

7. Describe the two main groups of leucocytes.
8. What do you know about monocytes?
9. What are the thrombocytes?
10. What is plasma?
11. Describe the different blood groups.
12. What is transfusion?
13. What is Rh factor?
14. What is anaemia and how can it be treated?
15. What disorders of blood do you know?

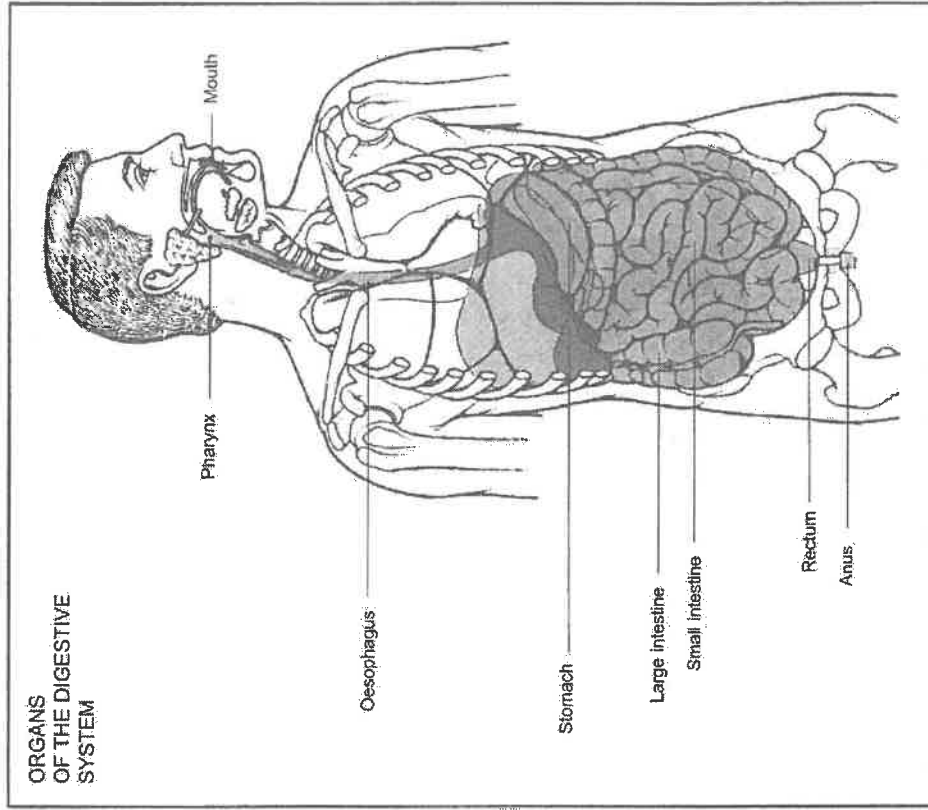
Translate:

krevní oběh; nedostatek kyslíku; hromadění odpadních produktů; patogen-
ní organismy; získání krevního vzorku; buňky klesají ke dnu; plazma
zůstává nahoře; skládá se z červených buněk; červené krvinky; bílé
krvinky; obsahuje hemoglobin; látka produkovaná ledvinami; zdravá kostní
dřeň; krevní destičky; mizní uzliny; jsou vylučovány ve stolici; ochraňuje
tělo proti infekci; prochází skrze stěny kapilár; jsou plně využity; proces
ničení bakterií; reakce na alergické procesy; senná rýma; jsou pouze
málo rozlišitelné; infekce, která přetrvává po určité době; různé velikosti;
délka života kolísá; jsou podstatny pro život; hrají důležitou roli; uvolňování
tekutiny; poškození žilních stěn; pohybují se volně; přítomnost antigenů;
shoduje se s pacientovou krevní skupinou; reakce může být smrtelná;
dostat transfuzi

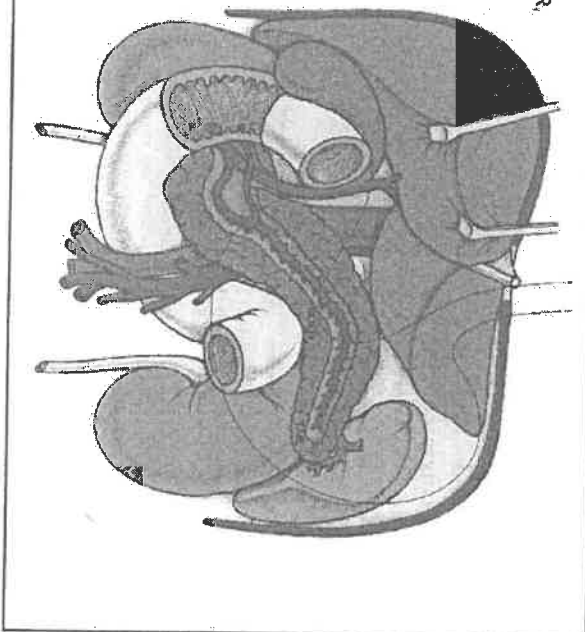
11. THE DIGESTIVE SYSTEM

The function of the digestive system is to digest food, absorb nutrients into the blood and eliminate any solid wastes. It is composed of:

1. A group of organs that form a tube to carry food from the mouth to the anus,
2. Several accessory organs that aid in digestion.



LIVER,
GALLBLADDER,
PANCREAS,
SPLEEN



Fats are stored in the liver and other fat deposits in the body and when required, they are taken to the liver and spit into fatty acids and glycerol. The bile leaves the liver through the hepatic duct that divides into the common bile duct (it carries bile into the small intestine) and the cystic duct that transports bile to the gallbladder for storage.

The Gallbladder

It is on the undersurface of the liver with an average capacity of 40 – 50 ml. When food containing fat and partially digested proteins enters the duodenum, a hormone is secreted by cells of the duodenal mucus; it is carried in the blood and, on reaching the gallbladder, stimulates the smooth muscle tissue to contract and eject bile.

The Pancreas

The pancreas lies on the left side of the abdominal cavity under the stomach. Pancreatic cells produce secretions and enzymes, where starches, fats and proteins break down into nutrients that can be absorbed into the blood.

Digestion

Three processes must occur to convert food into a form that can be used by the body: digestion, absorption and metabolism.

The digestion process takes 12 to 48 hours, depending upon the type and quantity of food consumed. There are two types of digestion: mechanical and chemical.

Mechanical changes in the food involve breaking relatively large pieces into very small and changing solid food into liquid form, but they cannot completely prepare food for use in the body.

Chemical digestion begins with the addition of the enzyme ptyalin to the food. Three salivary glands secrete ptyalin:

1. The parotid glands, located behind the upper jaw just below each ear,
2. The submaxillary glands, found in the floor of the mouth beside the lower jaw,
3. The sublingual glands, located under the tongue.

No digestive changes occur in the oesophagus; additional digestive processes begin in the stomach. How long food remains in the stomach depends upon the type of food consumed – carbohydrates leave the stomach more quickly than fats or proteins.

Digestion is complete when nutrients have been reduced to their simplest form: carbohydrates have become monosaccharides (glucose, fructose or galactose), proteins have become amino acids and fats have been broken down into fatty acids and glycerides. These substances must be absorbed before the body can use them. Absorption of nutrients occurs in all three sections of the small intestine, and absorption of water in the large intestine.

Metabolism is the process, by which the body uses nutrients for energy and the building of body tissue. Two processes are involved in metabolism:

- a) Anabolism – the building, repairing and maintaining of the tissue,
- b) Catabolism – the breaking down of tissues and excretion of the by-products.

When the products of carbohydrate digestion are absorbed into blood through the villi, these nutrients are transported to the liver, where fructose and galactose are changed to glucose. If glucose is not needed immediately for energy, the liver converts extra glucose into **glycogen**, which is stored in the liver. The body produces many substances to regulate the

level of glucose in the blood. When it is high, insulin converts the glucose into glycogen.

Insulin is a hormone produced in the pancreas; an increase in the blood glucose level stimulates the pancreas to secrete additional insulin, which results in a lowering of the blood sugar level. Several hormones may also raise the blood glucose level, as glucagon, produced by the pancreas; cortisone and epinephrine, produced by the adrenal glands; growth hormone and ACTH (adrenocorticotrophic hormone), produced by the pituitary glands; and thyroxin, produced by the thyroid gland.

Common disorders of the gastro-intestinal system.

Conditions of the mouth vary in severity from a mild inflammation to serious pathological changes such as cancer. Inflammation of the mucous membrane of the mouth is called **stomatitis**. Herpes simplex and fever blisters are viral infections that occur where mucous membrane joins the skin. Symptoms of **stomach disorders** include indigestion, nausea, vomiting and pain. Inflammation of the stomach lining is **gastritis**. When gastritis is accompanied by diarrhoea, the condition is called gastro-enteritis and involves the inflammation of both upper and lower tracts. Complete rest of the digestive system and administration of intravenous fluids may be required to control the symptoms.

Lesions of the upper digestive tract are called **peptic ulcers**. In the early stages they are treated with a diet, rest and medication. A large lesion may require surgical repair. The complications of the ulcer are haemorrhage and perforation.

Removal of all the stomach (for instance at the presence of a tumour) is called **gastrectomy**.

The inflammation of the small intestine is called **enteritis**; the infection in the large one is **colitis**. It is caused by bacteria, viruses and parasites. A regional enteritis, known as **Crohn's disease** is a chronic type.

Chronic inflammation that results in ulceration of the colon lining is called **ulcerative colitis**, caused mostly by emotional problems.

If the tiny lumen of the appendix becomes obstructed with faecal material and inflamed, we speak about **appendicitis**. The appendix then must be removed surgically as soon as possible, because if it has ruptured, the patient develops peritonitis, which is usually severe and dangerous.

When the enlarged veins (varicose veins) that are distended with blood occur in the rectum, we speak about haemorrhoids. Internal haemorrhoids

are located inside the anal sphincter, the external ones can be found outside the anus. Surgical excision is called haemorrhoidectomy. It is not a complicated procedure, but the postoperative period is painful.

One of the first symptoms of liver dysfunction is related to the secretion of bile. When the liver fails to remove bilirubin from the blood, its accumulation gives rise to **jaundice** (yellowing of the skin and the whites of the eyes).

The next common diseases of the liver are hepatitis, cirrhosis and cancer. **Viral hepatitis** is an inflammation that destroys liver cells. It is a serious illness that does not respond to drug therapy, but permanent liver damage is rare because new liver cells eventually replace the damaged ones. Convalescence is lengthy, sometimes requiring 3 to 6 months.

The exact reason for the **cirrhosis**, when normal liver cells are replaced by fibrous tissue, which results in hardening or scarring of the liver, is not known, but there is a relationship between alcoholism and the disease. There is no cure again, treatment is long and requires changes in the patient's life-style and a diet full of vitamins.

Inflammation of the gallbladder is called **cholecystitis** (caused by fats); and inflammation of the pancreas (mostly as a complication of a viral or bacterial infection) is called **pancreatitis**.

If the pancreas does not produce sufficient insulin to allow glucose to enter the body cells, the condition called **diabetes mellitus** develops. It may be hereditary and often occurs after the age of 50. Sometimes it can also develop as a secondary feature to another disorder or following the administration of certain drugs (corticosteroids).

The diabetes may be controlled by a diet alone, or by the combination of a diet and hypoglycaemic drugs, or diet and insulin. Patients who especially require insulin therapy are often children and young adults.

Insulin is a protein and cannot, therefore, be given orally as it would be destroyed by the gastric juices. It is prepared from the pancreas of cattle and sheep so that it might be given parenterally. There are different types of insulin and treatment involves active participation of the patient.

Tumours of the liver and pancreas are usually malignant and have a high death rate because symptoms do not occur until the tumour is large. Survival after diagnosis is usually less than one year.

VOCABULARY

alimentary canal [æli'mentəri keən]	zažívací ústrojí
anal [eɪnəl]	řiti
bare [beə]	holý, obnažený
bile [baɪl]	žluč
capsule [kæpsju:l]	pouzdro, váček
cholecystitis [kəʊlɪsɪs'taɪtɪs]	zánět žlučníku
cholelithiasis [kəʊlɪl'iθaɪsɪs]	žlučové kaménky
cut off [kʌt ɒf]	odříznout
deplete [de'pli:t]	vypřázdnit
diaphragm [daɪə'fræm]	bránice
diarrhoea [daɪə'ho:ə]	průjem
digestion [dɪ'dʒestʃn]	trávení
duct [dʌkt]	kanálek, vývod
duodenum [dju:'di:niəm]	dvanáctník
flatulence [flæ'tju:ləns]	nadýmání
fundus, pl. fundi [fʌndəs]	dno
gallbladder [gɔ:'blædə]	žlučník
gastric juice [gæs'trɪk dʒu:s]	žaludeční šťáva
gastritis [gæs'traɪtɪs]	zánět žaludku
hepatic [hɪ'pæɪtɪk]	játerní
hernia [he:'nɪə]	kyja
ileum [ɪliəm]	kyčelník
ileus [ɪliəs]	nepůrodnost střevní
indigestion [ɪn'dɪdʒestʃn]	špatné trávení
intestine [ɪn'testɪn]	střevo
small intestine [smɔ:lɪ]	tenké střevo
large intestine [dɑ:dʒ]	tlusté střevo
jaundice [dʒɔ:'ndɪs]	žloutenka
jejunum [dʒɪ:'dʒu:niəm]	lačník
nodular [nɒdju:lə]	uzlovitý
pancreas [pæŋkriəs]	slinivka břišní
pancreatitis [pæŋkriə'taɪtɪs]	zánět slinivky břišní
pelvic [pevɪk]	pánevní
peptic ulcer [peptɪk ʌl:sə]	žaludeční vřed
perforation [pe:'fɔ:reɪʃn]	průřezání, perforace
peristalsis [pe:'rɪstəɪsɪs]	peristaltika

peritoneum [perɪ'tɪni:əm]	pobřišnice
peritonitis [perɪ'taɪtɪs]	zánět pobřišnice
pylorus [paɪ'lɔ:əs]	vrátník
rectum [rektəm]	konečník
residue [rezɪdju:]	zbytek, usazenina
salivary gland [sæ'lɪvəri glænd]	slinná žláza
parotid salivary gland [pə'rɔʊd]	příušnicová slinná žláza
sublingual salivary gland [sʌb'lɪŋgwəl]	podjazyková slinná žláza
submaxillary salivary gland [sʌb'mæksɪləri]	podčelistní slinná žláza
scarring [skærɪŋ]	zjizvení
sphincter [sfnktə]	svěrač
spleen [spli:n]	slézina
stenosis [ste'nəʊsɪs]	zúžení
stool [stʊ:l]	stolice
swelling [swelɪŋ]	otok
uvula [ju:'vju:lə]	čípek
varix, varices [veərɪks, veərɪsɪz]	křečové žíly
veriform appendix [ve:'mɪfɔ:m ə'pendɪks]	červovitý přívěsek
villus, pl. villi [vɪləs, vɪlaɪ]	klik
viscera [vɪsərə]	útroby

QUESTIONS AND EXERCISES

Answer:

1. What is the function of the digestive system?
2. What is the digestive system composed of?
3. What organs are in the buccal cavity?
4. What are the salivary glands?
5. Describe the oesophagus.
6. Describe the stomach and its functions.
7. What are the accessory organs of the digestive system?
8. Describe the liver.
9. What is the function of bile?
10. Describe the gallbladder.
11. Describe the function of the pancreas.

12. List 6 types of nutrients.
13. Speak briefly about two types of digestion.
14. What is metabolism?
15. What disorders of the gastro-intestinal system do you know?

Translate:

trávicí soustava; přídatné orgány; zažívací ústrojí; trávit jídlo; vylučovat zbytky; lícni dutina; tvrdé patro; měkké patro; čípek; nosohltan; patrový oblouk; chuťové pohárky; kyselý; slaný; hořký; polykací mechanismus; peristaltický pohyb; částečně strávené jídlo; tenké střevo; trvá to asi šest hodin; voda se vsřebává; pokud se tyče délky, je tlusté střevo kratší; leží v horní části dutiny břišní; produkují hormony, uchovávají výměšky; přinášejí chemikálie; klínovitý orgán; játra jsou pokryta pobříšnicí; podstatný pro život; ničí toxické látky; uchovává glukózu; produkuje žluč; vsřebávání tuků; tukové zásoby v těle; rozštěpit na tukové kyseliny; přidání pyalínu do potravy; anabolické a katabolické procesy; reguluje hladinu glukózy v krvi; přeměnit glukózu na glykogen; špatné trávení; nevolnost; průjem; zvracení; zácpa; žaludeční vředy; to může být chirurgicky odstraněno; zánět slepého střeva; pooperační období je bolestivé; nahradit zničené buňky; nereaguje na lékovou terapii; zotavení bude vyžadovat celý měsíc

12. THE RESPIRATORY SYSTEM

The respiratory system is associated with the exchange of gases between man and his environment and also between the tissue cells and the blood. All body cells need a continuous supply of oxygen and also need to be able to get rid of carbon dioxide, which is produced by cell metabolism. These functions are achieved by **ventilation** that involves the passage of air from the atmosphere to the alveoli and from the alveoli back to the atmosphere. This consists of two acts:

- a) **Inspiration** – or taking air into the lungs, because of the negative interpleural pressure created by enlarging of the thoracic cavity,
- b) **Expiration** – or exhaling air out of the lungs during which the muscles of respiration return to their former position.

The movement of gases from a region of high tension to a region of low tension takes place through the capillary/alveolar membrane.

This process is termed **diffusion**. When blood passes through the lung capillaries, the tension of oxygen in the alveoli is higher than that of the blood and it passes through the membrane to a region of lower tension. Respiration consists of two phases; external and internal.

External respiration involves the exchange of oxygen and carbon dioxide in the capillaries and alveoli of the lungs.

Internal respiration is the exchange of oxygen and carbon dioxide between cells and capillaries through the body.

The structures concerned with ventilation are the upper and lower respiratory tracts, respiratory muscles, thorax and portions of the nervous system.

Upper Respiratory Tract

The upper airway is formed by the nose, mouth, pharynx and larynx. Air passes through the two nostrils (nares) into the nasal cavities, which are separated by the nasal septum. There is a moist mucous membrane lining and an abundance of capillaries.

The cavities have three bony protuberances called **conchae**, where the air is warmed and moistened. Thousands of tiny hairs called **cilia** protrude from the lining of the nasal cavity; their purpose is to filter dust particles from the air.

Several small cavities known as **sinuses** are located in the skull near the nasal cavities: ethmoidal sinus, sphenoidal sinus, maxillary sinus and