showing blood vessels and lymphatic vessels (lacteals).

A lacteal is a lymphatic capillary that absorbs dietary fats in the villi of the small intestine.

*What do the following words refer to ?

- aa. "Much undigested material is still present*" → "Present" means in the...
- bb. "it* is further mixed" → "It" refers to...
- cc. "It* is not an enzyme, however" → "It" refers to...
- dd. "This* is useful in neutralizing the acidic gastric acid" → "This" refers to...
- ee. "Its* inner surface is covered with ... villi" → "Its" refers to ...

True or False ? (Explain)

- xv. In every organ of the digestive tract, different enzymes are secreted to break down different nutrients.
- xvi. The major processes of digestion (i.e. conversion and absorption) are completed in the small intestine.
- xvii. All carbohydrates are eventually broken down into glucose and absorbed.
- xviii. Fructose is healthier than glucose.

Questions : (1) Ask questions about the following points, then (2) let someone else answer in a complete sentence (3) using as many of the suggested terms as possible.

WHERE (×3) – HOW (×2)

17. *The region in which* the conversion of nutrients is completed. *The means by which this is accomplished.* → ...

in the – by – action of – and – which – secreted by – and

The conversion ...

18. *The place and manner in which* nutrients are absorbed. → ...

in the – of – small – Simple – and – acids – blood – directly – whereas – and – through – into – which – to

All nutrients are ...

19. *Region(s) in which* the major processes of digestion occur. → ...

mouth – major – in the – which – into chyme – and begins – proteins – as well as in – where – completed by – and – and – absorbed by – villi

Although the process ...

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20. Make up one original question of your own relating to this section of the article, and write a 2-3 line answer to it using information either from the article or from outside sources.

6. A well-balanced diet is *necessary* for growth and energy.
7. *In contrast with* milk, beef contains no vitamin A and no vitamin C.
8. Glycogen, derived from glucose, is stored for *later use*.

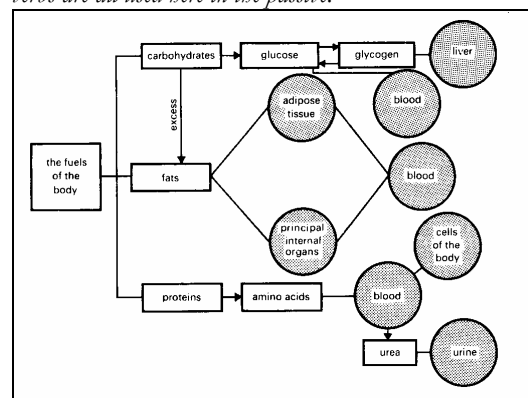
The Process of Digestion :

Region	Agent / Action	Effect
Mouth	Chewing	Break the food into smaller pieces. Expose more surface area.
	Saliva	Moisten food to facilitate swallowing
	Ptyalin	Begin the conversion of starch into simple sugars
Stomach	Pepsin	Begin the process of converting proteins into amino acids
	Peristalsis	Churn the food particles into a semi-solid mass known as chyme
Small Intestine	Bile	Complete the digestion of proteins, starches and fats
	Pancreatic enzymes (Lipase, Diastase)	
	Intestinal Enzymes (Erepsin, Invertase)	
	Blood Capillaries (inside the villi)	Absorb glucose, fructose, galactose and amino acids into the bloodstream
	Lacteals (inside the villi)	Absorb glycerol and fatty acids into the lymph

Rephrasing Rewrite the following sentences replacing the words printed in italics with expressions from the reading passage which have the same meaning.

1. Cereal grains are one of the *main* sources of carbohydrate in the diet.
2. Glucose *which is not needed immediately* is converted into glycogen.
3. Carbohydrates are stored in the liver *as* glycogen.
4. The liver reconverts some of its glycogen when the blood sugar concentration *falls*.
5. If *too much* sugar is *ingested*, it is excreted in the urine.

Language Use Use the verbs absorb, convert and store to complete the following sentences. N.B. The verbs are all used here in the passive.



- (a) Carbohydrates _____ into glucose.
- (b) Glucose _____ glycogen.
- (c) Glucose _____ into the blood.
- (d) Glycogen _____ the liver.
- (e) Glycogen _____ back into glucose, and this _____ into the blood.
- (f) Fats _____ in _____ and round the _____
- (g) Proteins _____ into _____
- (h) Amino acids _____ into the blood.
- (i) The amino acids not needed by the cells of the body _____ into urea and excreted in the _____

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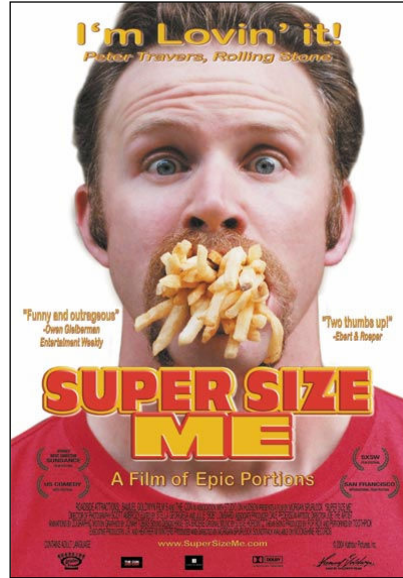
Super Size Me is an Academy Award-nominated 2004 documentary film written, produced, directed by and starring Morgan Spurlock, an American independent filmmaker. Spurlock's film follows a 30-day time period (February 2003) during which he subsists entirely on food and items purchased exclusively from McDonald's, and the film documents this lifestyle's drastic effects on Spurlock's physical and psychological well-being and explores the fast food industry's corporate influence, including how it encourages poor nutrition for its own profit.

During the filming, Spurlock dined at McDonald's restaurants three times per day, sampling every item on the chain's menu at least once. Also, if asked to Super Size his meal, he must. He consumed an average of 5,000 kcal (the equivalent of 9.26 Big Macs) per day during the experiment. After thirty days, he gained 24.5 lb (11.1 kg), a 13% body mass increase, and his Body Mass Index rose from 23.2 (within the 'healthy' range of 19-25) to 27 ('overweight'). He also experienced mood swings, sexual dysfunction, and liver damage. It took Spurlock fourteen months to lose the weight he gained.



Big Mac Nutritional Value, %RDA (USA):
540 kcal, Carb. 45g (15%), Protein 25g (45%), Fat 29g (45%), Dietary fiber 3g (12%), Salt 1040mg (43%), Weight 214g

Subsequent to the showing of the film at the 2004 Sundance Film Festival, the Supersize fries and beverage were retired from the menu and McDonald's replaced them with healthier foods, though McDonald's denied that this was in reaction to the movie. The corporation did, however, issue a press release on their website, denouncing Spurlock's film and blaming the filmmaker for being a part of the problem, and not the solution.



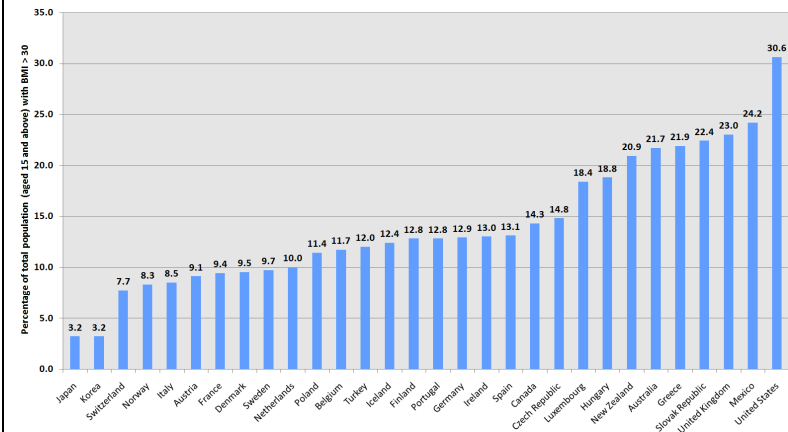
Malnutrition is a general term for a medical condition caused by an improper or insufficient diet. It most often refers to undernutrition resulting from inadequate consumption, poor absorption, or excessive loss of nutrients, but the term can also encompass overnutrition, resulting from overeating or excessive intake of specific nutrients. An individual will experience malnutrition if the appropriate amount of, or quality of nutrients comprising a healthy diet are not consumed for an extended period of time. An extended period of malnutrition can result in starvation, disease, and infection.

Malnutrition is the lack of sufficient nutrients to maintain healthy bodily functions and is typically associated with extreme poverty in economically developing countries. Malnutrition as the result of inappropriate dieting, overeating or the absence of a "balanced diet" is often observed in economically developed countries (eg. as indicated by increasing levels of obesity).

Most commonly, malnourished people either do not have enough calories in their diet, or are eating a diet that lacks protein, vitamins, or trace minerals. Medical problems arising from malnutrition are commonly referred to as deficiency diseases. Scurvy is a well-known and now rare form of malnutrition, in which the victim is deficient in vitamin C.

In 2006, Professor Popkin from the University of North Carolina, said there were now more overweight people across the world than undernourished people. He told the International Association of Agricultural Economists the number of overweight people had topped one billion (of which 300 million are obese), compared with 800 million undernourished. He added this transition from a starving world to an obese one was accelerating.

Country	Number of Undernourished (million)
1. India	198.0
2. China	150.0
3. Bangladesh	43.1
4. Democratic Republic of Congo	37.0
5. Pakistan	35.2
6. Ethiopia	31.5
7. Tanzania	16.1
8. Philippines	15.2
9. Brazil	14.4
10. Indonesia	13.8



Obesity : Percentage of total population (aged 15 and above) in the population of OECD countries with a body mass index greater than 30 (1996 to 2003).

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- absorb / absorber
- adipose tissue / le tissu adipeux
- albumin / l'albumine (f.)
- alcohol, Abbr. : ETOH / l'alcool
- alkaline / un alcalin
- amino acid / un acide aminé
- amount / une quantité
- as long as / tant que
- aspirin / l'aspirine
- ATP / l'ATP (adénosine triphosphate)
- available / disponible
- bean / un haricot, une fève
- bile / la bile
- blood sugar (concentration / level) / le taux de glycémie, de glucose
- bloodstream / le système sanguin
- body / le corps
- brain / le cerveau
- break / casser, briser
- break down into / décomposer
- caffeine / la caféine
- capillary / un capillaire
- carbohydrate / un glucide (un hydrate de carbone)
- cardiac orifice / le cardia
- catalyze / catalyser
- chew / mastiquer, mâcher
- churn / brasser, remuer ("baratter")
- chyle / le chyle
- chylomicron / un chylomicron
- chyme [kaïm] / le chyme (Bouillie formée par la masse alimentaire au moment où elle passe dans l'intestin après avoir subi l'action de la salive et du suc gastrique)
- colon / le côlon
- complete protein / une protéine complète
- contraction / une contraction
- convert (into) / convertir (en)
- corn (US) / le maïs
- counter-signal / un signal de contre-régulation, un antagoniste
- dairy / laitier
- destine for / destiner à
- diet / l'alimentation (aussi : un régime)
- dietary / alimentaire
- digestion / la digestion
- either... or... / ou bien... ou bien...
- empty (of) / vide (de)
- emulsify / émulsionner, émulsifier
- en plus / further
- enzymatic action / l'action enzymatique, des enzymes
- enzyme / un(e) enzyme
- essential / essentiel, indispensable
- eventually / plus tard, tôt ou tard, ultérieurement, NB. "Eventually" n'est pas seulement un faux ami (ce serait un faux sens de traduire par "éventuellement"), cet adverbe ne correspond pas systématiquement non plus à "finalement", même si cette traduction est indiquée dans les dictionnaires.
- excess / en trop, excédentaire
- excrete / excréter
- f(a)eces / les fèces
- fall / (re)tomber, chuter
- fast(ing) / le jeûne, à jeun
- fat / un lipide, une matière grasse, la graisse
- fatty acid / un acide gras
- fish / le poisson
- food / la nourriture, un aliment
- fructose / le fructose
- fuel / source d'énergie, aliment, (un "carburant")
- galactose / le galactose
- gall bladder / la vésicule biliaire
- gastric juice / les sucs gastriques
- globule / un globule
- glucagon / le glucagon
- glucose / le glucose
- glycerol / le glycérol
- glycogen / le glycogène
- growth / la croissance (NB. croître, grandir = to grow, grew, grown)
- hair-like / comme un cheveu, filiforme
- heart muscle / le muscle cardiaque
- hydrochloric acid / l'acide chlorhydrique
- in many respects / à bien des égards
- incomplete protein / une protéine incomplète
- increasing / croissant, en augmentation
- inner / interne, intérieur
- insulin / l'insuline
- intake / la consommation, la quantité absorbée ou ingérée
- ion / un ion
- ketone body / un corps cétonique
- lack / manquer de, ne pas posséder
- lacteal / un vaisseau chylifère, une veine lactée (ainsi nommée à cause de la couleur blanchâtre du chyle)
- large intestine / le gros intestin
- layer / une couche, une épaisseur
- liver / le foie
- lymphatic system / le système lymphatique
- lymphatic vessel / un vaisseau lymphatique
- main / principal
- mainly / principalement, surtout
- meal / un repas
- meat / la viande
- meet / satisfaire, répondre à
- membrane / une membrane
- merge / fusionner, se rejoindre
- metabolism / le métabolisme
- milky / laitieux, blanchâtre
- minute / minuscule
- moisten / mouiller, humecter
- mouth / la bouche
- mucus / le mucus, les mucosités
- neutralize / neutraliser
- nitrogen / l'azote (m.)
- nutrient / un nutriment
- oesophagus / l'œsophage
- oil / l'huile
- package into / emballer
- pancreas / le pancréas
- pancreatic juice / le suc pancréatique
- particle / une particule
- pepsin / la pepsine
- peristalsis / le péristaltisme
- pH / le pH
- plentiful / abondant
- portal vein / la veine porte
- process / traiter, transformer
- produce / produire NB. ne pas confondre le verbe "to produce" et le nom "a product"
- protein / une protéine
- ptyalin / la ptyaline (amylase salivaire)
- pyloric sphincter / le sphincter pylorique, le pylore
- rather / plutôt (que cela), au contraire
- readily / facilement, aisément
- rebuild / reconstruire
- refer to (as) / désigner
- relaxation / la décontraction, le relâchement
- release / (re)lâcher
- rely on / dépendre de, être dépendant de
- remain / rester
- remaining / restant
- rice / le riz
- rise / s'élever, augmenter
- saliva / la salive
- secrete / sécréter
- secrete / sécréter
- share / partager
- simple sugar / un glucide simple, un hexose
- skeletal muscle / le muscle strié squelettique
- small intestine / l'intestin grêle
- starch / l'amidon
- starvation / l'inanition, la faim
- stomach / l'estomac
- store / conserver, stocker, mettre en réserve
- subclavian / la veine sous-clavière
- sugar / un sucre, un glucide
- swallow / avaler
- sweep (NB. sweep/swept/swept) / balayer, parcourir
- synthesis / la synthèse
- take in / ingérer, absorber, assimiler
- take place / avoir lieu
- thereby / ainsi, de ce fait, par ce moyen
- thoracic duct / le canal thoracique
- throughout / partout (dans...), partout (à travers...)
- triglyceride / un triglycéride
- unlike / différent de, à la différence de, contrairement à
- urea / l'urée (nf.)
- urine / les urines
- use / l'usage, l'utilisation – NB. pronounciation "a use" [s], "to use" [ʒ]
- variety (of) / un mélange (varié)
- vegetable / un légume
- villus (pl. villi) / une villosité
- wall / la paroi
- waste(s) / les déchets
- wave / une onde
- wheat / le blé, le froment
- yield / produire, donner, rapporter