Contents

Splanchnology *(splanchnologia)*

Splanchnology is the science studying structure of viscera. The viscera or organs (viscera, *s. splanchna*) are organs, which are situated mainly in the body cavities (oral, nasal, thoracic, abdominal, and pelvic). The related organs with some common function form systems.

The ***digestive*** or ***alimentary*** system consists of the organs and glands associated with ingestion, mastication (chewing), deglutition (swallowing), digestion, and absorption of food and the elimination of feces (solid bodily waste) remaining after the nutrients have been absorbed.

The ***respiratory system*** consists of the air passages and lungs that supply oxygen to the blood for cellular respiration and eliminate carbon dioxide from it. The diaphragm and larynx control the flow of air through the system, which may also produce tone in the larynx that is further modified by the tongue, teeth, and lips into speech.

The ***urinary system*** consists of the kidneys, ureters, urinary bladder, and urethra, which filter blood and subsequently produce, transport, store, and intermittently excrete urine (liquid waste).

The ***reproductive*** or ***genital system*** (female and male) consists of the gonads (ovaries and testes) that produce oocytes and sperms, hormones and the genitalia that enable their union. After conception, the female reproductive tract nourishes and delivers the fetus.

The ***endocrine system*** consists of discrete ductless glands (such as the thyroid gland) as well as isolated and clustered cells of the gut and blood vessel walls and specialized nerve endings that secrete hormones. *Hormones* are organic molecules that are carried by the circulatory system to distant effector cells in all parts of the body. The influence of the endocrine system is thus as broadly distributed as that of the nervous system. These glands influence metabolism and other processes, such as the menstrual cycle.

Structure of the internal organs

By their structure all the internal organs are divided into two groups: tubular organs and parenchymatous organs.

The wall of the tubular organs has a common structure, consisting of few layers:

1. The mucous coat *(tunica mucosa)*.
2. The submucous layer *(tela submucosa)*.
3. The muscular coat *(tunica muscularis)*.
4. The serous coat *(tunica serosa)*, or the adventitious coat *(tunica adventitia)*.

1. The **mucous coat** consists of:

a) *epithelial lamina*, epithelial lining of the mucosa. The epithelium of the mucous coat differs according to the segments of the alimentary tract. The epithelium has a protective role;

b) *proper lamina* forms the connective-tissue foundation of the mucosa. It consists of loose fibrous connective tissue, which contains lymph nodules, glands, lymph and blood capillaries, nerves. The glands of the mucosa are divided into unicellular glands (located between the epithelial cells) and multicellular glands (located in the mucous and submucous coats);

c) at the boundary with the submucous layer the *muscular lamina* is located, represented by a thin layer of smooth muscle fibers. Under contraction of the muscular lamina the mucous coat forms folds.

2. The **submucous layer** consists of connective tissue and within this layer glands, lymph and blood vessels, lymph nodules are located. Due to the presence of the submucous layer the mucous coat forms folds. The folds can be: circular, longitudinal, semilunar, or to be chaotically arranged to form a network.

3. The **muscular coat** usually consists of two layers of muscle fibers. In the initial and end parts of the alimentary tract the muscle fibers are striated, but in the middle part of the alimentary canal the muscle cells are smooth.

Usually the internal layer of muscle is circular, and the external is longitudinal, but there are some exceptions (e.g. the muscular coat of the stomach consists of three layers of muscle fibers: external-longitudinal, middle-circular and internal oblique layer). Contractions of the muscular fibers are

peristaltic in character and spread toward the distal end of the intestine. The circular layer constricts the lumen of the intestine and forms sphincters along the alimentary canal.

4. The **serous coat** is the external coat for the most organs of the abdominal cavity and it was named *peritoneum*. It consists of loose fibrous connective tissue having a protective role for organs that it invests. The serous coat of the lungs was named *pleura* and the serous coat of the heart is the *pericardium*. The organs that are not covered outside by serous membrane are invested by adventitious coat, *tunica adventitia*.

The **parenchymatous organs** consist of *parenchyma* and *stroma*. These organs possess a *hilum* through which the vessels and nerves enter or leave the organ. The parenchymatous organs usually consist of lobes, segments, and lobules. They perform specific functions that cannot be assured by other organs (e.g. exchange of gases, discharge of metabolic wastes, production of hormones and enzymes etc.).

— The *parenchyma* is formed of high specialized elements that assure specific functions of organs.

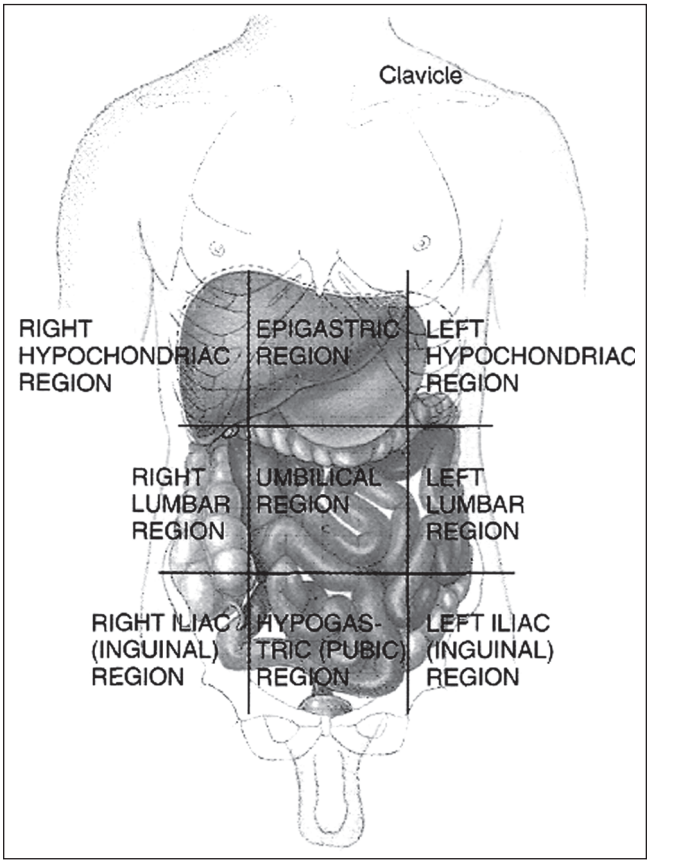

Fig. 1. Organs projection onto anterior abdominal wall

— The *stroma* consists of connective tissue that sustains the parenchyma, gives off interlobar, interlobular septa and leads the vessels and nerves within the organ. The stroma is like a soft skeleton of an organ.

Topography is the part of anatomy, which studies the orientation of organs. It includes: *holotopy (Fig. 1)* — location of organs in regions of the body; *skeletotopy* — projection of an organ on skeleton; *syntopy* — position of an organ relative to other organs.

Holotopy

Regions	Representative structures
Right hypochondriac	Right lobe of liver, gallbladder, superior third of right kidney
Proper epigastric	Left and right lobe of liver, lesser curvature and pyloric part of stomach, superior and descending part of duodenum, head and body of pancreas, suprarenal glands
Left hypochondriac	Body and fundus of stomach, spleen, left colic flexure, left kidney, tail of pancreas
Right lumbar	Superior part of cecum, ascending colon, right colic flexure, right kidney, part of small intestine
Umbilical	Middle part of transverse colon, part of small intestine
Left lumbar	Descending colon, inferior third of kidney, part of small intestine
Right inguinal	Lower part of cecum, appendix, part of small intestine
Hypogastric (pubic)	Urinary bladder (full), part of small intestine, part of sigmoid colon
Left inguinal	Junction of descending and sigmoid colon, part of small intestine

Digestive system *(systema digestorium)*

The digestive process takes place in the ***digestive tract***, or ***alimentary canal***, which extends from lips to the anus. The alimentary canal consists of the mouth, pharynx, esophagus, stomach, small intestine, large intestine with rectum, anal canal, and anus. The associated structures include the teeth, lips, cheeks, salivary glands, pancreas, liver, and gallbladder *(Fig. 2)*. Parts of the digestive tract have

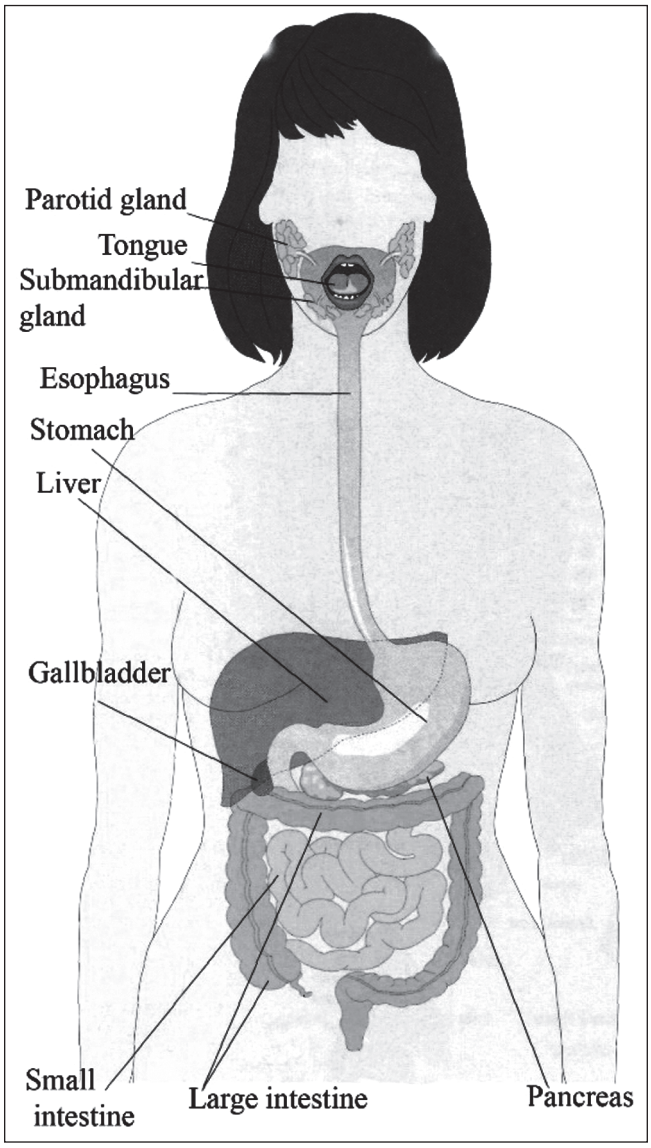

Fig. 2. Digestive system

specific functions, but all are composed of the same basic layers of tissue. The wall of the tube (from the inside to the outside) is composed of mucosa, submucosa, muscular, and serosa membranes.

Mouth

The structures within the mouth allow us to taste and masticate (chew) food, to swallow food and drink, and to manipulate the air that comes up from the voice box so that we can form words. Mucins as secret of salivary gland are the principal organic constituents of mucus, the slimy viscoelastic material that coats all mucosal surfaces. Compelling evidence suggests that they play an integral role in non-immune protection of the oral cavity. Specific protective functions include: 1) protection against desiccation and environmental insult, 2) lubrication, and 3) antimicrobial effects against potential pathogens. Teeth are necessary for chewing and speaking. But baby teeth ("first teeth") serve another very important purpose — they save space for the child's future permanent teeth. If teeth on either side of the open space encroach upon the empty space, there may not be room for the permanent tooth. The new permanent tooth may erupt out of its proper position and can affect positioning of other teeth. If teeth become crowded and out of alignment with each other, then the teeth are malocculaded. Malocculaded teeth are difficult to clean, have greater chances of becoming diseased and later might require expensive and time-consuming orthodontic treatment.

The **mouth**, or **oral cavity** *(cavitas oris)* *(Fig. 3)* consists of two parts: the small, outer vestibule of the mouth and the oral cavity proper.

The vestibule *(vestibulum oris)* is the slitlike space between the lips, cheeks, teeth and gingivae. The upper and lower lips *(labium superius et labium inferius)* are formed by the *m. orbicularis oris*, which is covered by the skin and mucous membrane. The parts of the lip: 1) pars cutanea, 2) pars intermedia (red), 3) pars mucosa. There is a fissure between the lips. The mucous membrane forms two folds — frenulum of the upper lip and frenulum of the lower lip *(frenulum labii superioris et frenulum labii inferioris)*.

The cheek *(bucca)* is formed by the *m. buccinator*, which is covered by the skin and mucous membrane. There is corpus adiposum buccae *(corpus adiposum buccae)* inside the cheek.

The proper oral cavity *(cavitas oris propria)* is bordered from the vestibule by the teeth and gingivae. Proper oral cavity has two walls. The superior wall ("roof of the mouth") or palate *(palatum)* has two sections: hard and soft palate.

The hard palate *(palatum durum)* is formed by the palatum osseum and mucous membrane.

The soft palate *(palatum molle)* is formed by the striated muscles and mucous membrane. The sections of the soft palate: 1) uvula *(uvula)*; 2) velum palatinum *(velum palatinum)*; 3) palatoglossal arch *(arcus palatoglossus)*; 4) palatopharyngeal arch *(arcus palatopharyngeus)*. There is tonsillar sinus or fossa between the arches of the soft palate, and this sinus contains palatine tonsil *(tonsilla palatina)*.

Muscles of the soft palate: 1) m. uvulae *(m. uvulae)*, 2) levator veli palatini *(m. levator veli palatini)*, 3) tensor veli palatini *(m. tensor veli palatini)*, 4) palatoglossal muscles *(m. palatoglossi)*, 5) palatopharyngeal muscles *(m. palatopharyngei)*.

The inferior wall of the proper oral cavity ("floor of the mouth") or diaphragm of the mouth is formed by the suprahyoid muscles of the neck which are covered by the mucous membrane.

The tongue *(lingua)* is muscle organ covered by mucous coat, aids in digestion by helping to form the moistened, chewed food into a *bolus*, and pushing it toward the pharynx to be swallowed. It also contains taste buds. The tongue also pushes the food against the hard palate, where it is crushed and softened.

External structure. The tongue has:

1. Root *(radix linguae)*.

2. Body *(corpus linguae)* with its upper surface or back *(dorsum linguae)* and inferior surface *(facies inferior linguae)* and lateral margins *(margo linguae)* between them.

3. Top *(apex linguae)*.

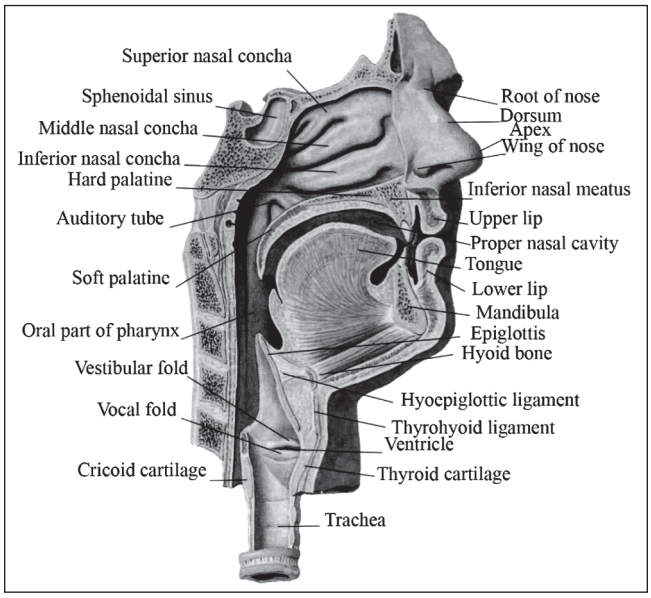

Fig. 3. Sagittal section of head and neck

Paired sublingual folds and unpaired frenulum of tongue *(frenulum linguae)* are situated below the inferior surface and are formed by the mucous membrane. Paired sublingual caruncles are situated near the frenulum linguae.

There is foramen caecum linguae *(foramen caecum linguae)* and terminal sulcus *(sulcus terminalis)* is at the back. The lingual tonsil *(tonsilla lingualis)* is situated behind the terminal sulcus.

The taste buds or papillae *(papillae linguales)* of the tongue:

1) filiform papillae *(papillae filiformes)* are situated at the top of the tongue;

2) conical papillae *(papillae conicae)* are situated at the top of the tongue;

3) fungiform papillae *(papillae fungiformes)* are situated at the top and dorsum of the tongue;

4) vallate papillae *(papillae vallatae)* are situated along terminal sulcus of the tongue;

5) foliate papillae *(papillae foliatae)* are situated at the lateral borders of the tongue.

Muscles of the tongue *(musculi linguae)* are divided into intrinsic and skeletal.

Muscles of the tongue

Name of muscles	Origin	Insertion	Action
A. Skeletal muscles			
Genioglossus	Superior mental spine	Aponeurosis of tongue	Bilateral activity depresses the tongue, pulls it anteriorly
Hyoglossus	Body and upper horn of hyoid bone	Root of tongue	Pulls the root of the tongue downward and backward
Styloglossus	Styloid process of temporal bone	Sides of the tongue posteriorly	Retrudes the tongue and elevates its root
B. Intrinsic muscles			
Superior longitudinal	Root of tongue	Aponeurosis of tongue in area of apex	Elevates apex and sides of the tongue, retrudes it
Inferior longitudinal	Aponeurosis of tongue in area of root	Aponeurosis of tongue in area of apex	Depresses the apex of the tongue, retrudes it
Transverse	Lingual septum	Aponeurosis of tongue in area of its lateral margin	Narrows and protrudes the tongue
Vertical	Aponeurosis of the tongue in area of its back	Aponeurosis of the tongue in area of its inferior surface	Flattens the tongue

The major salivary glands *(glandulae salivariae majores)* are the parotid, submandibular, and sublingual glands.

The paired parotid gland *(glandula parotidea)* is situated in the retromandibular fossa. The duct of the parotid gland *(ductus parotideus)* lies at the *m. masseter*, and at the region of the anterior margin of this muscle perforates *m. buccinator* and opens in the vestibulum of the oral cavity in front of the 2nd molar.

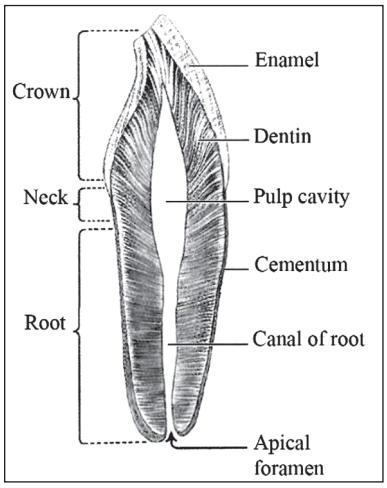

Fig. 4. Structure of the tooth

The paired submandibular gland *(glandula submandibularis)* is situated in the submandibular triangle. The duct of the submandibular gland *(ductus submandibularis)* perforates the oral diaphragm and opens at the caruncula sublingualis. The paired sublingual gland *(glandula sublingualis)* is situated in the plica sublingualis *(plica sublingualis)*. The major duct of the sublingual gland *(ductus sublingualis major)* opens at the caruncula sublingualis *(caruncula sublingualis)* and the minor ducts of the sublingual gland *(ductus sublinguales minores)* open at the plica sublingualis.

The minor salivary glands are: labial, buccal, palatine, lingual, molar. They secrete saliva, which contains water, salts, proteins, and at least one enzyme, salivary amylase, which begins the digestion of cooked starch.

The **teeth *(dentes)*** are located in the tooth sockets of the maxillae and mandible. The alveolar processes are covered by the mucosa or gums *(gingiva)*. The roots of the teeth are connected to the bone by a special type of fibrous joint called a dentoalveolar syndesmosis or gomphosis.

The main functions of the teeth are to:

— incise, reduce, and mix food with saliva during mastication (chewing) to form bolus;

— participate in articulation (distinct connected speech).

A tooth is identified and described on the basis of whether it is deciduous (primary) *(dentes decidui)* or permanent (secondary) *(dentes permanentes)*.

A tooth *(Fig. 4)* has a crown, neck, and root. The crown *(corona dentis)* projects from the gingiva. The neck *(cervix dentis)* lies between the crown and the root. The root *(radix dentis)* is fixed in the tooth socket by the periodontium; the number of roots varies. Most of the tooth is composed of dentin *(dentinum)*, which is covered by enamel *(enamelum)* over the crown and cement *(cementum)* over the root. The pulp cavity *(cavitas dentis)* contains connective tissue, blood vessels, and nerves. The root canal (pulp canal) transmits the nerves and vessels to and from the pulp cavity through the apical foramen on top of root *(apex radicis dentis)*.

The types of teeth *(Fig. 5)*

Name	Characteristic		Function
	Crown	Root	
Incisors *(dentes incisivi)*	Chisel-shaped	Single	Cutting, shearing
Canines *(dentes canini)*	Cone-shaped	Single	Holding, tearing
Premolars *(dentes premolares)*	Two cusps	Single, root of the first upper can be bifurcated	Breaking, crashing
Molars *(dentes molares)*	Three or more cusps	Three (upper), two (lower)	Grinding

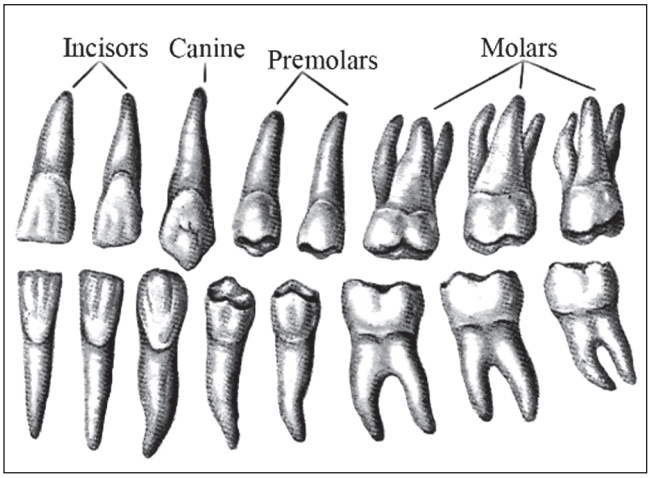

Fig. 5. Type of teeth

Surfaces of tooth crown:

A. The vestibular surface (labial or buccal) *(facies labialis, facies vestibularis, facies buccalis)* of each tooth is directed outwardly.

B. The lingual surface *(facies lingualisis)* is directed inwardly.

C. The mesial (proximal) surface *(facies mesialis)* of a tooth is directed toward the median plane of the facial part of the cranium.

D. The distal surface *(facies distalis)* is directed away from this plane; both mesial and distal surfaces are contact surfaces — that is, surfaces that contact adjacent teeth.

E. The masticatory surface is the occlusal surface *(facies occlusalis)*.

Children have 20 deciduous teeth; adults normally have 32 permanent teeth.

Features of milk teeth: they are smaller, the neck is more marked, the roots of the temporary molar teeth are smaller and more diverging. Apical foramens are wider.

The usual ages of the eruption (cutting) of the deciduous teeth, months

Eruption	Medial incisor	Lateral incisor	Canine	Molar I	Molar II
Upper	7–8	8–9	18–20	14–15	24
Lower	6–7	7–8	16–18	12–13	20–22

A dental formula is a graphic representation of the types, number and position of teeth in the oral cavity.

Formula of the deciduous teeth:

2012	2102
2012	2102

The most usual time of eruption of the permanent teeth, years

Eruption	Medial incisor	Lateral incisor	Canine	Premolar I	Premolar II	Molar I	Molar II	Molar III
Upper	7–8	8–9	11–12	10–11	10–12	6–7	12–13	17–21
Lower	6–7	7–8	9–10	10–12	11–12	6–7	11–13	12–26

Formula of the permanent teeth:

3212	2123
3212	2123

The **dental organ** is tooth + parodontium.

The parodontium is composed of periodontium (connective tissue fixing the tooth), alveola dentis, gums, cementum, which surround the teeth.

Check list

1. Mouth cavity, its parts. Name structures, which border the oral vestibule.
2. Describe the structure of oral cavity proper. Name walls of oral cavity proper.
3. Palate, its portions. Describe the structure of the hard palate. Describe the structure and the function of the soft palate. Muscles of the soft palate.
4. The fauces. Name the structures limiting it.
5. The tonsils of lymphoepithelial ring. Describe its function.
6. Tongue, its structure and functions. Characterize the structure of the mucous membrane of the tongue.
7. Describe the structure and functions of muscles of the tongue.
8. Classification of teeth according to their localization, form and roots. Describe the structure of a tooth (soft and hard tissues). Describe the tooth substance (what does the tooth consist of?).
9. Enumerate the terms and the sequence of the milk teeth eruption.
10. Formula of the deciduous (milk) teeth.
11. Enumerate the terms and the sequence of the permanent teeth eruption.
12. Formula of the permanent teeth.
13. Salivary glands of the mouth cavity. Classification of glands, their topography, structure.

Pharynx

The oropharynx, or pharynx, is a passage that connects the back of the mouth and the nose to the esophagus. This muscular tube, which is lined with mucous membranes, is a part of the respiratory and digestive systems. The top section of the pharynx is an air passage that connects the nasal cavity to the region behind the soft palate of the mouth. The middle section is a passage for both air and food and ends below the tongue. The lowest section is for food only and lies behind and to each side of the larynx, or voice box, merging with the esophagus. The average person breathes in about 13 million cubic feet of air in a lifetime. The air coming from a sneeze may reach a speed of 100 miles per hour. The pharynx is a long, thin muscular tube that connects the pharynx (throat) to the stomach. It forms an

important piece of the gastrointestinal tract and functions as the conduit for food and liquids that have been swallowed into the pharynx to reach the stomach. Stomach acid and chyme (partially digested food) is normally prevented from entering the esophagus due to the lower esophageal sphincter. If this sphincter weakens, however, acidic chyme may return to the esophagus in a condition known as acid reflux. Acid reflux can cause damage to the esophageal lining and result in a burning sensation known as heartburn. Knowledge about pharynx, esophagus and stomach is important for gastroenterologist, surgeon, physician, and therapist.

The **pharynx *(pharynx)*** *(Fig. 3)* is that part of the digestive tube, which is placed behind the nasal cavities, mouth, and larynx. The cavity of pharynx is about 12.5 cm long. Seven cavities communicate with it: two nasal cavities, two tympanic cavities, the mouth, the larynx, and the esophagus.

Topography

Holotopy: behind the nasal and oral cavities and the larynx.

Skeletotopy: base of the skull (basilar part of the occipital bone) along bodies of the six cervical vertebrae, then it continues with esophagus.

Syntopy: posteriorly the anterior group of the deep muscles of the neck. Laterally two tympanic cavities and the vessels and nerves of the neck are situated.

External structure. The cavity of pharynx *(cavitas pharyngis)* may be subdivided into three parts: nasal, oral, and laryngeal. The superior wall of the pharynx is called the fornix *(fornix pharyngis)* of the pharynx.

A. The nasal part *(pars nasalis pharyngis)* of the pharynx, or the nasopharynx. Its anterior wall is occupied by the choanae. On either lateral wall of the pharynx there is a funnel-shaped pharyngeal opening *(ostium pharyngeum tubae auditivae)* of the auditory tube (it is a part of the middle ear) bordered by torus tubarius. The accumulation of lymphoid tissue is located near that last opening and is called the tubal tonsils *(tonsilla tubaria)*. At the junction of the superior and posterior pharyngeal walls there is another accumulation of lymphoid tissue, the pharyngeal tonsil *(tonsilla pharyngealis)*. These six tonsils (lingual, two palatines, two tubal, and one pharyngeal) form lymphoepithelial ring.

B. The oral part *(pars oralis pharyngis)* of the pharynx reaches from the soft palate to the level of the hyoid bone. It is mixed in function because the alimentary and respiratory tracts intersect here. The oral part communicates with the oral cavity in front through the isthmus of fauces *(isthmus fauceum)*.

C. The laryngeal part *(pars laryngea pharyngis)* reaches from the hyoid bone to the lower border of the cricoid cartilage, where it continues with the esophagus. Anteriorly, it presents the triangular entrance of the larynx and is closed by the epiglottis. Its lateral boundaries are constituted by the aryepiglottic medial and lateral folds *(plica glossoepiglottica mediana et plica glossoepiglottica lateralis)*. On either side of the folds there is a piriform recess *(recessus piriformis)*.

Internal structure. The pharynx is a musculomembranous tube, composed of three coats: mucous, muscular, and fibrous. The mucous of nasal part is covered by ciliated epithelium. The fibrous coat of the pharynx, pharyngobasilar fascia is attached above to the basal part of the occipital bone and to the other bones of the base of the skull and stretches forward to the medial plate of the pterygoid process of the sphenoid bone. Superiorly, this fibrous tissue passes on to the buccinator muscle and is called the buccopharyngeal fascia. The pharyngeal muscles *(musculi pharyngis)* are arranged longitudinally (dilators) and circularly (constrictors).

The muscles of the pharynx

Name	Origin	Insertion
Constrictors of the pharynx		
Superior *(m. constrictor pharyngis superior)*	Pterygoid process of the sphenoid bone, mandible, root of tongue	Passes backward and join each other to form a seam on the midline of the pharynx, the pharyngeal raphe
Middle *(m. constrictor pharyngis medius)*	Hyoid bone	
Inferior *(m. constrictor pharyngis inferior)*	Laryngeal cartilages (thyroid and cricoid)	
Dilators of the pharynx		
Palatopharyngeus *(m. palatopharyngeus)*	Pterygoid process	Posterior wall of pharynx
Salpingopharyngeus *(m. salpingopharyngeus)*	Cartilaginous part of auditory tube	Lateral wall of pharynx
Stylopharyngeus *(m. stylopharyngeus)*	Styloid process of temporal bone	Lateral wall of pharynx

Action. When deglutition is about to be performed, the pharynx is drawn upward and dilated in different directions to receive the food propelled into it from the mouth. The stylopharyngei, which are much farther removed from one another at their origin than at their insertion, draw the sides of the pharynx upward and lateralward, and so increase its transverse diameter. As soon as the bolus of food is received in the pharynx, the elevator muscles relax, the pharynx descends, and the constrictors contract upon the bolus, and convey it downward into the esophagus.

Esophagus

The **esophagus** ***(esophagus)*** *(Fig. 2, 6)* or gullet is a muscular canal, about 23 to 25 cm long, extending from the pharynx to the stomach.

Topography

Holotopy: neck, thoracic and abdominal cavities.

Skeletotopy: from the level of the sixth cervical vertebrae to the eleventh thoracic vertebra.

Syntopy:

A. The cervical portion *(pars cervicalis)* of the esophagus adjoins anteriorly to trachea; laterally — to lobes of thyroid gland, common carotid artery and recurrent nerves; posteriorly — to vertebral column and longus colli muscles.

B. The thoracic portion *(pars thoracica)* of the esophagus is at first situated in the superior mediastinum between the trachea and the vertebral column. It then passes behind and to the right of the aortic arch, and descends in the posterior mediastinum along the right side of the descending aorta, then runs in front and a little to the left of the aorta, and enters the abdomen through the diaphragm at the level of the tenth thoracic vertebra. The esophagus adjoins to the trachea, left bronchus, pericardium, vertebral column, longus colli muscles, thoracic duct, hemiazygos veins, vagus nerves.

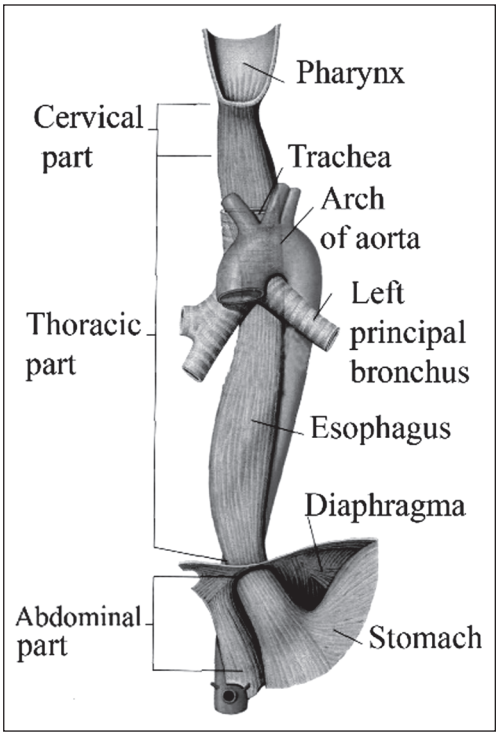

Fig. 6. Esophagus

C. The abdominal portion *(pars abdominalis)* of the esophagus is about 1.25 cm in length, lies in the esophageal groove of the liver.

External structure. The esophagus has three anatomical constrictions:

1. Paraesophageal *(constrictio pharyngoesophagealis)* — at the origin of the esophagus.

2. Aortico-bronchial *(constrictio partis thoracicae)* is a place, where the esophagus is crossed by the aortic arch and the left bronchus.

3. Diaphragmatic *(constrictio diaphragmatica)* is a place, where esophagus crosses through diaphragm.

Internal structure. The esophagus is composed of four coats: mucous, submucous, muscular, and fibrous. The mucous coat is thick, of a reddish color above and pale below. It is disposed in longitudinal folds. The esophageal glands are small, lodged in the submucous tissue. The submucous coat contains blood vessels, nerves, and mucous glands. The muscular coat is composed of skeletal muscles in upper third that is changed with smooth (external longitudinal and internal circular fibers) in other two third. The fibrous coat is the outer coat and consists of loose connective tissue. Abdominal parts are covered by peritoneum.

Stomach

Gastrointestinal tract includes the stomach, small and large intestine. Gastrointestinal stromal tumors is an uncommon type of cancer in the gastrointestinal tract. These types of cancer begin in the connective tissue like fat, muscles, nerves, cartilage, etc. Appendicitis is the inflammation of the appendix, the finger-like pouch that extends from the cecum. The most common symptoms are abdominal pain, loss of appetite, fever, and vomiting. Kids and teenagers are the most common victims of appendicitis and must be treated surgically for this pathology. While mild cases may resolve without treatment, most require removal of the inflamed appendix, either by laparotomy or laparoscopy. Untreated, mortality rate is high, mainly due to peritonitis and shock. Celiac disease is a disorder in

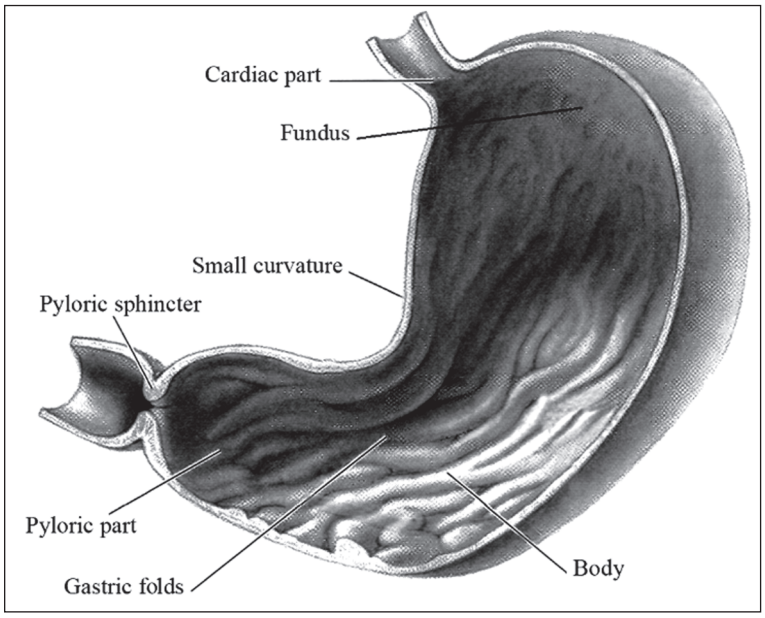

Fig. 7. Stomach

which a person's digestive system is damaged by the response of the immune system to a protein called gluten, which is found in rye, wheat, and barley, and also in foods like breakfast cereal and pizza crust. People with celiac disease experience abdominal pain, diarrhea, bloating, exhaustion, and depression when they eat food with gluten. They also have difficulty with digesting their food. Doctors can diagnose this condition by taking a full medical history or with a blood test. Diverticulitis is a common disease of the bowel, in particular the large intestine. Diverticulitis develops from diverticulosis, which involves the formation of pouches (diverticula) on the outside of the colon. Diverticulitis results if one of these diverticula becomes inflamed. Gastrointestinal infections can be caused by bacteria such as *Helicobacter pylori*, *Salmonella*, *E. coli*, or *Shigella*. A polyp is an abnormal growth of tissue (tumor) projecting from a mucous membrane. If it is attached to the surface by a narrow elongated stalk, it is said to be pedunculated.

The **stomach *(gaster)*** *(Fig. 1, 2, 7)* is the most dilated part of the digestive tube, and is situated between the end of the esophagus and the beginning of the small intestine.

Topography

Holotopy: it is projected onto epigastrium and the left infracostal region.

Skeletotopy: it lies from the level of the eleventh thoracic vertebra to the first-second lumbar vertebrae.

Syntopy: superiorly the stomach adjoins to the diaphragm and visceral surface of the liver; posteriorly — to pancreas, superior pole of the left kidney, left suprarenal gland, lien; inferiorly — to transverse colon and its mesocolon; anteriorly — to anterior abdominal wall.

External structure:

A. The stomach has an anterior wall *(paries anterior)* and posterior wall *(paries posterior)* separated by the lesser curvature *(curvatura minor)* and greater curvature *(curvatura major)*.

B. The following orifices are distinguished in the stomach:

1) the cardiac orifice *(ostium cardiacum)* by which the esophagus communicates with the stomach;

2) the pyloric orifice *(ostium pyloricum)* by which the stomach communicates with the duodenum.

C. Portions of the stomach:

1) cardiac part *(pars cardiaca)*;

2) fundus *(fundus gastricus)*;

3) body *(corpus gastricum)*;

4) pyloric part *(pars pylorica)* includes a pyloric antrum *(antrum pyloricum)*, and a pyloric canal *(canalis pyloricus)*.

Internal structure. The stomach is composed of four coats: mucous, submucous, muscular, and serous. The mucous coat contains special gastric glands *(glandulae gastricae)*, which produce gastric juice containing hydrochloric acid. The folds of the lesser curvature are longitudinal and form the "gastric path". In either parts stomach has rounded elevations called gastric areas *(areae gastricae)* on whose surface the numerous tiny openings (0.2 mm in diameter) of the gastric pits can been seen. The gastric glands open into these pits. In the region of the pyloric orifice there is a circular mucosal fold, called valvula pylori. The muscular coat is composed of unstriated muscle fibres. They are arranged into three layers: an external longitudinal layer, a middle circular layer, and an internal oblique layer *(stratum oblique)*. The circular layer increases in thickness in the pyloric part, and forms pyloric sphincter muscle *(m. sphincter pyloricus)*. The outermost layer of the gastric wall is formed by the serous coat.

Check list

1. Pharynx, its topography (skeletotopy, syntopy, holotopy), structure and parts. The characteristic of muscles of the pharynx. Describe the mechanism of swallowing.

2. Development of the digestive system. Variety of anomalies.

3. Describe the topography of the oesophagus, its function, parts. Name the contractions (narrow spots) of oesophagus and their topography. Relations of oesophagus with aorta.

4. Abdominal regions. Name the borders of the abdominal cavity.

5. Describe the topography of the stomach. Describe the shape, size and external structure of the stomach. Forms of the stomach changes. Classification of glands in the mucous membrane of the stomach. Describe the peculiarities of structure of muscle and stomach serous membranes.

Small intestine

The small intestine is a long, highly convoluted tube in the digestive system that absorbs about 90 % of the nutrients from the food we eat. It is given the name "small intestine" because it is only 1 inch in diameter, making it less than half the diameter of the large intestine.

The small intestine winds throughout the abdominal cavity inferior to the stomach. Its many folds help it to pack all 10 feet of its length into such a small body cavity. A thin membrane known as the mesentery extends from the posterior body wall of the abdominal cavity to surround the small intestine and anchor it in place. Blood vessels, nerves, and lymphatic vessels pass through the mesentery to support the tissues of the small intestine and transport nutrients from food in the intestines to the rest of the body. The large intestine is the final section of the gastrointestinal tract that performs the vital task of absorbing water and vitamins while converting digested food into feces. Although shorter than the small intestine in length, the large intestine is considerably thicker in diameter, thus giving it its name. The large intestine is about 1.5 m in length and 6–7 cm in diameter in the living body, but becomes much larger postmortem as the smooth muscle tissue of the intestinal wall relaxes. Knowledge about small and large intestine are of great importance for gastroenterologists, surgeons, physicians.

The **small intestine** ***(intestinum tenue)*** *(Fig. 1, 2, 8)* is a convoluted tube, extending from the pylorus to the ileal orifice of caecum (large intestine). It is about 7 m long. The small intestine is divisible into three portions: 1) the duodenum, 2) the jejunum, and 3) the ileum. The wall of the small intestine is composed of four coats: mucous, submucous, muscular, and serous.

The mucous coat has three distinctive features that enchance the digestion and absorption processes that take place in the small intestine:

1. Circular folds *(plicae circulares)* increase the surface area for absorption. Besides the circular folds, the mucous membrane of the duodenum has longitudinal fold *(plica longitudinalis duodeni)* on the medial wall of the descending part, which terminates as a major duodenal papilla *(papilla duodeni major)*. The opening of the conjoined common bile duct and the pancreatic duct is on papilla. Proximally to it, there is a minor duodenal papilla *(papilla duodeni minor)*. The accessory pancreatic duct opens on it.

2. Intestinal villi *(villi intestinales)* increase absorptive surface. Each villus contains blood capillaries and a lymph vessel for the accumulation and transportation of lipids.

3. Intestinal glands *(glandulae intestinales)* secrete intestinal juice.

The mucous membrane of the jejunum contains solitary lymphoid nodules *(noduli lymphoidei solitarii)*; ileum contains aggregated lymphoid nodules *(noduli lymphoidei aggregati)*, which help destroy microorganisms absorbed from the small intestine. There are many intestinal glands.

Submucous membrane contains blood vessels, lymphatics, nerves and glands (in duodenum) *(glandulae duodenales)*.

The muscular coat consists of external, longitudinal, and internal, circular layer. Ileocecal sphincter is formed by the circular layer in the region of ileocecal angle.

The serous coat is derived from the peritoneum. The jejunum and ileum are attached to the posterior abdominal wall by an extensive fold of peritoneum, the mesentery, which allows the freest motion.

The **duodenum** *(duodenum)* has received its name from being about equal in length to the breadth of twelve fingers (25 cm). It is the shortest, the widest and the most fixed part of the small intestine, and has no mesentery, being only partly covered by peritoneum, mainly in front.

Topography of the duodenum

Holotopy: the duodenum is situated in the abdominal cavity. It is within the boundaries of the epigastrium and the umbilical region proper.

Skeletotopy: the duodenum stretches from the level of the twelfth thoracic vertebrae to that of the first or third lumbar vertebrae.

Syntopy: the duodenum adjoins above to quadrate lobe of liver and gallbladder, inferiorly — to right kidney with adrenal gland and pancreas.

External structure. From the above the duodenum may be divided into four portions: superior part, continued by the superior flexure of duodenum *(flexura duodeni superior)* into descending *(pars descendens)*, continued with the inferior flexure of duodenum *(flexura duodeni inferior)* into horizontal *(pars horizontalis)*, and ascending *(pars ascendens)* continued by the duodenojejunal flexure *(flexura duodenojejunalis)* into jejunum. The duodenojejunal flexure is fixed by a suspensory muscle of duodenum within suspensory ligament of duodenum *(lig. suspensorium duodeni)*.

The remainder of the small intestine from the end of the duodenum is named **jejunum** *(jejunum)*, formed by loops and located mainly in the left upper part of abdominal cavity and **ileum** *(ileum)*, formed by loops and located mainly in the right lower part of abdominal cavity. There is no morphological line of distinction between the two, but ileum is more narrow, has more circular folds, intestinal villi, and intestinal glands decrease to the large intestine direction.

Large intestine

The **large intestine** ***(intestinum crassum)*** *(Fig. 1, 2, 8)* extends from the ileocaecal orifice to the anus. It is about 1.5–1.8 m long. Its caliber is largest at its commencement at the caecum, and gradually diminishes as far as the rectum, where there is a dilation of considerable size just above the anal canal.

External structure. Besides the differences in diameter and length between the large and small intestines, the large intestine has three distinctive structural differences:

1. In the large intestine, an incomplete layer of longitudinal muscle forms three separate bands of muscle called taenia coli *(taenia coli)* along the full length of the intestine. Three types of the taenia coli are: tenia libera *(tenia libera)*, a free band, which stretches on the anterior surface of the caecum and ascending colon and descending colon; on the transverse colon it runs on the posterior surface because the colon here turns about its axis; tenia mesocolica *(tenia mesocolica)* stretches along the line of attachment of the mesentery of the transverse colon; tenia omentalis *(tenia omentalis)* runs along the line of attachment of the greater omentum on the transverse colon and along the continuation of this line on the other parts of the colon.

2. Because the taenia coli are not as long as the large intestine itself, the wall of the intestine becomes puckered with bulges called haustra coli *(haustra coli)*.

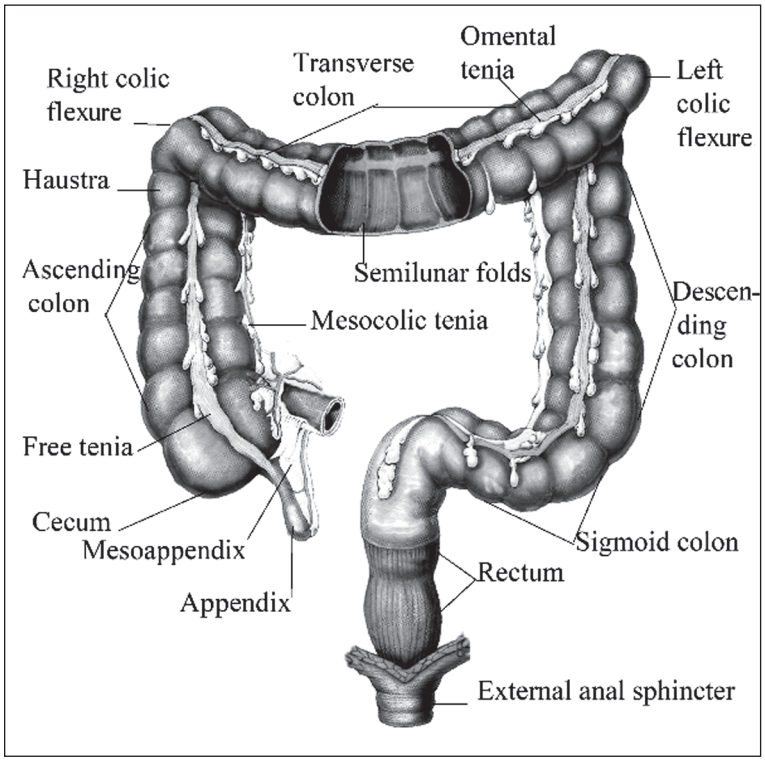

Fig. 8. Large intestine

3. Fat-filled pouches called epiploic appendages *(appendices omentales)* are formed at the points where the visceral peritoneum is attached to the taenia coli in the serous layer.

The large intestine is divisible into three parts: 1) the caecum, 2) the colon, and 3) the rectum.

The **cecum** *(caecum)* is a blind intestinal pouch, approximately 7.5 cm in both length and breadth, located in the right iliac fossa inferior to the junction of the terminal ileum and cecum. The terminal ileum opens into by the ileal orifice *(ostium ileale)* bordered by iliocecal valve to prevent reflux from the cecum into the ileum. Also, cecum has appendicular orifice *(ostium appendicis vermiformis)*, which leads into appendix.

The **appendix** *(appendix vermiformis),* traditionally, vermiform

appendix, is a blind intestinal diverticulum (6–10 cm in length) that contains masses of lymphoid tissue *(noduli lymphoidei aggregati)*.

The **colon** consists of four parts: ascending colon, descending colon, transverse colon, sigmoid colon.

The **ascending colon** *(colon ascendens)* is situated in the right lateral region of the abdomen, passes from the cecum to the right colic flexure (hepatic flexure) *(flexura coli dextra, flexura coli hepatica)* below the right lobe of the liver.

The **transverse colon** *(colon transversum)* (approximately 45 cm long) is the third, longest, and most mobile part of the large intestine. It crosses the abdomen from the right colic flexure to the left colic flexure *(flexura coli sinistra, flexura coli splenica)*, where it bends inferiorly to become the descending colon. The left colic flexure is usually more superior, more acute, and less mobile than the right colic flexure. Being freely movable, the transverse colon usually achieves to the level of the umbilicus.

The **descending colon** *(colon descendens)* is located in the left lateral region of the abdomen, between the left colic flexure and the left iliac fossa, where it continues with the sigmoid colon.

The **sigmoid colon** *(colon sigmoideum)*, characterized by its S-shaped loop of variable length (usually approximately 40 cm), connects the descending colon to the rectum on level of the third sacral vertebra.

The terminal segments of the large intestine are the **rectum** *(rectum)*, anal canal, and anus. Despite its name, the rectum is not straight. The upper part of the rectum corresponding to the sacral flexure is in the pelvic cavity and is called the rectal ampulla *(ampulla recti)*. The terminal part of the rectum passing to the back and downward is called the anal part, or the anal canal *(canalis analis)*. The anal canal and anus *(anus)* are open only during defecation.

Internal structure. The wall of the large intestine is composed of four coats: mucous, submucous, muscular, and serous or adventitia. The anatomy of the large intestine reflects its primary functions: the reabsorption of any remaining water and some salts, and the accumulation and movement (excretion) of undigested substances as feces. The mucosa is smooth, has semilunar fold *(plicae semilunares coli)* and contains lymphoid tissue in the form of many solitary follicles. The transverse mucosal folds *(plicae transversae recti)* are present in the upper part of the rectum. The upper part of the anal canal contains 5 to 10 permanent longitudinal columns known as anal (or rectal) columns *(columnae anales)*. The mucosa and submucosa of the rectum contain a rich network of veins called the hemorrhoidal plexus. Submucous coat connects together the mucous and muscular layers. It consists of loose, filamentous connective tissue containing blood vessels, lymphatics, and nerves. The muscular coat consists of an external, longitudinal layer, which forms taenia coli and an internal, circular layer, which forms the semilunar folds. Around anal canal circular layer forms involuntary internal sphincter of rectum *(m. sphincter ani internus)*. Just under the skin the external anal sphincter (voluntary) formed by skeletal muscles is located.

The serous coat covers some parts of the large intestine completely and others partly. The relations of the parts of the colon to the peritoneum are as follows:

— the ascending and descending — mesoperitoneally;

— the caecum, vermiform appendix, and transverse and sigmoid colons — intraperitoneally and mesocaecum, mesoappendix, mesotransversum, and mesosigmoideum have a mesentery.

Three parts are distinguished in the rectum according to its peritoneal relations:

— an upper part — intraperitoneally and has a short mesentery, mesorectum;

— a middle part — mesoperitoneally;

— and a lower part — extraperitoneally.

Check list

1. Small intestine, its parts. Topography (skeletotopy, holotopy, syntopy) of the intestine. The relation of different parts of the intestine to the peritoneum.
2. Duodenum. Describe the structure of the duodenum. Topography (skeletotopy, holotopy, syntopy) of each part of the duodenum. Relation of the duodenum to the peritoneum.
3. Jejunum. Describe the structure of the jejunum. Topography (skeletotopy, holotopy, syntopy) of the jejunum. Relation of the jejunum to the peritoneum.
4. Ileum. Describe the structure of the ileum. Topography (skeletotopy, holotopy, syntopy) of the ileum. Relation of the ileum to the peritoneum.
5. Describe the structure of the intestine wall. Describe the peculiarities of the structure of mucous membrane of different parts of the intestine.

6. Large intestine, its parts. Name the special signs distinguishing it from the small intestine. Topography (skeletotopy, holotopy, syntopy) of each part of the large intestine. The relation of different parts of the large intestine to the peritoneum.

7. Describe the structure of the cecum. Topography (skeletotopy, holotopy, syntopy) of the cecum. The relation of the cecum to the peritoneum.

8. Colon. Describe the structure of the colon, its parts and flexures. Topography (skeletotopy, holotopy, syntopy) of the colon. The relation of the colon to the peritoneum.

9. Characterize every membrane of the wall of the colon. How to distinguish colon from intestine by the features of mucous membrane?

10. Rectum. Describe the structure of the rectum, its parts. Topography (skeletotopy, holotopy, syntopy) of colon. The relation of the rectum to the peritoneum.

11. Peculiarities of the structure of mucous and muscular membranes of the rectum. Name sphincters of the rectum.

Liver

The liver is the body's largest gland. It is a vital organ that supports nearly every other organ in the body in some facet. Without a healthy liver, a person cannot survive. Common liver diseases include hepatitis infection, fatty liver disease, and cancer, as well as damage from alcohol, the pain reliever acetaminophen, and some cancer drugs. Liver dialysis in which a machine performs the detoxification function of the liver is still a relatively new treatment, and it cannot support a person longer than a few years. Dialysis is normally used in the time between liver failure and liver transplant surgery.

The pancreas is a glandular organ that produces a number of hormones essential to the body. It forms an integral part of the digestive system. The pancreas is also critical to the production of insulin and glucagon, which regulate glucose levels in the blood. If the pancreas stops producing insulin, this leads to diabetes and a number of associated health issues. Other problems that concern the pancreas include pancreatic cancer. This is a particularly hard cancer to spot since the tumor generally is not palpable (it can't be felt) due to the pancreas positioning. People with pancreatic cancer generally only start to display symptoms when the tumor becomes large enough to interfere with its neighboring organs.

Disorders of the pancreas, liver, and gallbladder affect the ability to produce enzymes and acids that aid in digestion. Cystic fibrosis is a chronic, inherited illness where the production of abnormally thick mucus blocks the duct or passageways in the pancreas and prevents the digestive fluids from entering the intestines, making it difficult for the person with the disorder to digest protein and fats, which cause important nutrients to pass through without being digested. People with this disorder take supplements and digestive enzymes to help manage their digestive problems. Hepatitis is a viral condition that inflames a person's liver; that can cause it to lose its ability to function. Viral hepatitis, like hepatitis A, B, and C, is extremely contagious. Acute or chronic inflammation results in the abdominal pain caused by the gallbladder. Ninety percent of cases of acute cholecystitis are caused by the gallstones. The actual inflammation is due to secondary infection with bacteria of an obstructed gallbladder, with the obstruction caused by the gallstones. Cholestasis is the blockage in the supply of bile into the digestive tract. It can be intrahepatic (the obstruction is in the liver) or extrahepatic (outside the liver). It can lead to jaundice, and is identified by the presence of elevated bilirubin level that is mainly conjugated.

The morpho-functional feature of the liver, gallbladder, pancreas makes it possible for physicians to have an integral concept about the hepato-biliary system and its function, the variants of pathology and methods of treatment.

The **liver** ***(liver; hepar)*** *(Fig. 1, 2, 9, 10)* is the largest gland in the body. It weighs 1.2–1.6 kg.

Topography of the liver

Holotopy: it is situated in the upper and right parts of the abdominal cavity, occupying almost the whole of the right hypochondrium, the greater part of the epigastrium.

Skeletotopy: the upper edge of the liver projects in right 10^{th} intercostal space (midaxillary line). Then it lifts to the level of the 4^{th} rib (midclavicular line) and passes across the sternum a bit upper from xiphoid process, terminates in left 5^{th} intercostal space (between midclavicular line and parasternal lines). The lower edge of the liver passes along the costal arch from right 10^{th} intercostal space (midaxillary line) to the left 5^{th} intercostal space, crossing epigastrium 1.5 cm lower from xiphoid process.

Syntopy: visceral surface *(facies visceralis)* of the liver adjoins with the organs, which form impressions:

— esophageal impression *(impressio esophagea)*;
— gastric impression *(impressio gastrica)*;
— duodenal impression *(impressio duodenalis)*;
— colic impression *(impressio colica)*;
— renal impression *(impressio renalis)*;
— suprarenal impression *(impressio suprarenalis)*.

Diaphragmatic surface *(facies diaphragmatica)* adjoins to diaphragm and anterior abdominal wall and carries cardiac impression *(impressio cardiaca)*.

External structure. The liver has diaphragmatic surface and the visceral surface separated by a sharp lower border *(margo inferior)*.

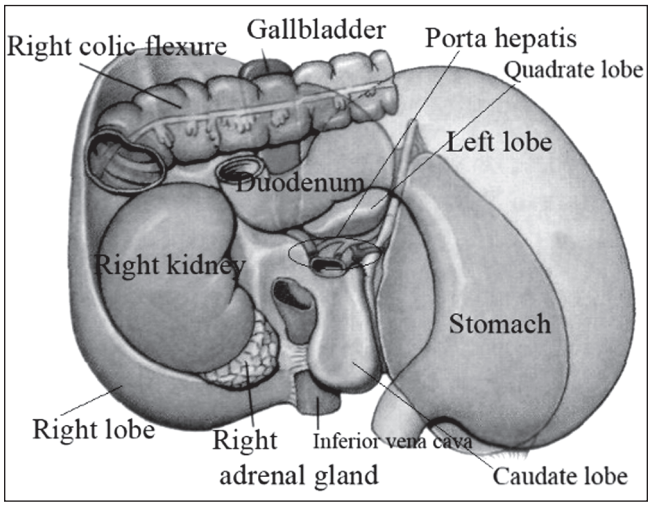

Fig. 9. Syntopy of liver

Two lobes are distinguished in the liver, the right *(lobus hepatis dexter)* and the left *(lobus hepatis sinister)* lobes, which are separated on the diaphragmatic surface by the falciform ligament *(ligamentum falciforme)*. At the visceral surface there are the right hepatic lobe containing quadrate lobe *(lobus quadratus)*, and caudate lobe *(lobus caudatus)*, which are bordered by:

1. The fissura for venosus ligament *(fissura ligamenti venosi)*. It lodges in the fetus, the ductus venosus, and in the adult a slender fibrous cord, lig. venosum, the obliterated remains of that vessel; it lies between the caudate lobe and the left lobe of the liver.

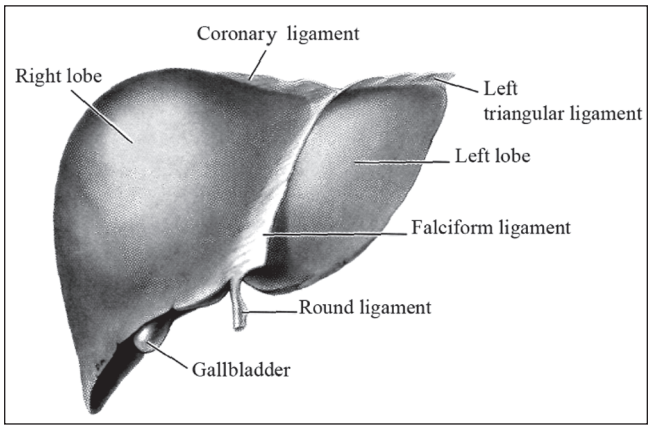

Fig. 10. Anterior view of the liver

2. The incisura for teres ligament *(incisura ligamenti teretis)* lodges the umbilical vein in the fetus and its remains the round ligament in the adult; it lies between the quadrate lobe and the left lobe of the liver.

3. The fossa for the gallbladder *(fossa vesicae biliaris; fossa vesicae felleae)* lies between the quadrate lobe and the proper right lobe of the liver.

4. The groove for the inferior vena cava *(sulcus venae cavae)* lies between the caudate lobe and the proper right lobe of the liver.

Transversally to forenamed fissures the porta hepatis *(porta hepatis)* is located. It transmits:
a) portal vein of the liver;
b) proper hepatic artery;
c) common hepatic duct;
d) nerves;
e) lymphatics.

The liver is connected to the diaphragm and to the anterior wall of the abdomen by ligaments: the falciform, the coronary *(lig. coronarium)*, and the two lateral, right and left triangular *(lig. triangulare dextrum et sinistrum)*, the round ligament *(lig. teres hepatis)* is a fibrous cord, the obliteral umbilical vein. The liver is covered by the peritoneum (mesoperitoneally) for the most part except for an area nuda *(area nuda)* on its posterior border where it is in direct contact with the diaphragm. Under the serous coat of the liver there is a thin fibrous capsule of Glisson.

Internal structure. The anatomical units of the liver: lobulus — segmentum — lobus.

The substance of the liver is composed of lobules (1 million), as small granular bodies, measuring from 1 to 2.5 mm in diameter. They are functional units of the liver. Each lobule contains the central vein (a branch of the hepatic vein) running longitudinally through it. Liver cells, known as hepatocytes (polyhedral in form), within the lobules are arranged in one-cell-thick plate-like layers that radiate from the central vein to the edge of the lobule. Each corner of the lobule usually contains a portal area,

a complex composed of branches of the portal vein (interlobular vein), hepatic artery (interlobular artery), and interlobular bile ductules. These tubular structures form hepatic or **portal triads**. Between the radiating rows of cells there are delicate blood channels called **sinusoids**, which transport mixed blood from the portal vein and hepatic artery.

The interlobular bile ductules join in segmental ducts. This join with other ducts form two right and left hepatic ducts *(ductus hepaticus dexter et ductus hepaticus sinister)*, and by their union form the common hepatic duct *(ductus hepaticus communis)*, which leaves the liver at the transverse fissure.

The scheme of the bile outflow:

bile capillaries → interlobular bile ductules → paralobular bile ductules → segmental ducts → right and left hepatic ducts → common hepatic duct → cystic duct → gallbladder → cystic duct + common hepatic duct → common bile duct. The common bile duct *(ductus choledochus)* joins to the main pancreatic duct *(ductus pancreaticus)*, enlarges into the hepatopancreatic ampulla *(ampulla hepatopancreatica)*, and then joins with the major duodenal papilla, which opens into the descending part of the duodenum. The circular layer of muscles in the wall of the distal portion of the ductus choledochus in the area of duodenum is very strong and forms *m. sphincter ductus choledochi*.

There are two **venous systems** in the liver: the portal and caval. Together with arterial vessels, they form "rete mirabile hepatis".

The **functions** of the liver are:

1) the secretion of bile;

2) removal of amino acids from organic compounds;

3) formation of urea from worn-out tissue cells (proteins), and conversion of excess amino acids into urea (deamination) to decrease ammonia level;

4) formation of fetal erythrocytes in the embryonic period;

5) homeostasis of blood by manufacturing most of the plasma proteins;

6) removing bilirubin from the blood, manufacturing heparin, and helping to synthesize the blood-clotting agents prothrombin and fibrinogen from amino acids;

7) synthesis of certain amino acids, including non-essential amino acids;

8) conversion of galactose and fructose to glucose;

9) oxidation of fatty acids;

10) formation of lipoproteins, cholesterol, and phospholipids (essential constituents of plasma membranes);

11) conversion of carbohydrates and proteins into fat;

12) modification of waste products, toxic drugs, and poisons (detoxification);

13) synthesis of vitamin A from carotene;

14) maintenance of a stable body temperature by raising the temperature of the blood passing through it (its many metabolic activities make the liver the body's major heat producer);

15) storage functions: the liver stores glucose in the form of glycogen, and with the help of enzyms, it converts glycogen back into glucose as it is needed by the body; the liver also stores the fat-soluble vitamins (A, D, E, and K), minerals such as iron from the diet, and antianemic factor; the liver can also store fats and amino acids, and convert them into usable glucose as required.

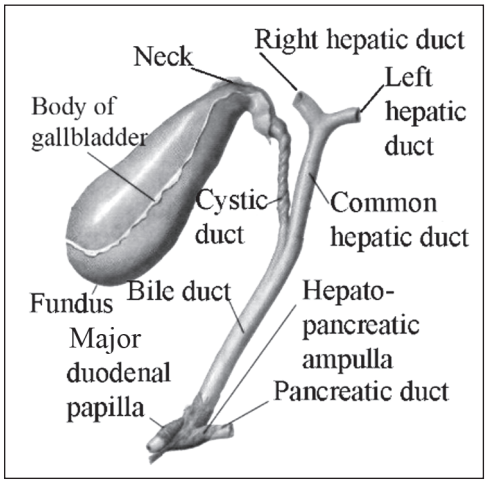

Fig. 11. Gallbladder

The **gallbladder** ***(vesica fellea, vesica biliaris)*** *(Fig. 11)* is a conical or pear-shaped musculomembranous sac, lodged in a fossa on the visceral surface of the right lobe of the liver. It is from 7 to 10 cm in length, 2.5 cm in breadth at its widest part. It is divided into a fundus, body, and neck. The fundus *(fundus vesicae biliaris)* is directed downward, forward, and to the right; the body *(corpus vesicae felleae)* and neck *(collum vesicae felleae)* are directed upward and backward to the left. The upper surface of the gallbladder is attached to the liver by connective tissue and vessels. The cystic duct *(ductus cysticus)* drains bile into and the common hepatic duct.

The body and the neck of the gallbladder is covered by peritoneum only on the inferior surface; its fundus is completely invested by peritoneum, and adjacent to the anterior abdominal wall in the angle formed by the right rectus abdominis muscles and the inferior borders of the ribs.

Internal structure of the gallbladder. It consists of three coats: serous, fibromuscular, and mucous. The fibromuscular coat consists of dense fibrous tissue, which is mixed with the smooth muscular fibers, disposed chiefly in a longitudinal direction, a few running transversely. The mucous coat is loosely connected with the fibrous tissue and formed mucous folds. This coat is covered by columnar epithelium, and contains many mucous glands. In the neck and in the cystic duct there are folds arranged spirally and forming the spiral valve.

Pancreas

The **pancreas** ***(pancreas)*** is a mixed gland. Its exocrine (9/10) part is related to a group of acinar or acinar-tubular glands, concerned with external secretion and excretes its secretion into the duodenum by way of the ducts. The main pancreatic duct joins the common bile duct, enlarges into the hepatopancreatic ampulla, and then joins the great duodenal papilla, which opens into the descending part of the duodenum. In addition to the main duct, there is usually an accessory pancreatic duct, which opens on the minor duodenal papilla. The smaller part of the gland consists of the islets of Langerhans (1/10) and is an endocrine structure secreting insulin into the blood. Insulin regulates the blood sugar content. The total length of the pancreas varies from 12 to 15 cm.

Topography

Holotopy: epigastrium and the left hypochondrium.

Skeletotopy: the first-second lumbar vertebrae.

Syntopy: it is situated behind the stomach on the posterior abdominal wall.

External structure. The head of pancreas *(caput pancreatis)* is surrounded by duodenum, posteriorly it adjoins the vena cava inferior, and the left renal vein, and the aorta. It has a body *(corpus pancreatis)* and a tail *(cauda pancreatis)* adjoined to lien. The body is prismatic in shape and has three surfaces: anterior, posterior, and inferior. These three surfaces are separated by three borders: superior, anterior, and inferior. The peritoneum covers the anterior and inferior surfaces of the pancreas.

Check list

1. Liver. Describe the topography of the liver. Relation of the liver to the peritoneum. Name the ligaments of the liver.
2. Liver. Describe topography (skeletotopy, holotopy, syntopy) of the liver.
3. Describe the external structure of the liver. Name the liver impressions.
4. Liver. Describe the structure of the liver: lobes, parts. Describe structures located in the gate of the liver.
5. Liver. The excretion and outflow of bile.
6. Gallbladder. Describe the gallbladder topography. Describe the external structure of the gallbladder. Relation of the gallbladder to the peritoneum.
7. Gallbladder. Describe the internal structure of the gallbladder.
8. Characterize every membrane of the gallbladder. Functions of the gallbladder.
9. Bile duct. Describe the topography, structure of the gallbladder. Name the sphincters of bile ducts.
10. Pancreas. Describe the pancreas topography. Describe the external structure of the pancreas and pancreatic duct. Relation of the pancreas to the peritoneum.

Peritoneum

Infectious, inflammatory, neoplastic, and traumatic processes frequently involve the peritoneal cavity and its reflections; thus, it is important to identify the affected peritoneal ligaments and spaces. The potential peritoneal spaces, the peritoneal reflections that form the peritoneal ligaments, mesenteries, and omenta, and the natural flow of peritoneal fluid determine the route of spread of intraperitoneal fluid and disease processes within the abdominal cavity. The peritoneal ligaments, mesenteries, and omenta also serve as boundaries for disease processes and as conduits for the spread of disease. Knowledge of structure of the abdominal cavity is necessary in surgical and gynecological practice for understanding the spread of pathological process, making revision of abdominal organs, prognosis and choosing treatments methods.

The **peritoneum** ***(peritoneum)*** *(Fig. 12)* is the largest serous membrane in the body, and consists of a closed sac in a male. In a female the peritoneum is not a closed sac, since the free ends of the uterine tubes open directly into the peritoneal cavity. The part, which lines the abdominal wall, is named the parietal peritoneum *(peritoneum parietale)* that is reflected over the contained viscera and constitutes

the visceral peritoneum *(peritoneum viscerale)*. The free surface of the membrane is a smooth layer of flattened mesothelium, lubricated by a small quantity of serous fluid, which allows the viscera to glide freely against the wall of the cavity or upon each other with the least possible friction. The space between the parietal and visceral layers of the peritoneum is named the peritoneal cavity *(cavitas peritonealis)*.

Following along the peritoneum from one organ to another, and from viscera to the parietes, it forms: ligaments, omenta, mesenteries, fossae and folds, bursae, canals, sinuses, recesses, excavations.

Ligaments:

— falciform ligament of the liver *(lig. falciforme)*;
— coronary ligament of the liver *(lig. coronarium)*;
— right triangular ligament of the liver *(lig. triangulare dextrum)*;
— left triangular ligament of the liver *(lig. triangulare sinistrum)*;
— hepatorenal ligament *(lig. hepatorenale)*;
— hepatoduodenal ligament *(lig. hepatoduodenale)*;
— hepatogastric ligament *(lig. hepatogastricum)*;
— gastrophrenic ligament *(lig. gastrophrenicum)*;
— gastrolienal ligament *(lig. gastrolienale)*;
— gasrocolic ligament *(lig. gastrocolicum)*.

There are two omenta, the lesser and the greater. The liver is attached to the lesser curvature of the stomach by the hepatogastric and to the duodenum by the hepatoduodenal ligaments. These ligaments form the lesser omentum *(omentum minus)*.

On the greater curvature of the stomach they join again and are descended in front of the transverse colon *(lig. gastrocolicum)* and the loops of the jejunum and ileum to form the anterior lamina of the greater omentum. They then turn upon themselves and form the posterior lamina of the greater omentum, and ascend again as far as the transverse colon, where they separate and enclose mesocolon transversum. The greater omentum *(omentum majus)* is made up of four layers of the peritoneum.

The mesenteries *(mesenteria)* are:

— the mesentery proper *(mesenterium)*. The root of the mesentery proper *(radix mesenterii)* is narrow, about 15 cm long, and is directed obliquely from the duodenojejunal flexure at the left side to the right sacroiliac articulation;
— the transverse mesocolon *(mesocolon transversum)*;
— the sigmoid mesocolon *(mesocolon sigmoideum)*;
— the mesoappendix *(mesoappendix)*.

For the easier understanding of the complex relations, the whole peritoneal cavity can be separated into three floors:

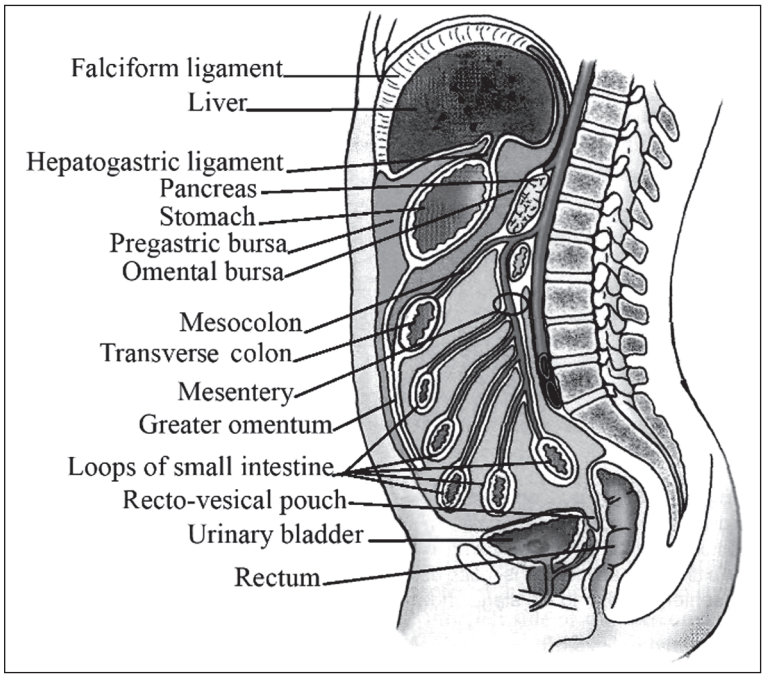

Fig. 12. Peritoneum. Sagittal section of the trunk

1) an upper floor;
2) a middle floor;
3) a lower floor.

An **upper floor** is bounded superiorly by the diaphragm, and inferiorly by the mesocolon transversum. This cavity is separated into three sacs: hepatic bursa, pregastric bursa and omental bursa.

The hepatic sac *(bursa hepatica)* is related to the right lobe of the liver and is separated from the pregastric bursa by the falciform ligament; and is bounded from behind by the right portion of the coronary ligament.

The pregastric sac *(bursa pregastrica)* is related to the left lobe of the liver, anterior surface of the stomach, and the spleen; the left portion of the coronary ligament passes on the posterior border of the left lobe of the liver.

The epiploic foramen *(foramen epiploicum)* is the passage into omental bursa *(bursa omentalis)*.

It is bounded:

— anteriorly: by the free border of the lesser omentum, with the common hepatic duct, the portal vein, and the proper hepatic artery;

— posteriorly: by the peritoneum covering the inferior vena cava;

— superiorly: by the peritoneum on the caudate lobe of the liver;

— below: by the peritoneum covering the commencement of the duodenum, and the common hepatic artery.

Vestibule of omental bursa is the part, which adjoins the epiploic foramen with the main omental bursa and is situated behind the hepatoduodenal ligament.

The boundaries of the omental bursa:

— anteriorly: from above downward, by the caudate lobe of the liver, the lesser omentum, the stomach, and the greater omentum;

— posteriorly: it is limited, from below upward, by the greater omentum, the transverse colon, the transverse mesocolon, the posterior surface of pancreas, the left suprarenal gland, and the upper end of the left kidney;

— laterally: bursa extends from the epiploic foramen to the hilum of the spleen, and then to the anterior surface of the kidney, where it is limited by the phrenicosplenic, splenorenal and gastrosplenic ligaments.

A middle floor extends downward from the mesocolon transversum to enter the pelvis minor. It contains: at the region of the duodenojejunal flexure, there are superior and inferior duodenojejunal recesses *(recessi duodenojejunalis superior et inferior)*, at the junction of the small intestine and the colon, there are superior and inferior ileocaecal recesses *(recessi ileocaecalis superior et inferior)*, between the mesocolon sigmoideum on the left side, there is intersigmoid recess *(recessus intersigmoideus)*. The fold of the peritoneum between the iliac muscle and the lateral surface of the caecum is known as the caecal fold. A small opening, which is limited by this fold, is named retrocaecal recess *(recessus retrocaecalis)*. The middle floor contains right and left lateral canals *(canales laterales dexter et sinister),* and right and left mesenteric sinuses *(sinusi mesenterici dexter et sinister)*. The right canal is situated between the right lateral wall of the abdomen and the ascending colon. The left canal is situated between the left lateral wall of the abdomen and the descending colon. The right mesenteric sinus is situated from the right of the root of the mesentery proper and is a closed space. The left mesenteric sinus is situated from the left of the root of the mesentery proper and is communicated with the cavity of the pelvis minor.

A **lower floor** is located in the pelvis minor. The peritoneum here follows closely the surfaces of the pelvic viscera and the pelvic walls, and presents important differences in the two sexes. In a male the peritoneum forms rectovesical excavation *(excavatio rectovesicalis)*. It is between the anterior surface of the rectum and the bladder. In a female excavatio rectovesicalis is divided by the uterus and the vagina into a small anterior vesicouterine excavation *(excavatio vesicouterina)* and a large, deep, posterior rectouterine excavation *(excavatio rectouterina)*.

In the lower part of the anterior abdominal wall the peritoneum parietale forms five folds converging in the umbilicus: one unpaired medial umbilical fold *(plica umbilicalis medialis)*, and two paired middle and lateral umbilical folds *(plicae umbilicalis lateralis et mediana)*. These folds bound on each side several fossae, which are related to the inguinal canal: medial and lateral inguinal fossae *(fossae inguinalis medialis et lateralis)* and the supravesical fossa *(fossa supravesicalis)*.

According to the distribution of the peritoneum, the abdominal organs are defined as:

Intraperitoneal visceral organs (covered with the peritoteum from all sides)	**Mesoperitoneal visceral organs** (covered with the peritoteum from three sides)	**Extraperitoneal or retroperitoneal visceral organs** (covered with the peritoteum from only one side)
Abdominal part of the esophagus	Liver and gallbladder	Pancreas
Stomach	Ascending colon	Duodenum
Spleen	Descending colon	Inferior 1/3 of the rectum
Jejunum and ileum	The middle 1/3 of the rectum	Empty urinary bladder
Caecum and appendix vermiformis	Full urinary bladder	Adrenal glands
Transverse colon, sigmoid colon		Kidneys
Superior 1/3 of the rectum		
Uterus and uterine tube		

Check list

1. Peritoneum. General characteristics. Name the derivatives of the peritoneum.
2. Peritoneal cavity. Show the boundaries of upper, middle and lower floors of peritoneal cavity. Describe the topography of the peritoneum of the upper floor. Omental bursa: boundaries, connections. Describe the omental opening.
3. Peritoneal cavity. The upper floor. The hepatic bursa: boundaries, connections.
4. Peritoneal cavity. The upper floor. Pregastric bursa: boundaries, connections.
5. Describe the topography of the peritoneum of the middle floor: canals, sinuses, folds, recesses, ligaments, mesenteric root.
6. Greater omentum. Describe structures, which form the omentum.
7. Lesser omentum. Describe its structures.
8. Describe the topography of the peritoneum in the small pelvic cavity.

Necessary terms *(vocabulary)*

Latin	English
Systema digestorium	**Alimentary system**
Oris	**Mouth**
Cavitas oris	Oral cavity
Tunica mucosa oris	Mucous membrane of mouth
Vestibulum oris	Oral vestibule
Rima oris	Oral fissure; oral opening
Labia oris	Lips
Labium superius	Upper lip
Labium inferius	Lower lip
Frenulum labii superioris	Frenulum of upper lip
Frenulum labii inferioris	Frenulum of lower lip
Commissura labiorum	Labial commissure
Angulus oris	Angle of mouth
Bucca	Cheek
Corpus adiposum buccae	Buccal fat pad
Papilla ductus parotidei	Papilla of parotid duct
Cavitas oris propria	Oral cavity proper
Palatum	Palate
Palatum durum	Hard palate
Velum palatinum	Soft palate
Raphe palati	Palatine raphe
Rugae palatinae	Palatine rugae
Papilla incisiva	Incisive papilla
Gingiva	Gingiva; gum
Caruncula sublingualis	Sublingual caruncle
Plica sublingualis	Sublingual fold
Glandulae oris	Glands of mouth
Glandulae salivariae majores	Major salivary glands
Glandula parotidea	Parotid gland
Ductus parotideus	Parotid duct
Glandula sublingualis	Sublingual gland
Ductus sublingualis major	Major sublingual duct
Ductus sublinguales minores	Minor sublingual ducts
Glandula submandibularis	Submandibular gland
Ductus submandibularis	Submandibular duct

Latin	English
Glandulae salivariae minores	Minor salivary glands
Glandulae labiales	Labial glands
Glandulae buccales	Buccal glands
Glandulae molares	Molar glands
Glandulae palatinae	Palatine glands
Glandulae linguales	Lingual glands
Dentes	Teeth
Arcus dentalis mandibularis	Mandibular dental arcade
Dens incisivus	Incisor tooth
Dens caninus	Canine tooth
Dens premolaris	Premolar tooth
Dens molaris	Molar tooth
Dens molaris tertius	Third molar tooth
Corona dentis	Crown of tooth
Cuspis dentis	Cusp of tooth; cuspid tooth
Tuberculum dentis	Tubercle of tooth
Fissura occlusalis	Occlusal fissure
Corona clinica	Clinical crown of tooth
Cervix dentis	Neck of tooth
Radix dentis	Root of tooth
Apex radicis dentis	Root apex
Radix clinica	Clinical root
Cavitas dentis	Pulp cavity
Cavitas coronae	Pulp cavity of crown
Canalis radicis dentis	Root canal
Foramen apicis dentis	Apical foramen
Pulpa dentis	Dental pulp
Dentinum	Dentine
Enamelum	Enamel
Cementum	Cement
Periodontium	Periodontium
Alveolus dentalis	Tooth socket
Dentes decidui	Deciduous teeth
Dentes permanentes	Permanent teeth
Lingua	Tongue

Latin	English
Corpus linguae	Body of tongue
Radix linguae	Root of tongue
Dorsum linguae	Dorsum of tongue
Facies inferior linguae	Inferior surface of tongue
Margo linguae	Margin of tongue
Apex linguae	Apex of tongue
Tunica mucosa linguae	Mucous membrane of tongue
Frenulum linguae	Frenulum of tongue
Papillae linguales	Lingual papillae
Papillae filiformes	Filiform papillae
Papillae fungiformes	Fungiform papillae
Papillae vallatae	Vallate papillae
Papillae foliatae	Foliate papillae
Foramen caecum linguae	Foramen caecum of tongue
Tonsilla lingualis	Lingual tonsil
Septum linguae	Lingual septum
Aponeurosis linguae	Lingual aponeurosis
Musculi linguae	Muscles of tongue
M. genioglossus	Genioglossus
M. hyoglossus	Hyoglossus
M. styloglossus	Styloglossus
M. longitudinalis superior	Superior longitudinal muscle
M. longitudinalis inferior	Inferior longitudinal muscle
M. transversus linguae	Transverse muscle
M. verticalis linguae	Vertical muscle of tongue
M. palatoglossus	Palatoglossus
Fauces	Fauces
Isthmus faucium	Isthmus of fauces
Palatum molle	Soft palate
Uvula palatina	Uvula
Arcus palatoglossus	Palatoglossal arch
Arcus palatopharyngeus	Palatopharyngeal arch
Fossa tonsillaris	Tonsillar fossa
Tonsilla palatina	Palatine tonsil
Aponeurosis palatina	Palatine aponeurosis
M. levator veli palatini	Levator veli palatini
M. tensor veli palatini	Tensor veli palatini
M. uvulae	Musculus uvulae
M. palatoglossus	Palatoglossus
M. palatopharyngeus	Palatopharyngeus
Pharynx	**Pharynx**
Cavitas pharyngis	Cavity of pharynx
Pars nasalis pharyngis	Nasopharynx
Fornix pharyngis	Vault of pharynx
Tonsilla pharyngealis	Pharyngeal tonsil
Noduli lymphoidei pharyngeales	Pharyngeal lymphoid nodules
Ostium pharyngeum tubae auditivae	Pharyngeal opening of auditory tube
Torus tubarius	Torus tubarius

Latin	English
Tonsilla tubaria	Tubal tonsil
Recessus pharyngeus	Pharyngeal recess
Pars oralis pharyngis	Oropharynx
Vallecula epiglottica	Epiglottic vallecula
Plica glossoepiglottica mediana	Median glosso-epiglottic fold
Plica glossoepiglottica lateralis	Lateral glosso-epiglottic fold
Pars laryngea pharyngis	Laryngopharynx
Recessus piriformis	Piriform recess
Constrictio pharyngooesophagealis	Pharyngo-oesophageal constriction
Musculi pharyngis	Pharyngeal muscles
Raphe pharyngis	Pharyngeal raphe
M. constrictor pharyngis superior	Superior constrictor
M. constrictor pharyngis medius	Middle constrictor
M. constrictor pharyngis inferior	Inferior constrictor
M. stylopharyngeus	Stylopharyngeus
M. salpingopharyngeus	Salpingopharyngeus
M. palatopharyngeus	Palatopharyngeus
Oesophagus	**Oesophagus**
Pars cervicalis	Cervical part
Pars thoracica	Thoracic part
Constrictio bronchoaortica	Bronchoaortic constriction
Constrictio phrenica	Diaphragmatic constriction
Pars abdominalis	Abdominal part
Gaster	**Stomach**
Paries anterior	Anterior wall
Paries posterior	Posterior wall
Curvatura major	Greater curvature
Curvatura minor	Lesser curvature
Incisura angularis	Angular incisure
Cardia; pars cardiaca	Cardia; cardiac part
Ostium cardiacum	Cardiac orifice
Fundus gastricus	Fundus of stomach
Fornix gastricus	Fornix of stomach
Incisura cardialis	Cardiac notch
Corpus gastricum	Body of stomach
Canalis gastricus	Gastric canal
Pars pylorica	Pyloric part
Antrum pyloricum	Pyloric antrum
Canalis pyloricus	Pyloric canal
Pylorus	Pylorus
Ostium pyloricum	Pyloric orifice
M. sphincter pyloricus	Pyloric sphincter
Plicae gastricae	Gastric folds
Areae gastricae	Gastric areas
Foveolae gastricae	Gastric pits
Glandulae gastricae	Gastric glands
Intestinum tenue	**Small intestine**
Villi intestinales	Intestinal villi

Latin	English
Glandulae intestinales	Intestinal glands
Noduli lymphoidei solitarii	Solitary lymphoid nodules
Noduli lymphoidei aggregati	Aggregated lymphoid nodules
Duodenum	Duodenum
Pars superior	Superior part
Ampulla; bulbus	Ampulla; duodenal bulb
Flexura duodeni superior	Superior duodenal flexure
Pars descendens	Descending part
Flexura duodeni inferior	Inferior duodenal flexure
Pars horizontalis	Horizontal part
Pars ascendens	Ascending part
Flexura duodenojejunalis	Duodenojejunal flexure
M. suspensorius duodeni	Suspensory muscle of duodenum
Lig. suspensorium duodeni	Suspensory ligament of duodenum
Papilla duodeni major	Major duodenal papilla
Papilla duodeni minor	Minor duodenal papilla
Glandulae duodenales	Duodenal glands
Jejunum	Jejunum
Ileum	Ileum
Intestinum crassum	**Large intestine**
Caecum	Caecum
Papilla ilealis	Ileal papilla
Ostium ileale	Ileal orifice
Appendix vermiformis	Appendix; vermiform appendix
Ostium appendicis vermiformis	Orifice of vermiform appendix
Colon	Colon
Colon ascendens	Ascending colon
Flexura coli dextra; flexura coli hepatica	Right colic flexure; hepatic flexure
Colon transversum	Transverse colon
Flexura coli sinistra; flexura coli splenica	Left colic flexure; splenic flexure
Colon descendens	Descending colon
Colon sigmoideum	Sigmoid colon
Plicae semilunares coli	Semilunar folds of colon
Haustra coli	Haustra of colon
Appendices omentales; appendices epiploicae	Omental appendices
Taeniae coli	Taeniae coli
Taenia mesocolica	Mesocolic taenia
Taenia omentalis	Omental taenia
Taenia libera	Free taenia
Rectum	Rectum
Flexura sacralis	Sacral flexure
Flexurae laterales	Lateral flexures
Plicae transversae recti	Transverse folds of rectum
Ampulla recti	Rectal ampulla
Canalis analis	Anal canal
Flexura anorectalis	Anorectal flexure
Junctio anorectalis	Anorectal junction

Latin	English
Columnae anales	Anal columns
Sinus anales	Anal sinuses
Linea anocutanea	Anocutaneous line
Linea pectinata	Pectinate line
M. sphincter ani internus	Internal anal sphincter
M. sphincter ani externus	External anal sphincter
Anus	Anus
Hepar	**Liver**
Facies diaphragmatica	Diaphragmatic surface
Impressio cardiaca	Cardiac impression
Area nuda	Bare area
Sulcus venae cavae	Groove for vena cava
Fissura ligamenti venosi	Fissure for ligamentum venosum
Lig. venosum	Ligamentum venosum
Facies visceralis	Visceral surface
Fossa vesicae biliaris; fossa vesicae felleae	Fossa for gallbladder
Fissura ligamenti teretis	Fissure for ligamentum teres
Lig. teres hepatis	Round ligament of the liver
Porta hepatis	Porta hepatis
Impressio oesophageale	Oesophageal impression
Impressio gastrica	Gastric impression
Impressio duodenalis	Duodenal impression
Impressio colica	Colic impression
Impressio renalis	Renal impression
Impressio suprarenalis	Suprarenal impression
Margo inferior	Inferior border
Lobus hepatis dexter	Right lobe of liver
Lobus hepatis sinister	Left lobe of liver
Lobus quadratus	Quadrate lobe
Lobus caudatus	Caudate lobe
Lobuli hepatis	Lobules of liver
Aa. interlobulares	Interlobular arteries
Vv. interlobulares	Interlobular veins
Vv. centrales	Central veins
Ductus biliferi interlobulares	Interlobular bile ducts
Ductus hepaticus dexter	Right hepatic duct
Ductus hepaticus sinister	Left hepatic duct
Ductus hepaticus communis	Common hepatic duct
Vesica biliaris; vesica fellea	**Gallbladder**
Fundus vesicae biliaris; fundus vesicae felleae	Fundus of gallbladder
Infundibulum vesicae biliaris	Infundibulum of gallbladder
Corpus vesicae biliaris; corpus vesicae felleae	Body of gallbladder
Collum vesicae biliaris; collum vesicae felleae	Neck of gallbladder
Ductus cysticus	Cystic duct
Plica spiralis	Spiral fold

Latin	English
Ductus choledochus; ductus biliaris	Bile duct
M. sphincter ductus choledochi	Sphincter of bile duct
Ampulla hepatopancreatica	Hepatopancreatic ampulla
M. sphincter ampullae	Sphincter of ampulla
Pancreas	**Pancreas**
Caput pancreatis	Head of pancreas
Processus uncinatus	Uncinate process
Incisura pancreatis	Pancreatic notch
Collum pancreatis	Neck of pancreas
Corpus pancreatis	Body of pancreas
Facies anterosuperior	Anterosuperior surface
Facies posterior	Posterior surface
Facies anteroinferior	Antero-inferior surface
Margo superior	Superior border
Margo anterior	Anterior border
Margo inferior	Inferior border
Tuber omentale	Omental eminence
Cauda pancreatis	Tail of pancreas
Ductus pancreaticus	Pancreatic duct
M. sphincter ductus pancreatici	Sphincter of pancreatic duct
Ductus pancreaticus accessorius	Accessory pancreatic duct
Peritoneum	**Peritoneum**
Peritoneum parietale	Parietal peritoneum
Peritoneum viscerale	Visceral peritoneum
Mesenterium	Mesentery
Radix mesenterii	Root of mesentery
Mesocolon	Mesocolon
Mesocolon transversum	Transverse mesocolon
Mesocolon sigmoideum	Sigmoid mesocolon
Mesoappendix	Mesoappendix
Omentum minus	Lesser omentum
Lig. hepatophrenicum	Hepatophrenic ligament
Lig. hepatoesophageale	Hepato-oesophageal ligament
Lig. hepatogastricum	Hepatogastric ligament
Lig. hepatoduodenale	Hepatoduodenal ligament
Lig. hepatocolicum	Hepatocolic ligament
Omentum majus	Greater omentum
Lig. gastrophrenicum	Gastrophrenic ligament
Lig. gastrosplenicum; lig. gastrolienale	Gastrosplenic ligament; gastrolienal ligament
Lig. gastrocolicum	Gastrocolic ligament
Lig. splenorenale; lig. lienorenale	Splenorenal ligament; lienorenal ligament
Lig. pancreaticosplenicum	Pancreaticosplenic ligament
Lig. pancreaticocolicum	Pancreaticocolic ligament
Lig. splenocolicum	Splenocolic ligament
Lig. phrenicocolicum	Phrenicocolic ligament
Lig. coronarium	Coronary ligament
Lig. falciforme	Falciform ligament

Latin	English
Lig. triangulare dextrum	Right triangular ligament
Lig. triangulare sinistrum	Left triangular ligament
Lig. hepatorenale	Hepatorenal ligament
Recessus, fossae et plicae	Recesses, fossae and folds
Bursa omentalis	Omental bursa; lesser sac
Foramen omentale; foramen epiploicum	Omental foramen; epiploic foramen
Vestibulum	Vestibule
Recessus superior	Superior recess
Recessus inferior	Inferior recess
Recessus splenicus; recessus lienalis	Splenic recess
Plica gastropancreatica	Gastropancreatic fold
Plica hepatopancreatica	Hepatopancreatic fold
Plica duodenalis superior; plica duodenojejunalis	Superior duodenal fold; duodenojejunal fold
Recessus duodenalis superior	Superior duodenal fossa
Plica duodenalis inferior	Inferior duodenal fold
Recessus duodenalis inferior	Inferior duodenal fossa
Recessus intersigmoideus	Intersigmoid recess
Recessus ileocaecalis superior	Superior ileocaecal recess
Recessus ileocaecalis inferior	Inferior ileocaecal recess
Plica ileocaecalis	Ileocaecal fold
Recessus retrocaecalis	Retrocaecal recess
Plicae caecales	Caecal folds
Recessus subphrenicus	Subphrenic space
Recessus subhepaticus	Subhepatic space
Recessus hepatorenalis	Hepatorenal recess
Trigonum cystohepaticum	Cystohepatic triangle
Plica umbilicalis mediana	Median umbilical fold
Fossa supravesicalis	Supravesical fossa
Plica umbilicalis medialis	Medial umbilical fold
Fossa inguinalis medialis	Medial inguinal fossa
Trigonum inguinale	Inguinal triangle
Plica umbilicalis lateralis; plica epigastrica	Lateral umbilical fold; epigastric fold
Fossa inguinalis lateralis	Lateral inguinal fossa
Peritoneum urogenitale	Urogenital peritoneum
Fossa paravesicalis	Paravesical fossa
Plica vesicalis transversa	Transverse vesical fold
Excavatio vesicouterina	Vesico-uterine pouch
Lig. latum uteri	Broad ligament of uterus
Mesometrium	Mesometrium
Mesosalpinx	Mesosalpinx
Mesovarium	Mesovarium
Trigonum parietale laterale pelvis	Pelvic lateral wall triangle
Fossa ovarica	Ovarian fossa
Plica rectouterina	Recto-uterine fold
Excavatio rectouterina	Recto-uterine pouch
Excavatio rectovesicalis	Recto-vesical pouch
Fossa pararectalis	Pararectal fossa