Kharkiv National Medical University
Department of Propedeutic of Pediatrics N 2

PATIENS EXAMINATION AND SEMIOTICS OF CHILDREN DISEASES

WORKBOOK
FOR THE THIRD – YEAR STUDENTS OF THE MEDICAL UNIVERSITY

Student's name _____

Group № _____

Teacher _____

Kharkiv 2021

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Patients examination and semiotics of children diseases : workbook for the third-year students of the medical university / comp. Y. V. Karpushenko. Kharkiv : KhNMU, 2021. 140 p.

Compilers Y. V. Karpushenko

Обстеження пацієнта та семіотика дитячих хвороб : робочий зошит для студентів 3-го курсу медичних університетів, що навчаються англійською мовою / упоряд. Ю. В. Карпушенко. Харків : ХНМУ, 2021. 140 с.

Упорядник Ю. В. Карпушенко

CONTENS

Topic: Anatomical and physiological features of nervous system in children, physical examination

1. How the development of central nervous system in embrio and fetus proceeds?
2. What harmful factors can influence development of central nervous system in ante-, intra- and early postnatal periods?
3. What anatomical and physiological features of nervous system do the child get distinguished from an adult person?
4. Why head`s fontanelle`s sizes examination is important in the NS assessment?
5. What criteria are used to psychomotor development assessment?
6. Motility development depending on the age.
7. Statics development depending on the age.
8. Sensory reactions development depending on the age.
9. Speech development depending on the age.
10. Mental development depending on the age.
11. Characterize and name basic permanent reflexes.
12. What groups of transitory reflexes do you know? What reflexes belong to each group, their duration and methods of determining?
13. What are the main features of cerebral spinal fluid in children of different ages?
14. What is the procedure of lumbar puncture? What are the main features of this procedure in infants?
15. What paraclinical methods of CNS investigation do you know?

The recommended references.

1. Lecture.
2. Patients examination and semiotics of pediatric diseases (modul 2):Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
3. Propaedeutics of children's diseases and nursing of the child : [textbook for students of higher medical educational institutions] / T. Kapitan. 4th ed., updat. and translat. in English.– Vinnitsa : The State cartographical Factory, 2010. 806 p.
4. Клінічне обстеження дитини = PediatricPhysicalExamination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.
6. Prober CG, Srinivas NS, Mathew R. Central nervous system infections. In: Kliegman RM, Stanton BF, St. Geme JW, Schor NF, editors.Nelson textbook of pediatrics. 20th ed. New Delhi: Reed Elsevier India Pvt. Ltd; 2016. Pp. 2936–48.

1. The critical term for the CNS formation is _____ of _____ period.

1. The main antenatal risk factors for CNS formation:

1) _____

2) _____

3) _____

4) _____

5) _____

6) _____

7) _____

8) _____

9) _____

The main intranatal risk factors are:

1) _____

2) _____

3) _____

The main early postnatal risk factors are:

1) _____

2) _____

3) _____

2. Describe Anatomical and physiological features of CNS in children:

Features of CNS in children	Clinical significance
Cerebral tissue vascularisation	
The brain vascular system of fetus includes anastomoses developed insufficiently	
The child's brain contains more protein than the brain of the adult	
The quantity of CSF	
The most underdeveloped part of the brain is the brain stem	
Hystological immaturity of the neurons at birth	
The blood-brain barrier (BBB) of the fetus and a newborn is normally semi-permeable, allowing protein and other large and small (glucose) molecules to pass it freely from the cerebral vessels into the CSF, but prevent blood cell penetration.	

Features of CNS in children	Clinical significance
The process of normal formation of nervous cells is influenced by	
Functional minority of regulating action of the cortex in favor of sub-cortical formations with *domination thalamo-pallidal and strio-pallidal areas* in the first months of life	
Lower end of the cord is at L3 at birth	

4. There are ___ opened head`s fontanelles in a full term newborn baby.

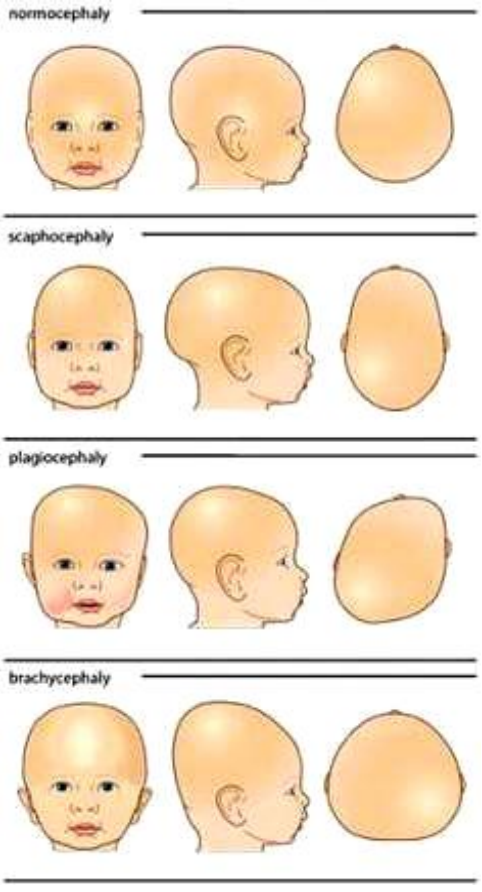
They are _____

Define (draw) and name the most prominent part on the back and frontal for measuring head circumference:

	Age	Head circumference
Infants	Birth – 6 months	Monthly gain _____ cm
	6–12 months	Monthly gain_____ cm

Average head circumference at birth is _____ cm.

Match the following pictures with definitions:



is the medical term to name a baby's head that has normal dimensions and proportions

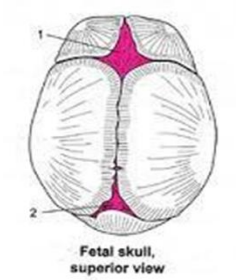
variant of flat head syndrome will have a head shape deformity, either to the back or side of the head.

this is when the back of the head becomes flattened, causing the head to widen. To compensate, the front of the skull sometimes bulges out.

is the most common of the craniosynostosis conditions and characterized by a long, narrow head.

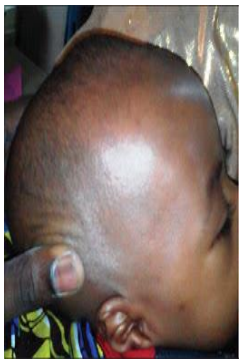
Fontanelles

Name № 1_____ №2



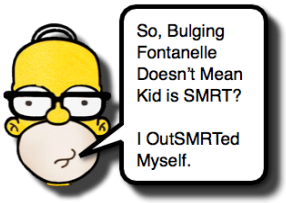
Normal size of anterior fontanelle at birth is_____cm.

Anterior fontanelle should be closed up to _____ months.



Bulge anterior fontanelle is symptom of _____

(exicosis, hydrocephalus, meningitis)



Sunken fontanelle is symptom of _____

(exicosis, hydrocephalus, meningitis)

The main features of cerebral spinal fluid in children

	NEONATES		Patients >6 months of Age
	Preterm	Term	
White blood cells per mm^3			
Range	0-25	0-22	0-7
Polymorphonuclear leukocytes (%)	57	61-84	5
Protein (mg per 100 mL)			
Range	65-150	20-170	20-45
Glucose (mg per 100 mL)			
Range	24-63	34-119	50-80
Cerebrospinal fluid/blood glucose (%)			
Range	55-105	44-128	60-75

Data from McMillian JA, editor: *Oski's pediatrics principles and practice*, Philadelphia, 2006, Lippincott Williams and Wilkins; Custer JW, Rau RE, editors: *Harriett Lane handbook*, ed 18, Philadelphia, 2008, Mosby.

5. The evaluation of Psychomotor development (PMD)

Criteria of assessment with the definition:

Motility _____

_____

Statics _____

_____

Sensory reactions _____

Speech _____

_____

Mental development _____

_____

The flexed position of the healthy newborn body at rest caused by _____

_____

Characteristics of the movements of a newborn: _____

_____

List the movements development in order:

By 2–3 weeks _____

At 2nd months _____

In the 4^{th} month _____

4^{th}–5^{th} months _____

5^{th}–6^{th} months _____

On the 10^{th} _____

11^{th} month _____

By the end of the 1^{st} year _____

List static development by the order:

2^{nd}-3^{rd} month _____

4^{th} month _____

6^{th}-7^{th} onth _____

9^{th}-10^{th} month _____

_____

Static development

The 1^{st} sign is _____, it appears on the 2^{nd}-3^{rd} month

The child sits at the _____

The child stands by the _____

Sensory reactions manifestations _____

_____

_____

_____

Oral attention looks like _____

Normally disappear by the _____ months.

Acoustical and visual concentration checks by a _____ (specialist) on the _____ month

How to check hearing? _____

How to check sight? _____

How pain can be seen in children? _____

_____

Sensory speech appears _____

And can be detected with _____
_____
Speech development
4–6 weeks _____
6 month _____
By the end of the 1st year _____
2 years _____
Mental development refers to _____
_____
At 1 month _____
At 2–3 months _____
At 4 months _____
At 5 months _____
At 7 months _____
At 9 months _____
At the end of 1st year _____
_____
_____
The mental development of the child will be normal when _____
_____
To assess motility, as a state of PMD, a pediatrician should find out the expressiveness of unconditioned (innate, instinctive) reflexes. All these reflexes are divided into 3 groups:
I – Permanent
II – Transitory
III – Righting
I – Permanent reflexes exist _____
They are:
1) _____
2) _____
3) _____
4) _____
5) _____
II – Transitory reflexes exist _____
Groups of transitory reflexes:
1. Oral reflexes _____
a) Sucking reflex: lasts up to _____
b) Kussmaul-Henzler's search reflex: lasts up to _____,
is conducted _____
the child reacts_____
c) Lip reflex: lasts up to _____,
is conducted _____
the child reacts _____
d) Babkin's reflex: lasts up to _____,
is conducted _____
the child reacts_____
2. The basic spinal reflexes are
a) Defense reflex: lasts up to _____,
is conducted _____
the child reacts _____

b) Supporting reflex: lasts up to _____,
is conducted _____
the child reacts _____
c) Stepping reflex: lasts up to _____,
is conducted _____
the child reacts _____
d) Upper grasping reflex (Robinson's): lasts up to _____,
is conducted _____
the child reacts _____
e) Lower grasping reflex (Vercom's): lasts up to _____,
is conducted _____
the child reacts _____
f) Moro's reflex: lasts up to _____,
is conducted _____
the child reacts _____
g) Kernig's reflex: lasts up to _____,
is conducted _____
_____
the child reacts _____
Kernig's symptom when _____
h) Crowling response (Bauer's): lasts up to_____,
is conducted _____
the child reacts _____
i) Babinski's reflex (plantar): lasts up to _____,
is conducted _____
the child reacts _____
j) Galant's response: lasts up to _____,
is conducted _____
the child reacts _____
k) Perez's reflex: lasts up to _____,
is conducted _____
the child reacts _____

3. The basic myeloencephalical posotonic reflexes are

a) Symmetric cervical tonic reflex: lasts up to _____,
is conducted _____
the child reacts _____
b) Asymmetric cervical tonic reflex: lasts up to _____,
is conducted _____
the child reacts _____

a _____ or b _____

III – The basic righting reflexes are

a) Upper reflex of Landau: appears at the age _____ month conducted

_____

the child reacts _____

b) Lower reflex of Landau: appears at the age _____ month conducted

_____

the child reacts _____

c) Sideward support reaction: appears at the age_____month conducted

_____

the child reacts _____

c) Parashute reaction: appears at the age _____ month conducted

_____

d) the child reacts _____

Take into account while estimating the results of unconditioned reflexes

***Their presence or absence**

***At presence – its symmetricity**

***Time of their occurrence and disappearance**

***Correspondence of the expressiveness of the reflex to the age of the child**

Permissible **delay of criteria** due to the age is:

*During the 1st year – 1 month

*During the 2st year – 3 months

*During the 3st year – 6 months

Functional delay of the development of the NS when _____

_____

Pathological delay (encephalopathy) of the development of the NS when _____

_____

_____

Paraclinical methods of CNS investigation

1. Central spinal fluid (CSF) examination

Lumbar puncture

Lumbar puncture (LP) is the procedure used to obtain cerebral spinal fluid.

CSF samples must be obtained with strict adherence to Aseptic Technique.

An LP is only conducted after a thorough neurological examination and raised intracranial pressure (ICP) or other contraindications have been excluded.

Indications

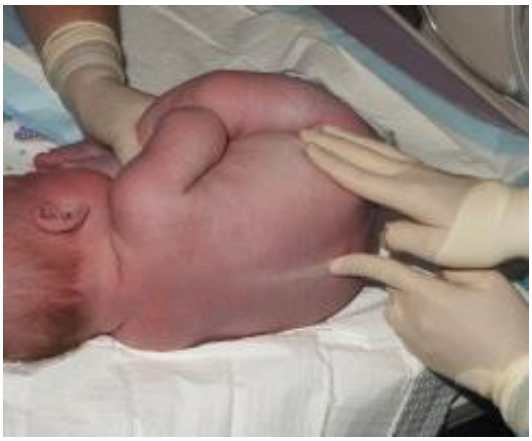
- Suspected meningitis or encephalitis
- Suspected sub-arachnoid haemorrhage with a normal CT
- Measurement of opening pressure in suspected idiopathic intracranial hypertension
- Therapeutic reduction in ICP in idiopathic intracranial hypertension
- Disease staging and instillation of chemotherapy in oncology patients
- To assist with the diagnosis of other central nervous system pathologies including demyelinating, neuroinflammatory and neurometabolic conditions.

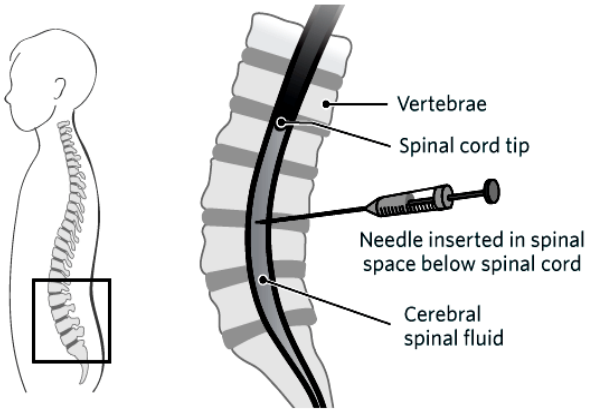
Contraindications

- Coma or decreased conscious state: absent / non-purposeful response to painful stimuli
- Signs of raised intracranial pressure (ICP)
- Within 30 minutes of seizure or if normal conscious level has not returned post seizure.
- New focal neurological signs - hemiparesis, extensor plantar responses, ocular palsies.
- Strong suspicion of meningococcal infection with risk of Disseminated Intravascular Coagulation (typical purpuric rash in an unwell child).
- Local infection at the needle insertion site.
- Coagulation defects.
- Cardiovascular compromise / shock.
- Respiratory compromise e.g. baby with apnoeas.
- Thrombocytopaenia. If platelets < 50 discuss with Consultant

Position of patient

- Perform hand hygiene before touching the patient.
  Appropriate positioning increases the interspinous distance, facilitating access to meninges and CSF
  - Position the patient in a lateral position with the patient facing the holding nurse
  - Patient knees and chin are to be drawn to the chest, and body well flexed
  - The hips should be vertical to align the iliac crests i.e. back should be 90 degrees to the bed
  - The patients back should be positioned parallel and close to the edge of the bed with the hips vertically aligned.





Alternatively

1. Older patients may prefer to remain in a sitting position. Have the patient slouch shoulders over a pillow without bending at the hips and maintaining the 90 degree back to bed position.
2. Avoid over flexion of the neck, especially in infants as respiratory compromise may result.

Preparation

- Perform hand hygiene before touching the patient.
- Identify the LP site – a line between the top of the iliac crest intersects the spine at approximately the L3/L4 interspace:
  - Site for needle insertion should be L3/L4 or L4/L5 interspace.
- Wash hands using aseptic technique and put on sterile gown and gloves.
- Prepare skin with antiseptic swab sticks or sterile forceps and gauze:
  - Wipe antiseptic swab in a circular motion commencing at the proposed insertion site
  - Repeat with second swab stick or sterile forceps and gauze.
- Drape the patient with the fenestrated sterile drape ensuring the airway is visible at all times.
- Remove caps from the CSF specimen containers.
- Identify the landmarks and palpate the needle insertion point.

- If using local anaesthetic:
  - Infiltrate the skin with 1 % lignocaine (allow 1–2 minutes for anaesthetic effects).
- Ensure the skin is dry prior to the needle insertion.
- Reconfirm the land marks and LP site prior to the needle insertion.

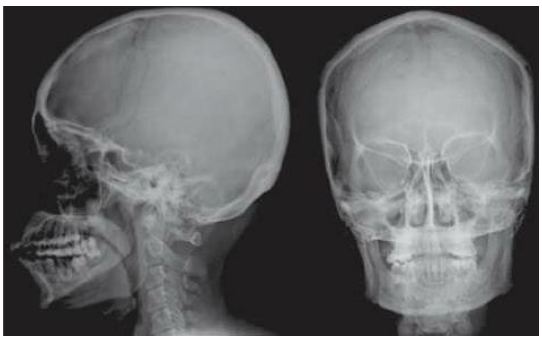
Spinal needle insertion

- Hold the spinal needle so that bevel is in the superior position (facing up)
- With the stylet in position, insert the needle through the skin and wait for any patient movement to stop
- Aiming for the umbilicus, advance the needle in the spinous ligament until there is a decrease in resistance
- Remove the stylet and check for CSF appearing at the needle hub
- When sample collection is complete, reinsert the stylet
- Remove the needle and stylet
- Use sterile gauze to apply gentle pressure to the insertion site
- Cover the insertion site with a transparent occlusive dressing, which should remain in situ for 24 hours
- Remove personal protective equipment and perform hand hygiene.

CSF Interpretation

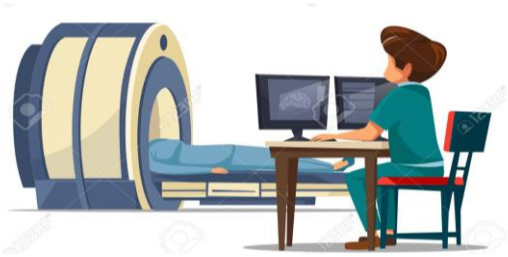
- All CSF should be sent for urgent cell count, protein, glucose, microscopy and culture.
- Normal CSF should not contain neutrophils but may have variable WBC depending on age.

	Neutrophils	**Lymphocytes**	**Protein**	**Glucose**
Normal term neonate	0	< 20	< 1 g/L	> 2/3 serum glucose or > 2.0 mmol.L
Normal (> 1 month of age)	0	< 5	< 0.4 g/L	>2/3 serum glucose or > 2.5 mmol/L
Bacterial meningitis	Very high	Usually < 100	> 1 g/L	Low
Viral meningitis	Usually < 100	10–1000	Normal	Normal

2.  _____ (note method)

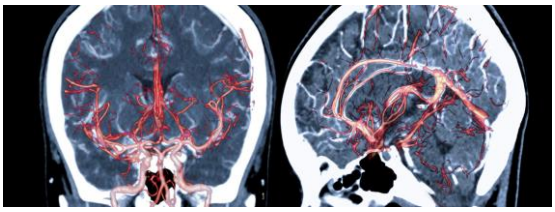
What can be detected by this method?

_____

3.  _____ (note method)

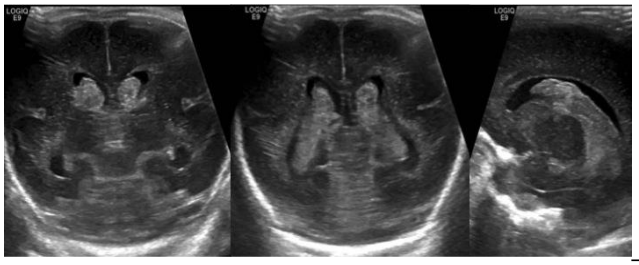
What can be detected by this method?

_____

4.  _____ (note method)

What can be detected by this method?

_____

5.   _____(note method)

What can be detected by this method?

_____

6.  _____ (note method)

What can be detected by this method?

_____

Practical skills

Describe the muscle tone on examination:

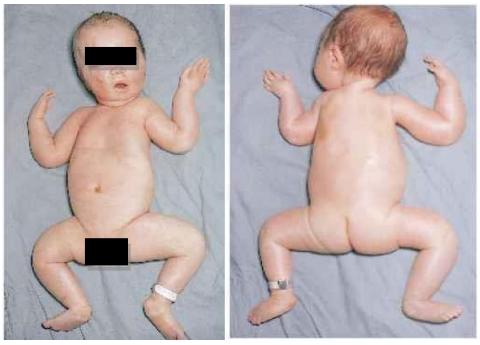
_____

_____

_____

_____

_____



Name position of the infant with muscle hypotonia

_____

_____

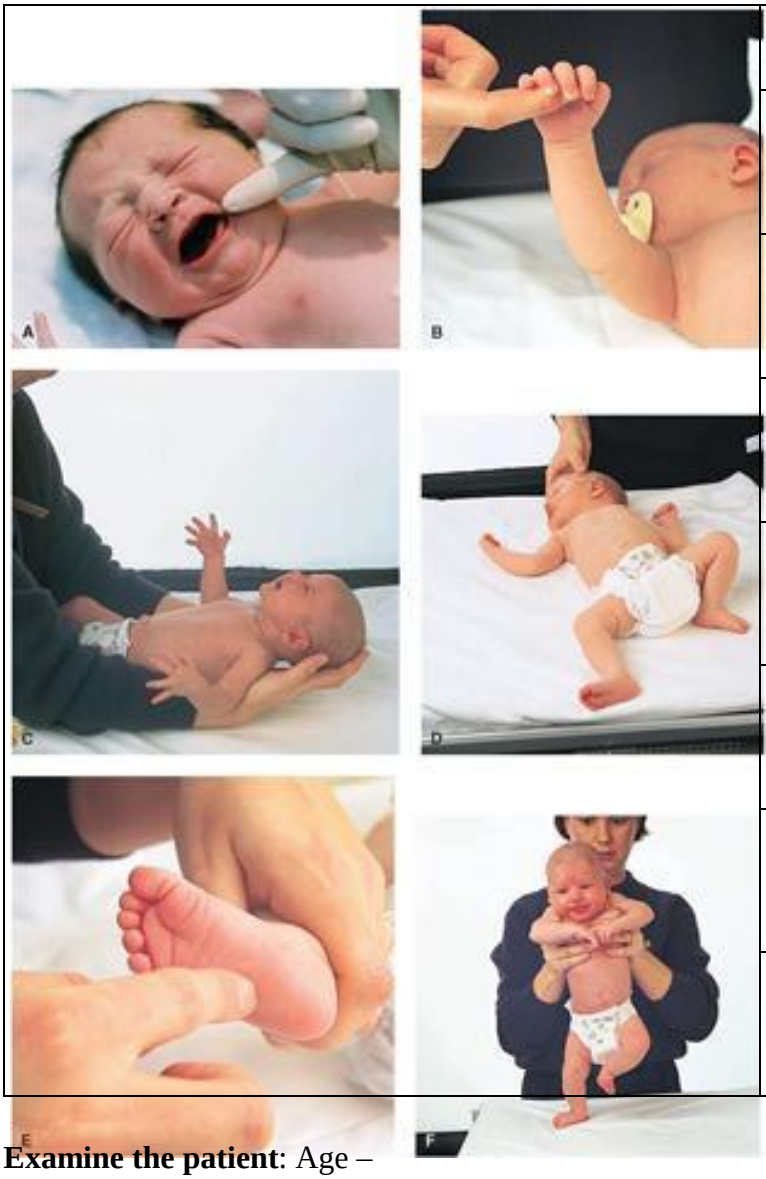
_____

_____

_____

_____

Neonatal Reflexes assessment:



The label	Find Neonatal Reflexe in the corresponding picture and lable
	Palmar grasp reflex
	Babinski's reflex
	Tonic neck reflex:
	Sucking reflex
	Moro's reflex
	Stepping reflex
	Rooting reflex

Examine the patient: Age –

Level of consciousness: _____

Examination of the child's head:

size _____cm shape _____

asymmetry_____

anterior fontanel: size _____, tension_____, sutures_____,

dilated veins _____, cephalohematoma _____.

Examination of motor system: – underline present.

1. posture _____
2. motor disorders (palsy, paresis), athetosis, tics, tremor, no
3. Muscles development:

shape _____

tone _____

Motility

Movements: limited, chaotic, coordinated, no

The coordinated movements of muscules of eyes –

Turning of head in different directions –

Hands activity –

Turning from supine position to the abdominal –

Turning from abdominal position to the supine –

Walking –
The coordinated purposeful movements of all muscules –
Assess reflexes for newborns and infants (present or not)
Moro's reflex
tonic neck reflex stepping reflex
Babinsky'sign planter palmar
grasping reflex
sucking reflex
swallowing reflex
defense reflex
Kernig's reflex
Crawling reflex
Upper reflex of Landau
Lower reflex of Landau

Meningeal signs (positive or negative)**:**

Brudzinski neck _____
Brudzinski leg _____
neck rigidity _____
Kerning's sign _____.

Describe Normal Values for Cerebrospinal Fluid

	Neonate	**Infant/child**
Pressure		
Cytosis (cells)		
Cell type		
Protein		
Glucose (% of Serum)		
Color		

Theme: The semiotics of the main nervous system diseases in children

1. What are the major causes of congenital abnormalities of nervous system in children?
2. What complaints are specific for CNS diseases?
3. What does it mean the stigmata and what is its clinical significance?
4. What are the semiotics of hydrocephaly?
5. What are the semiotics of Down's syndrome?
6. What are the semiotics of cerebral palsy?
7. What are the semiotics of meningeal syndrome?
8. What are the symptoms of meningitis?

The recommended literature.

1. Lecture
2. Patients examination and semiotics of pediatric diseases (modul 2) : workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. – Zaporozhye : ZSMU, 2016. – 104 p.
3. Propaedeutics of children's diseases and nursing of the child : [textbook for students of higher medical educational institutions] / T. Kapitan. – 4th ed., updat. and translat. in English. – Vinnitsa : The State cartographical Factory, 2010. – 806 p.
4. Клінічне обстеження дитини = PediatricPhysicalExamination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. – 2-е вид., перероб. – Вінниця : Нова Книга, 2019. – 498 с.
5. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.
6. Prober CG, Srinivas NS, Mathew R. Central nervous system infections. In: Kliegman RM, Stanton BF, St. Geme JW, Schor NF, editors.Nelson textbook of pediatrics.20th ed. New Delhi: Reed Elsevier India Pvt. Ltd; 2016. pp. 2936–48.

The major causes of congenital abnormalities of CNS are:

**DISORDERS OF NEURAL TUBE FORMATION*

The neural tube usually fuses 18–26 days after ovulation. Failure of closure may lead to anencephaly, encephalocele, spina bifida or spina bifida occulta. Liveborn anencephalic babies usually die in hours or days.

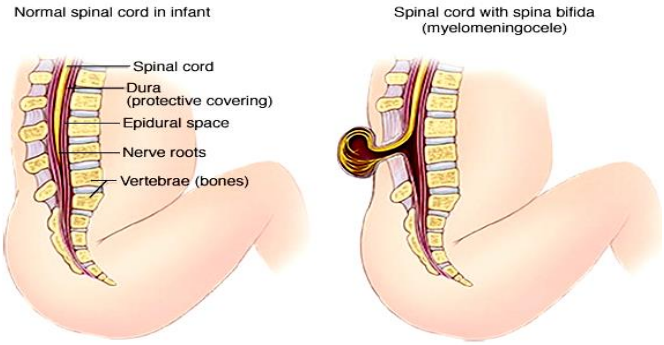
Aetiology. Most NTDs result from a complex interaction between several genes and poorly understood environmental factors.

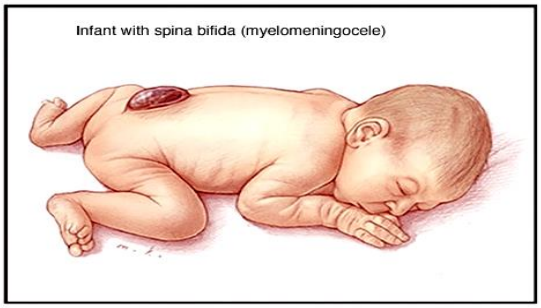
Genetic factors. NTDs occur in many syndromes and chromosome disorders. However, an NTD may be the only anomaly in a member of a family in which case the relatives have an increased risk for all types of NTD.

Environmental factors. Periconceptual multiple vitamin supplements containing folic acid reduce the incidence of neural tube defects. Some drugs taken during the pregnancy may increase the risk. These include sodium valproate and folic acid antagonists such as trimethoprim, triamterene, carbamazepine, phenytoin, phenobarbitone, and primidone.

Spinal dysraphism

Spina bifida cystica

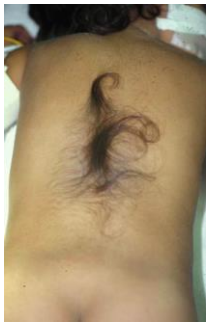




This is a cystic lesion which in 80–90 % is a myelomeningocele in which the spinal cord is a component of the cyst wall. It is lumbosacral in about 80 % of cases. There is usually a mixture of upper and lower motor neurone signs depending on the level and there is always disturbance of bladder and bowel function. Surviving infants require complex orthopaedic and urological support, including surgery. About 5 % of cases of spina bifida cystica are meningoceles in which there is no neural tissue in the cyst wall, there is no associated hydrocephalus, and neurological examination may be normal. Hydrocephalus complicates most cases of lumbosacral meningomyelocele. Ultrasound shows hydrocephalus in about 90 % of cases at birth. Usually it is associated with the Chiari II malformation, which is present in about 70 % of cases of meningomyelocele and consists of downward protrusion of the medulla below the foramen magnum to overlap the spinal cord. Distortion of the medulla and midbrain can cause lower cranial nerve palsies and central apnoea (which may be misdiagnosed as epilepsy).

Occult spinal dysraphism

The term spina bifida occulta is often applied to a defect of the posterior arch of one or more lumbar or sacral vertebrae (usually L5 and S1). It is found incidentally by *x* ray in 25 % of hospitalised children and may be regarded as a normal variant. However, it must not be assumed that spina bifida occulta is always benign. If examination of the skin over the spine reveals a naevus, hairy patch, sinus or subcutaneous mass, magnetic resonance imaging of the spinal cord is probably indicated, particularly if there are associated neurological abnormalities of sphincter or limb control. Several different abnormalities may be found, such as an open sinus tract which could cause recurrent meningitis, a lipoma attached to a low lying spinal cord, or diastematomyelia which is a sagittal cleft dividing the spinal cord into two halves often with a bony or cartilaginous spur transfixing the cord. If an abnormality involving the cord or nerve roots is found there is a case for neurosurgical intervention, but the indications for this are controversial.



Syringomyelia

This is a tubular cavitation of the spinal cord which tends to be in the cervical region but may involve the whole cord. It rarely becomes symptomatic in children. Shunting of the cavity is sometimes performed and posterior fossa exploration may be undertaken. It is often associated with the Chiari I malformation in which there is downward displacement of the lower cerebellum, including the tonsils.

**DISORDERS OF REGIONALISATION*

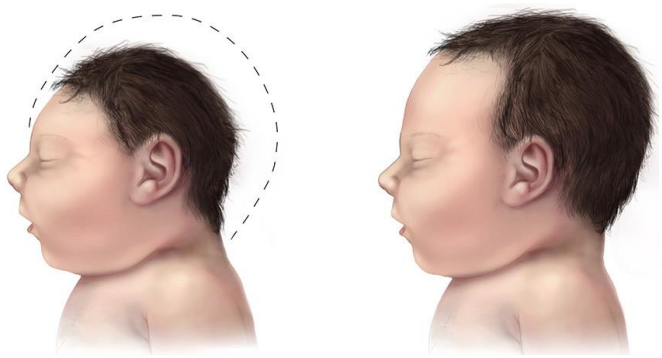
Abnormal development of the anterior portion of the neural tube (the mediobasal prosencephalon) and associated structures caused by disturbances in ventral induction (described above) may cause abnormalities of the brain and face. The most severe is holoprosencephaly in which there is failure of the prosencephalon to separate into two cerebral hemispheres. The mildest is olfactory aplasia without other cerebral malformations. The severity of associated facial abnormalities often parallels those in the brain. In the most severe facial abnormality there is anophthalmia and absence of the nose. However, there may be just mild hypotelorism (closely set eyes), a single central incisor tooth or the face may be normal.

**DISORDERS OF CORTICAL DEVELOPMENT*

Disorders of proliferation and differentiation

Microcephaly

This is an abnormally _____ head circumference (< 0.4th centile on occipito-frontal head circumference charts), which is disproportionately in relation to the rest of the body. The usual implication of this finding is that brain growth is not normal. However, if a small head circumference is detected in the neonatal period it is prudent to perform an x ray of the skull to look for evidence of early closure of all the cranial sutures (total craniosynostosis).

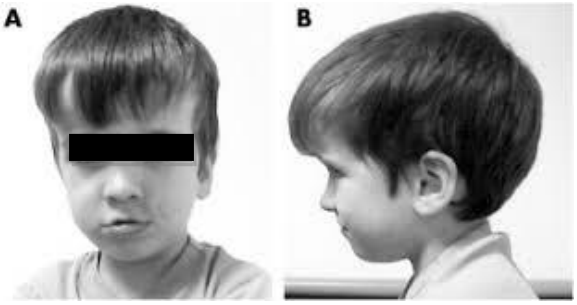


Genetic causes

There are familial cases where the neurological problems are relatively mild. However microcephaly is usually associated with significant abnormalities such as pyramidal tract signs and profound learning difficulties. It is part of more than 450 syndromes listed in the Oxford Dysmorphology Database.

Megalencephaly (Macrocephaly)

Megalencephaly is increased size of the brain itself. Large heads can run in normal families but inherited megalencephaly can be associated with significant learning difficulties, neurological abnormalities, and seizures. Hemimegalencephaly is unilateral enlargement of one side of the brain, sometimes the hemisphere only. Associated neurological problems can be severe–intractable seizures, developmental delay, and sometimes hemiparesis.



Disorders of migration

Migrating neurones may fail to reach their intended destination in the cerebral cortex. The abnormalities may be focal or diffuse. If neurones fail to leave the ventricular zone, periventricular heterotopias result. If they fail to complete their migration in the cortex this causes lissencephaly. If only a subpopulation of neurones are affected and others complete migration this causes nodular or band heterotopias.

Agyria-pachygyria (lissencephaly)

There may be complete absence of gyri, in which case the terms agyria or lissencephaly (Greek: "smooth brain") are used. Pachygyria describes a reduced number of broadened and flat gyri with less folding of the cortex than normal. There may be varying degrees of agyria/pachygyria in the same brain.

Heterotopias

Periventricular heterotopias are abnormal collections of neurones in the subependymal region. They may be part of a complex malformation syndrome or they may be isolated. They may be clinically silent or associated with seizures and developmental problems. Subcortical heterotopias can be divided into two groups. Nodular heterotopias of grey matter are found in association with other migration disorders and may be the cause of partial seizures. Subcortical laminar heterotopias are also known as band heterotopias or "double cortex".

Polymicrogyria (microgyria)

This developmental disturbance may occur after the fifth month of pregnancy. The causes are poorly understood but may be genetic, infective or hypoxic (perhaps associated with poor cerebral perfusion). The clinical manifestations depend on the location and extent of the abnormalities. There is a bilateral perisylvian syndrome (or anterior operculum syndrome) in which bilateral opercular abnormalities are seen on magnetic resonance imaging, some of which have the appearance of polymicrogyria. These patients have a pseudobulbar palsy with dysarthria, loss of voluntary control of the face and tongue leading to drooling and difficulty feeding. Familial occurrence has been reported.

Disorders of cortical organisation

Some patients have cortical microdysgenesis—microscopic abnormalities of cortical arrangement that have been described in the brains of patients with epilepsy, autism, schizophrenia, and the fetal alcohol syndrome. The extent to which these findings explain abnormal brain function is an area of active research. Other patients have areas of focal cortical dysplasia which are large enough to be seen on computed tomographic or magnetic resonance imaging scans. These dysplasias are a cause of early onset seizures that may be focal or generalised. Resection of cortical dysplasias may improve seizure control.

**COMBINED AND OVERLAPPING CEREBRAL MALFORMATIONS*

There are distinct abnormalities that represent an overlap between different classes of malformation.

Agenesis of the corpus callosum

Porencephaly

Schizencephaly

**MALFORMATIONS OF POSTERIOR FOSSA STRUCTURES*

include aplasia or hypoplasia of the cerebellar hemispheres (which may be combined with brainstem abnormalities). There may be abnormalities of the vermis, including the Dandy-Walker malformation (which consists of complete or partial agenesis of the vermis, dilatation of the fourth ventricle, and enlargement of the posterior fossa) and the Joubert syndrome (an autosomal recessive disorder characterised by absence or hypoplasia of the postero-inferior part of the vermis).

Disorders of the nervous system may involve the following:

- ***Vascular disorders***, such as stroke, transient ischemic attack (TIA), subarachnoid hemorrhage, subdural hemorrhage and hematoma, and extradural hemorrhage
- ***Infections***, such as meningitis, encephalitis, polio, and epidural abscess
- ***Structural disorders***, such as brain or spinal cord injury, Bell's palsy, cervical spondylosis, carpal tunnel syndrome, brain or spinal cord tumors, peripheral neuropathy, and Guillain-Barré syndrome
- ***Functional disorders***, such as headache, epilepsy, dizziness, and neuralgia
- ***Degeneration***, such as Parkinson disease, multiple sclerosis, amyotrophic lateral sclerosis (ALS), Huntington chorea, and Alzheimer disease

Signs and symptoms of nervous system disorders

The following are the most common general signs and symptoms of a nervous system disorder. Please, complete the list with the symptoms more typical for children

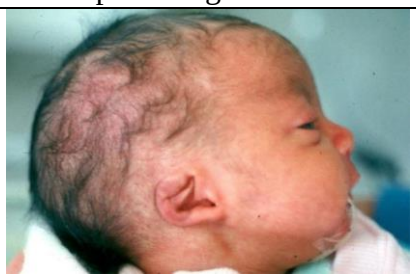
- Persistent or sudden onset of a headache
- Loss of feeling or tingling
- Weakness or loss of muscle strength
- Loss of sight or double vision
- Memory loss
- Impaired mental ability
- Lack of coordination
- Muscle rigidity
- Tremors and seizures
- Back pain which radiates to the feet, toes, or other parts of the body
- Muscle wasting and slurred speech
- New language impairment (expression or comprehension)

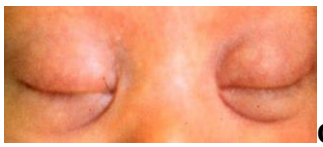
_____
_____
_____
_____
_____
_____

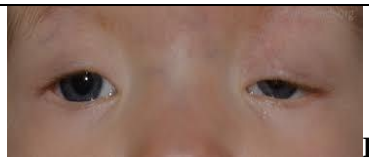
Stigmata

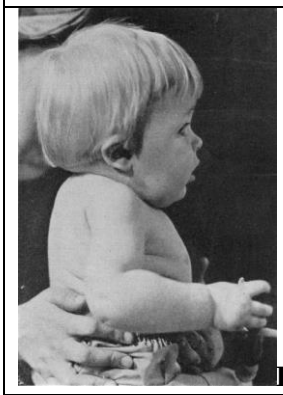
Find and label the most widespread stigmata in the corresponding picture:

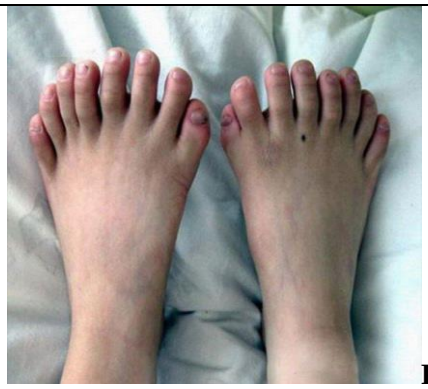

A


B


C


D


E


F


G


H

Syndactyly –

Brachydactyly –

Too short neck –

Epicanthus –

Low or asymmetrically located ears –

Micrognatia –

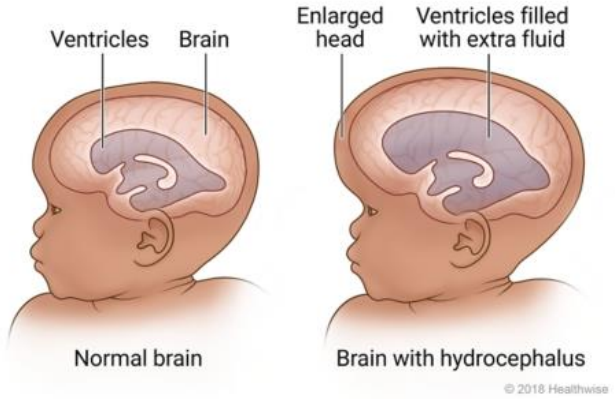
Ptosis –

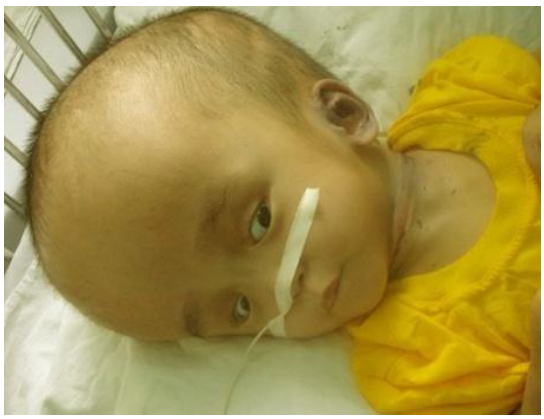
Polydactyly –

“Sandals-like” deformation of feet –

Normally, stigmas should not exeed _____
Why it is important to consider stigmas?
Answer _____
_____

Hydrocephaly (hydrocephalus)
Is the disease characterized by _____
_____
It can arise before birth or any time afterward. It may be due to many causes including a birth defect, hemorrhage into the brain, infection, meningitis, tumor, or head injury. Most forms of hydrocephalus are the result of obstructed CSF flow in the ventricular system. With birth defects, physical obstruction of CSF flow in the ventricular system is usually the cause of the hydrocephalus. Hydrocephalus is a common companion of spina bifida (meningomyelocele).
Classification
On the time occurrence – acquired and developmental (congenital)
On the course of the disease – acute and chronic
On localization – external, internal and general
The sizes of skull could be normal or slightly increased in _____ form.





Note the major symptoms of hydrocephalus

Cranial sutures reaction	
Fontanels reaction	
Scalp thikness	
Scalp veins reaction	
Forehead size	
Eyes reaction	
“Sun-set sign”	
Graefe’s symptom	

Down syndrome
Is one of the forms of _____ caused by _____
Neuro-psychological development peculiarities:
In early neonatal period _____
_____
The parameters of statics _____
_____
Speech development _____
Intellectual and mental development _____
Note pathognomonic external and internal signs:

 	1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11.

Cerebral palsy

Cerebral palsy (CP) is a neurological condition caused by brain damage and it is the most common motor and movement disability of childhood.

CP refers to a group of symptoms and disabilities, such as:

- Movement and walking disabilities
- Speech difficulties
- Learning disabilities
- Cognitive impairments
- Hearing or vision loss
- Epilepsy
- Emotional and behavioral challenges
- Spinal deformities
- Joint problems

The main causes CP

Brain damage is the cause of CP, but there are many different things that can trigger damage. For this reason, the exact cause of cerebral palsy can't always be determined. Possibilities include:

- Poor brain development in the womb
- Maternal infections or medical conditions
- Disruption of blood flow to the developing brain
- Genetic conditions
- Ingestion of toxins or drugs during pregnancy
- Damage to the head or skull during delivery
- Complications related to premature delivery

*There are **four types of cerebral palsy***:

1. Spastic Cerebral Palsy

Spastic CP accounts for 75 percent of all cases. It causes increased muscle tone, known as spasticity and causes:

- Delayed developmental milestones for moving.
- Abnormal movements.

- Movement inhibition.
- Stiff and spastic muscles.
- Difficulties controlling muscle movement.
- Difficulties moving from one position to another.

Spastic quadriplegia impacts a child's upper and lower limbs and body, severely restricting mobility.
Spastic diplegia only affects the lower half of the body. Many of these children can still walk with some impairments and may need assistive devices such as walkers.
Spastic hemiplegia affects one side of the body only, usually the arm more than the leg. Most children with hemiplegia can walk.

2. Dyskinetic Cerebral Palsy

Is the second most common type of CP. Symptoms include:

- Dystonia, repetitive and twisting motions.
- Athetosis, writhing movements.
- Chorea, unpredictable movements.
- Poor posture.
- Painful movements.
- Difficulty swallowing or talking.

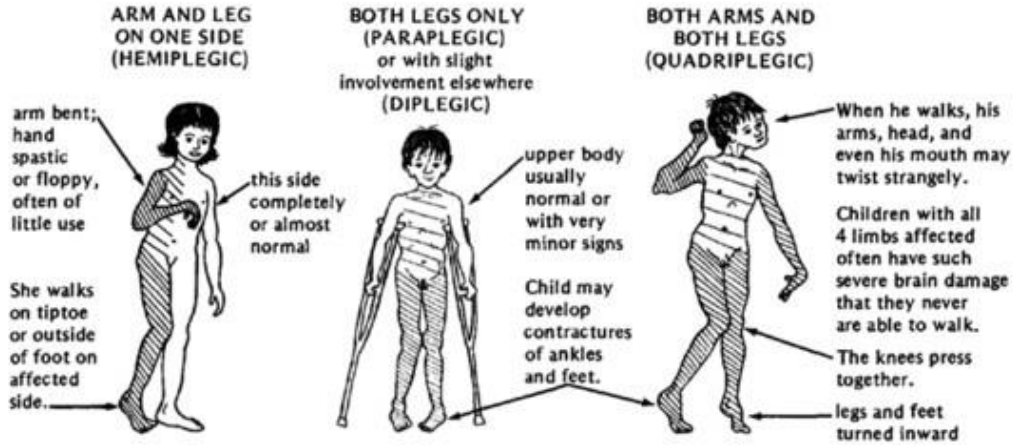
3. Ataxic Cerebral Palsy

Ataxic CP is the least common. It causes poor balance, limited coordination, tremors, and shaky movements that are difficult to control.

4. Mixed Cerebral Palsy

Mixed CP causes symptoms characteristic of two or three of the other types. Spastic-dyskinetic cerebral palsy is the most common type of mixed CP.
When diagnosing cerebral palsy, doctors look for spastic movements, abnormal muscle movements, delayed development, and poor coordination.

Cerebral palsy symptoms:



Describe hemiplegic _____
_____
_____

Describe paraplegic _____
_____
_____

Describe quadriplegic _____
_____
_____

Match the definitions of <u>Movement disorders</u> with the correct words:

Paralysis (palsy) is	gross uncoordination that may become worse with the eyes closed
Ataxia is	slow, writhing, wormlike, constant, grossly uncoordinated movements that increase on voluntary activity and decrease on relaxation
Athetosis is	incomplete paralysis
Paresis is	the absence of any voluntary movements
Dystonia is	involuntary, compulsive, stereotyped movements of an associated group of muscles (can be suppressed by strong-willed effort)
Tics is	constant small very fast involuntary movements
Tremors is	slow twisting movements of limbs or trunk (alternation of a hypotonia with rigidity, formation of elaborate postures)

Meningeal syndrome

The clinical symptoms arising due to the affection of meninges (inflammatory and non-inflammatory genesis).

The most frequent signs are:

1. _____
2. _____
3. _____
4. _____
5. Meningeal position – _____

Meningeal Signs assessment:

Meningeal Sign	Describe implementation
Kernig's symptom	
Brudzinski's higher (neck) symptom	
Brudzinski's Middle (pubis) symptom	
Brudzinski's Lower (contralateral leg) symptom	
Zygomatic	
Neck rigidity	
Lessage's symptom	

When the meninges of brain are affected by **non-inflammatory origin** the syndrome of_____ develops.

Meningitis

Meningitis is a clinical syndrome characterized by inflammation of the meninges.

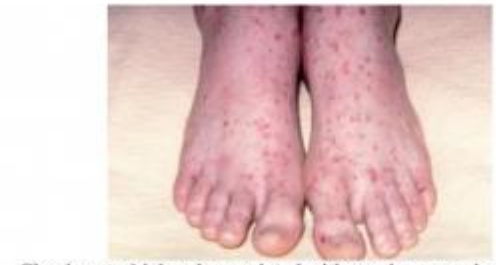
Meningitis can be caused by infection by *bacteria or viruses*. The particular pathogens are not special to meningitis; it is just an inflammation of that specific set of tissues from what might be a broader infection.

Bacterial meningitis can be caused by Streptococcus, Staphylococcus, or the tuberculosis pathogen, among many others.

Viral meningitis is usually the result of common enteroviruses (such as those that cause intestinal disorders), but may be the result of the herpes virus or West Nile virus. Bacterial meningitis tends to be more severe.

Signs and Symptoms:

The symptoms of meningitis don't appear in any particular order and may appear differently in different people.

In older children and adults symptoms of meningitis can include headache, fever, vomiting, neck stiffness, drowsiness and confusion, and discomfort looking at bright lights. In babies and young children symptoms can include fever, cold hands or feet, refusing feeds or vomiting, fretfulness, being difficult to wake or lethargic, and sometimes a high-pitched moaning cry or whimpering.	
There may also be a rash, particularly with meningococcal meningitis where there is often a characteristic purplish-red rash. A rash looks like small red or purple spots, some areas might be bigger. The rash does not fade when pressed	 Classic petechial rash associated with meningococcal meningitis[4]

Blood tests and a lumbar puncture (removal of spinal fluid through a needle) are often required to determine if meningitis is viral or bacterial.

Fill the table with Values for CS F corresponding to disease

	Bacterial Meningitis	**Viral Meningitis**
Opening Pressure mmHg		
Cytosis (cells)		
Cell type		
Protein		
Glucose (% of Serum)		
Color		

Practical skills

Examine the patient: Age –

Level of consciousness :_____.

Examination of the child's head:

size_____

cm shape_____

asymmetry_____

for infants assess anterior fontanel: size_____, tension_____, sutures_____, dilated veins_____, cephalohematoma_____.

Examination of motor system:

1. posture _____
2. gait
3. motor disorders (palsy, paresis), athetosis, tics, tremor – yes or not.
4. Muscles Development:
   shape_____
   contour of the body_____in relaxed and tensed state;
   muscle bulk_____;
   muscle tone_____;
   muscle strength_____.

Deep tendon reflexes: Biceps

_____

triceps _____

brachioradial _____

knee _____

Achilles _____

For newborn's and infants assess reflexes (present or not)

Moro's reflex

tonic neck reflex

stepping reflex

Babinsky'sign

planter reflex

palmar grasp

traction

root reflex

sucking reflex

swallow and gag reflex

Meningeal signs (positive or negative)**:**

Brudzinski Upper_____

Brudzinski Middle_____

Brudzinski Lower_____

neck rigidity _____

Kerning's symptom_____

Theme: Examination of the skin and its accessory organs, subcutaneous tissue and lymph nodes. Clinical manifestation of the skin disorders

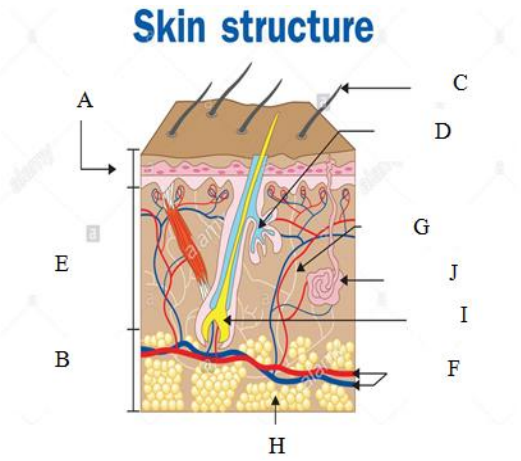
Theoretical part:

1. The features of skin and its derivatives in children.
2. What characteristics of the skin the physician should be able to assesses during the examination? (color, texture, temperature, moisture, turgor, lesions)
3. Clinical value of the skin color changes (pallor, cyanosis, hyperemia, jaundice).
4. Primary and secondary lesions of skin (rashes, exanthema).
5. Semiotics of infectious and allergic rashes in children.
6. Subcutaneous fat investigation. (normotrophy, hypotrophy, marasmus, obesity).
7. Assessment of the lymph nodes.

The recommended literature

1. Lecture
2. Propedeutics of children's diseases and nursing of the child.T. Kapitan, Vinnitsa: The State cartographicae Factory. 2012. P. 205–224.
3. The language of Dermatology http://www. Dermatology.org/morphologu,index.html.
4. Patients examination and semiotics of pediatric diseases (modul 2):Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
5. Клінічне обстеження дитини = PediatricPhysicalExamination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.

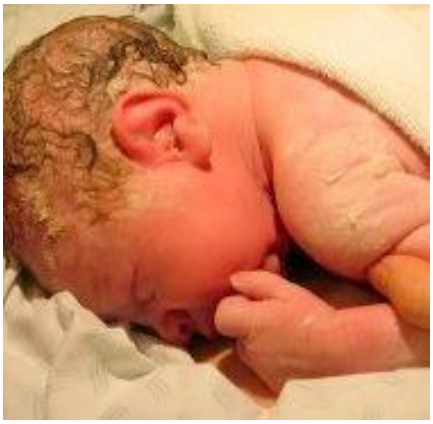
Label: Figure 1 Skin



1. epidermis
2. subcutaneous tissue
3. hair
4. sebaceous gland
5. dermis
6. blood vessel
7. nerve
8. adipose connective tissue
9. pore
10. sweat gland

The functions of the skin are:

1._____
2._____
3._____
4._____
5._____
6._____
7._____
8._____



The normal skin in a new born has_____ color, a little edema, is covered with embryonic ***lanugo hair*** in the _____ area.

After birth, dermis is covered with a ***vernix caseosa*** – _____.

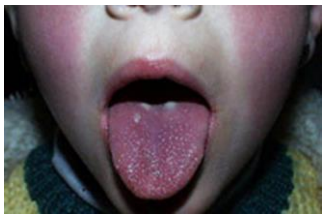
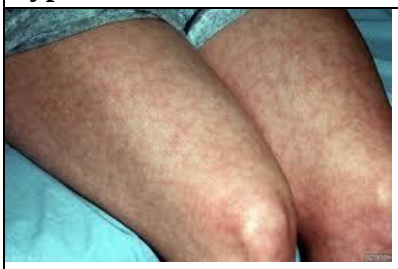
Normal color is _____.

On the 2nd–3rd day the skin asquires a_____ shade (jaundice of a newborn).

Fill table 1: **Anatomical physiological features of the skin and its appendices in newborn and infant**

Anatomical physiological features	**Their values**
Epidermis:	
Dermis:	
subcutaneous tissue:	
blood vessel:	
sweat gland:	
sebaceous gland:	
Nails:	
The hair:	

Fill table 2: **Skin color changes**

Skin color changes	What disease or pathological state is this discoloration indicate
  **Pallor**	
 **Cyanosis**	
 **Jaundice**	
 **Hyperemia**	
 **Marmorated**	
 **Dirty-brown**	

Fill table 3: **Primary rush elements**

Circumscribed, flat, nonpalpable changes in skin color	Palpable elevated solid masses	Circumscribed superficial elevations of the skin formed by free fluid in a cavity within the skin layers
1_____ 2_____	1_____ 2_____ 3_____ 4_____	1_____ 2_____ 3_____

Definitions

Match the definitions in *Column I* with the correct words in *Column II*

Column I	***Column II***
____**1** a small, thin plate of horny epithelium, resembling a fish scale, cast off from the skin	**A** ulcer
____**2** an outer layer or covering; a scab; a coagulation product of blood, serum, pus, or a combination of two or more of these	**B** scar
____**3** a wearing away; a state of being worn away, with loss of superficial portions of the dermis	**C** scale
____**4** destruction and loss of epidermis, dermis, and subcutaneous tissue	**D** erythema
____**5** the fibrous tissue replacing normal tissues destroyed by injury or disease	**E** ecchymosis
____**6** redness of skin	**F** erosion
____**7** a dark bluish or purplish coloration of the skin and mucous membrane due to deficient oxygenation of the blood in the lungs or to an abnormally great reduction in the flow of the blood through the capillaries	**G** clubbing
____**8** a yellowish staining of the integument, the deeper tissues, and the excretions with bile pigments	**H** crust
____**9** a purplish patch caused by extravasation of blood into the skin; black and blue spot; larger than petechiae	**I** jaundice
____**10** broadening and thickening of ends of fingers; seen in chronic pulmonary disease, due to lack of oxygen	**J** vitiligo
____**11** the appearance on the skin of white patches due to simple loss of pigment without other trophic changes	**K** cyanosis
____**12** a nonelevated, discolored, cutaneous lesion; a spot on the skin smaller than 1 cm	**L** lichenification
____**13** a small, circumscribed, solid elevation on the skin (less than 1 cm)	**M** hemangioma
____**14** a small, circumscribed elevation on the skin, containing serum (less than 0.5–1 cm)	**N** wheal
____**15** a bleb; blister; a circumscribed area of separation of the epidermis, due to the presence of clear serum; larger than a vesicle	**O** macule
____**16** a small, circumscribed elevation on the skin, containing pus (less than 0.5–1 cm)	**P** maceration
____**17** an acute, circumscribed, transitory area of edema of the skin; hive; an urticarial lesion; lesion produced by intradermal injection or test	**Q** plaque
____**18** minute hemorrhage, of pinpoint to pinhead size, in the skin	**R** papule

Column I	*Column II*
____**19** a flat elevation larger than 0.5 cm, often formed by a coalescence of papules	**S** tumor
____**20** a small node; a solid, elevated mass larger than a papule	**T** pustule
____**21** an elevated fluctuant sac containing fluid or a semisolid material	**U** petechiae
____**22** a palpable elevated mass larger than a nodule	**V** vesicle
____**23** leathery induration; an induration and thickening of the skin due to a chronic inflammation caused by scratching or long-continued irritation	**W** blister
____**24** a congenital collection of blood vessels forming a benign tumor	**X** bulla
____**25** softening of the tissues by action of liquid	**Y** dermatoglyphics
____**26** the study of surface markings of the skin, especially of the palmar and plantar regions	**Z** nodule

Review Questions

True—False

_____1 Physiologic jaundice in newborns appears within the first 24 hours.
_____2 Poor skin turgor is an indicator of dehydration.
_____3 Scaliness and desquamation are seldom seen in normal newborns.
_____4 Pubic hair most commonly appears at age 9-10 years.
_____5 Infants with coarctation of the aorta, below the aortic arch, may show more cyanosis in the lower extremities than in the upper one.
_____6 Mongolian spots are seen more often in the brown and black race, and have no clinical significance.
_____7 Cafe-au-lait spots may be indicative of neurofibromatosis.
_____8 In moderate amounts, small firm mobile nodes in neck and inguinal area are generally abnormal in the child.
_____9 Erythema nodosum is seen in children with rheumatic fever.
_____10 Tufts of hair over the spinal and sacral region may mark a spina bifida.
_____11 Children with severe protein malnutrition often have hair tipped with a reddish rust color.
_____12 Newborns with erythema toxicum neonatorum should be isolated.
_____13 Very brittle dry hair may indicate hyperthyroidism.
_____14 As in jaundice, the sclera are yellow in carotinemia.

Give an example of the diseases, performed with different elements of rush:

1. Macule, erythema_____
2. Papule_____
3. Vesicle_____
4. Nodule_____
5. Bulla_____
6. Pustule_____
7. Bulla_____
8. Ecchymosis_____
9. Blister_____
10. Lichenification_____

Subcutaneous tissue

Anatomical and physiological features:

- Thikness - _____
- General development_____
- Brown-adopose tissue is_____

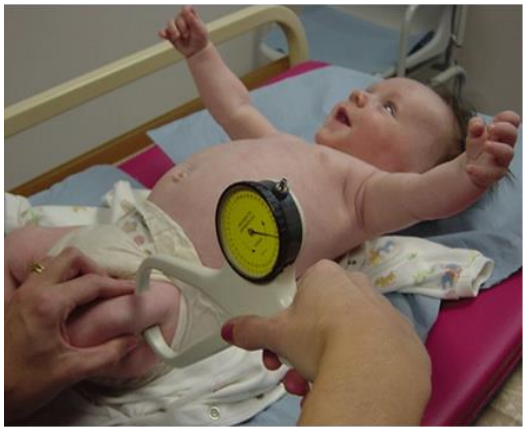
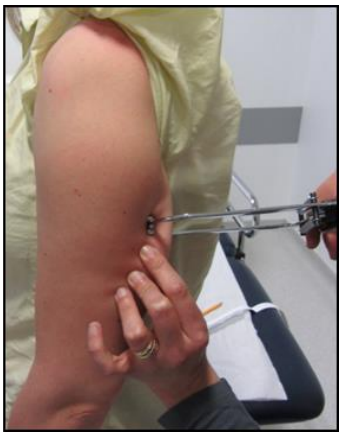
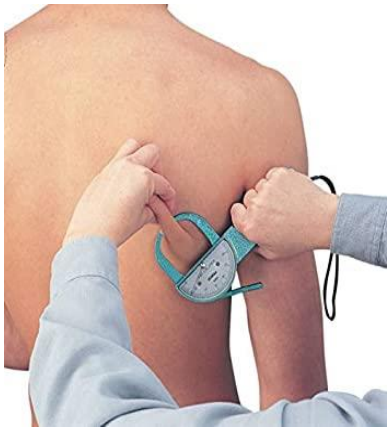
_____

- Adipose tissue is almost absent in_____till_____

_____

Parameters for adipose tissue estimation by palpation: dryness, velvetiness, warmth, elasticity, thikness, turgor.

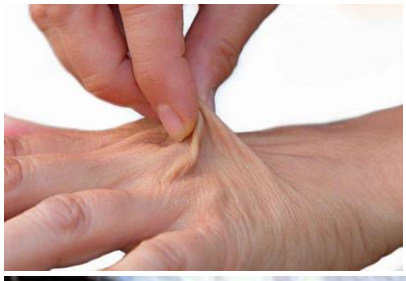
Methods of adipose tissue measuring

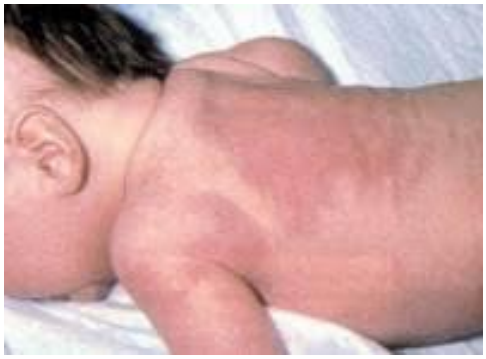
Note all places for adipose tissue thickness measurement and their normal values:

1._____
2._____
3._____
4._____
5._____

Tissue turgor



Normally, tissue turgor is satisfactory.
It can display (name pathology) _____
_____
_____
_____
_____



Sclerema is a_____
_____
_____

Scleredema is a _____
_____
_____
_____
_____

***Examine* the skin of the child and record findings on the check list below.**

CHECK LIST

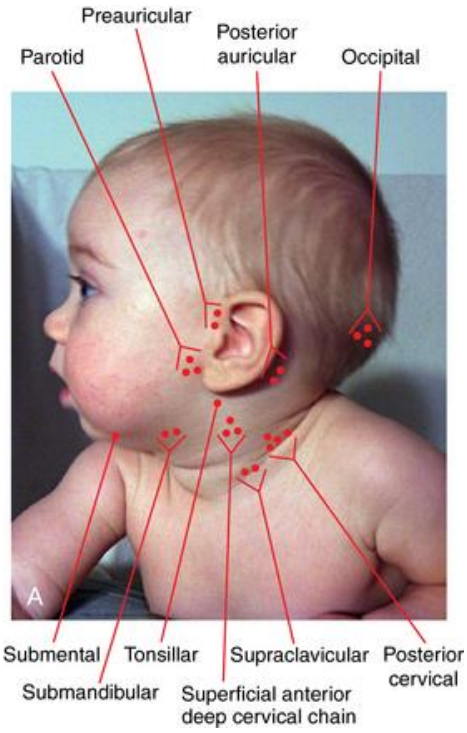
Skin: Inspection and Palpation

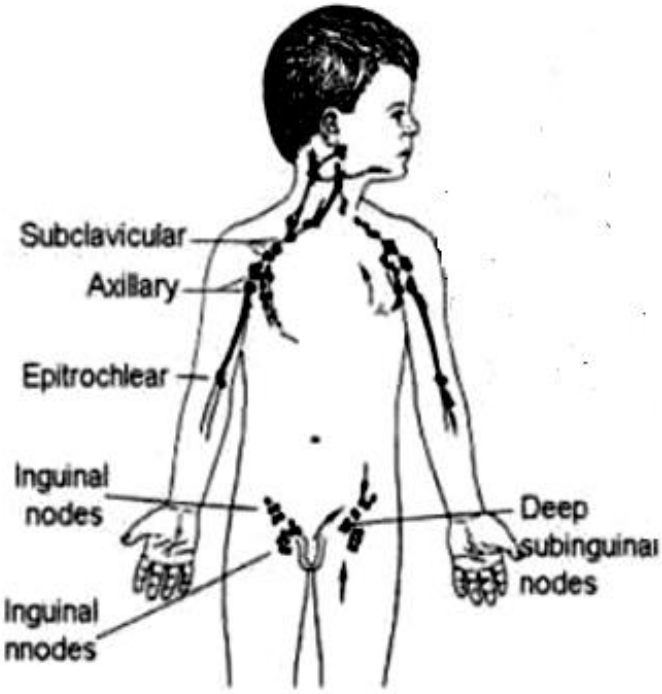
The following list should be filled in for each inspection and palpation required in the learning activities.

Sex_____ Age_____

General Observations	Yes	No	Describe *(where appropriate)*
Color *(normal)* brown			
cyanosis			
redness			
yellowness			
pallor			
vitiligo			
White-rosy			
other			
Moisture dryness			
sweating			
oiliness			
Temperature cool			
warm *(normal)*			
hot			
Texture rough			
smooth			
Turgor good			
Lesions			
type			
configuration (grouping)			
distribution			
morphology			
Edema			

LYMPHATIC SYSTEM





The lymph nodes estimation criteria

Criteria	*Normal parameters*
Localization	Only in the submandibular, axillary and inguinal areas
Size	No more than 0,5 cm
Quantity	No more 3–4 in one site
Mobility at the palpation	Movable
Adhesion of nodes between themselves (conglomeration)	Not conglomerated
Elastic or dense	Elastic
Painfulness	Painless
Skin temperature in the palpable nodes' place	Normal
External appearance of the skin in the place of palpable nodes	Not changed

Review Questions

CHECK *LIST* *Lymphatic System: Inspection and Palpation*

The following list should be filled in for each inspection and palpation required in the learning activities.

Sex_____

Age_____

Location of Nodes	**Yes**	**No**	**Describe** *(where appropriate)* **According to Characteristics Listed Below***
Head and Neck pre-auricular			
posterior auricular			
occipital			
tonsillar			
submaxillary			
submental			
superficial cervical			
posterior cervical chain			
deep cervical chain			
supraclavicular			
Axillary infraclavicular			
lateral			
central			
pectoral			
subscapular			
Epitrochlear			
Inguinal		i	
horizontal			
vertical			

* **LYMPH NODES—CHARACTERISTICS**:

Size ----- cm	Consistency	
Color	soft	
Temperature	firm	
Movable/fixed	hard	Tender/nontender

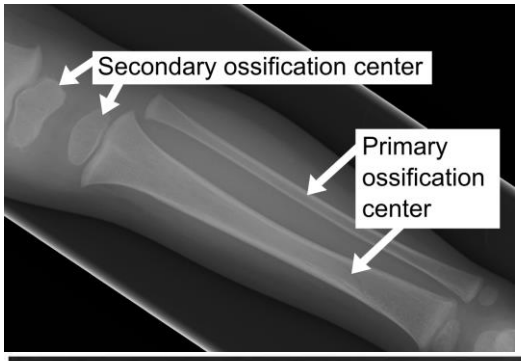
Theme: **Anatomical and physiological peculiarities of musculoskeletal system in child. Examination of musculoskeletal system. The semiotic of the main damages of musculoskeletal system**

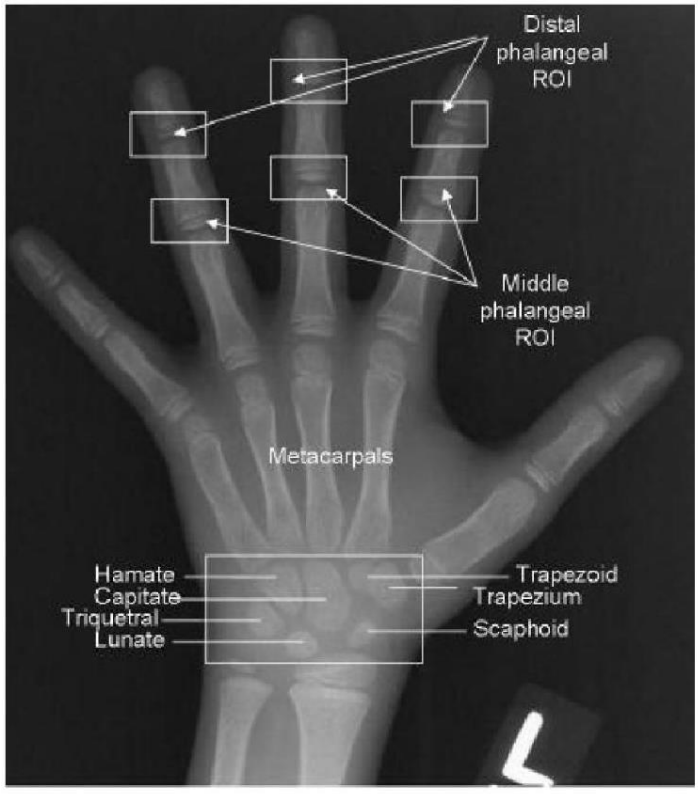
1. Describe skeletal growth and development in the embryo and postnatal period. When does bone formation begin? Where are “primary” and “secondary” centers of ossification in long bones? What is “bone age”? How is “bone age” determined? How long linear growth can continue? What congenital defects involving skeleton do you know? (spina bifida, cleft lip and palate, rickets).
2. What anatomical and physiological features of musculoskeletal system do you know? What disorders do these peculiarities promote?
3. What are the chief complaints of the patient with musculoskeletal disorders? What factors from prenatal and neonatal history are important and should be obtained?
4. What parts does the examination of the musculoskeletal system include?
5. Tell about inspection and palpation of the head. What characteristics of the fontanel does pediatrician note? At what pathology these can be observed?
6. At what age does an eruption of the first primary teeth begin? What is chronology of human dentition? What formula is used for estimating the number of primary teeth in children who are younger 2 years?
7. Tell about inspection of the chest. What is feature of infancy rib cage? What pathological shape of rib cage do you know? What is the rachitic rosary and Harrison's groove? When do they observe?
8. What deformity of spine do you know? What are causes of these deformities? How do you discover scoliosis?
9. What disorders can be revealed by inspection of the upper and lower extremities? At what diseases are they occurred?
10. What are clinical manifestations of the hip dysplasia? How do you check Ortolani’s test (Barlow’s, Allis’s, Trendelenburg’s)? What gait has the child with bilateral dislocations of hips?
11. What physiologic and pathological disorders of muscle tone do you know? When these are occurs?

Recommended literature

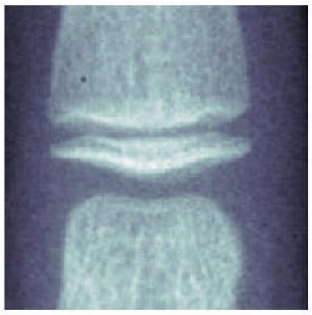
1. Lecture
2. Propedeutics of children's diseases and nursing of the child.T. Kapitan, Vinnitsa : The State cartographicae Factory. 2012. P. 225246.
3. Patients examination and semiotics of pediatric diseases (modul 2):Workbook for the third-year students of the medical university / comp. : N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination: навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics: підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.

The skeletal system formation is implemented_____than other systems – on the ____th week of intra uterine development. The final structure of bones is formed_____ and realized at the age_____.
The skeleton of a fetus is formed from_____
by means of two kinds of osteogenesis:_____.
The diaphysis of tubular bones consist of_____
Epiphyses, hand bones, feet bones consist of_____
Timely ossification – is_____
The points of ossification arise in the _____
_____





a)



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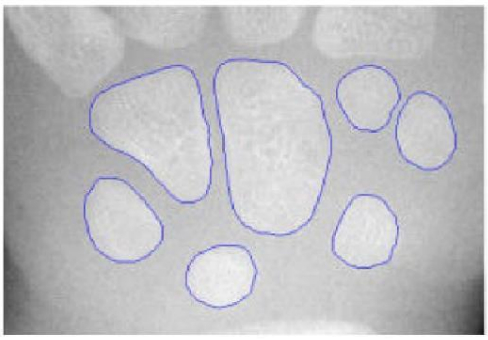
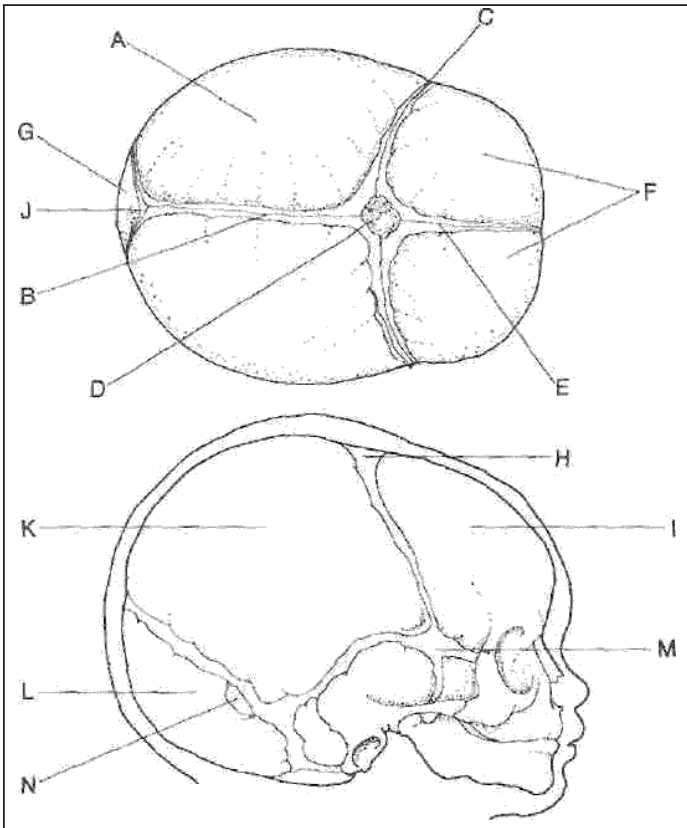


c)

For the timely and correct development of osteal tissue children need optimal amount of:
1.
2.
3.
4.
Normal Calcium level in a blood serum is equal to_____
Till which age the intensive growth of a skeleton and its active regeneration may result in soft and flexible osteal tissue? Answer:_____

Figure 1:Fetal skull



Label: (The labels may fit more than one letter)

__1. lambdoidal suture

__2. coronal suture

__3. sphenoid fontanel

__4. anterior fontanel

__5. parietal bones

__6. frontal bones

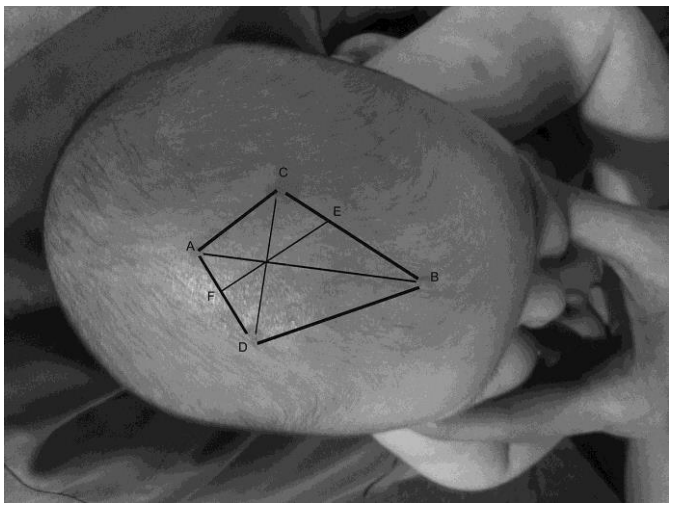
__7. sagittal suture

__8. mastoid fontanel

__9. posterior fontanel

__10. frontal suture

__11. occipital bone



Find correct lamdmark for the fontanel measurement:

_____

The backbone peculiarities

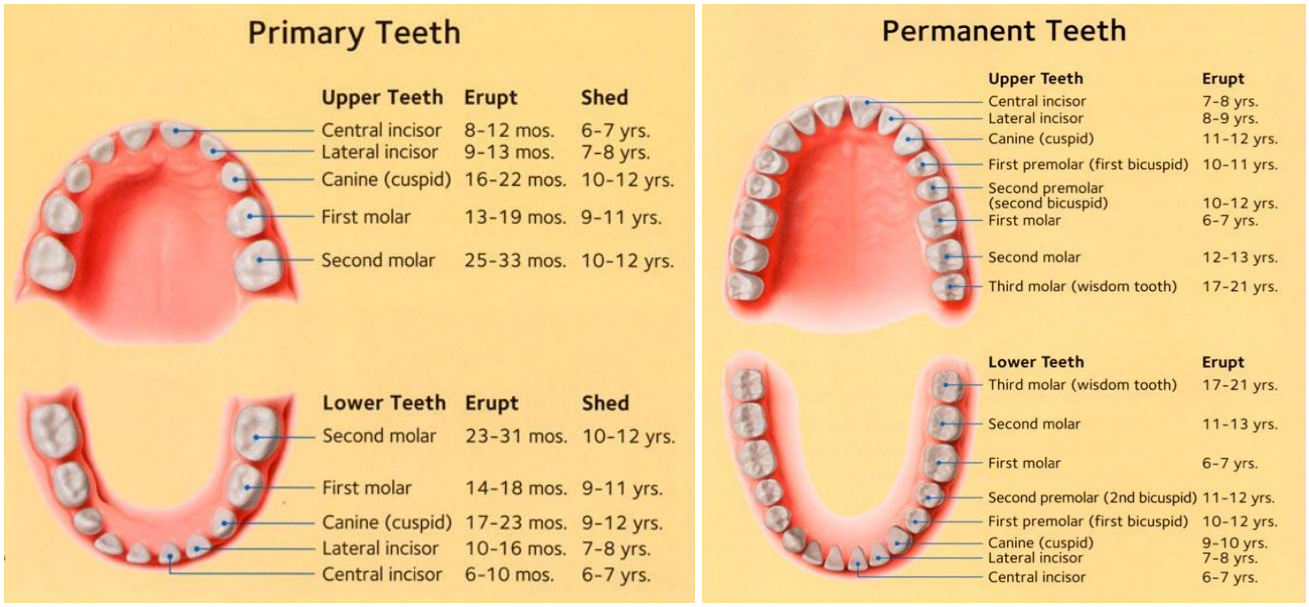
Normal curvatures of spinal cord	Description (age of development)
After birth	
Cervical lordosis	
Thoracic kyphosis	
Lumbar lordosis	

Newborn skeletal system features:

11. Ribs_____

The thorax_____

Figure 2: Deciduous (primary, permanent) dentition



Up to the end of 1st year of life baby should have_____teeth.

A child of 2 years old should have_____teeth**.**

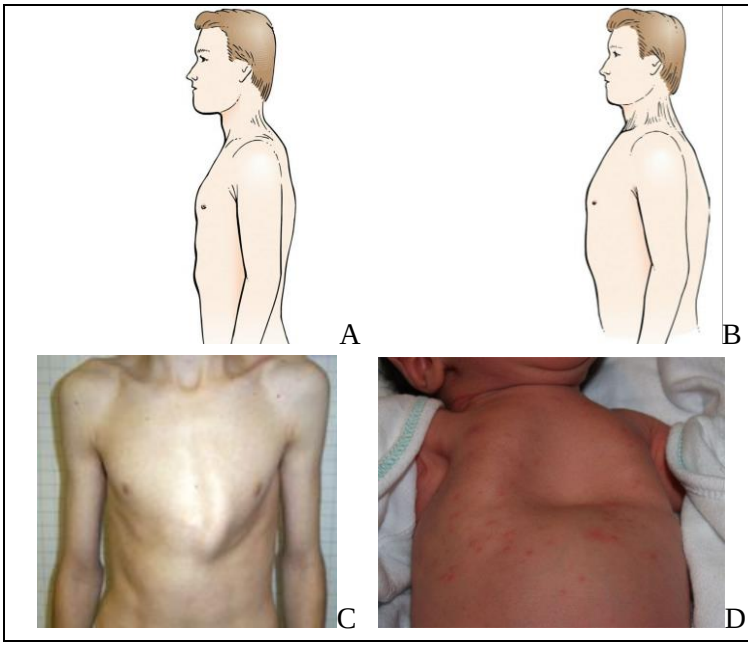
To determine number of teeth of a child aged 6–24 month can be used formula _____, where_____.

Permanent teeth formula (till 12 years old): _____, where_____

Describe type of the thorax

Thorax type	Description
Normosthenic	
Asthenic	
Hypersthenic	
Emphysematic	

Label Thorax shape



____Pectus carinatum (pigeon chest)

____Pectus exavatum

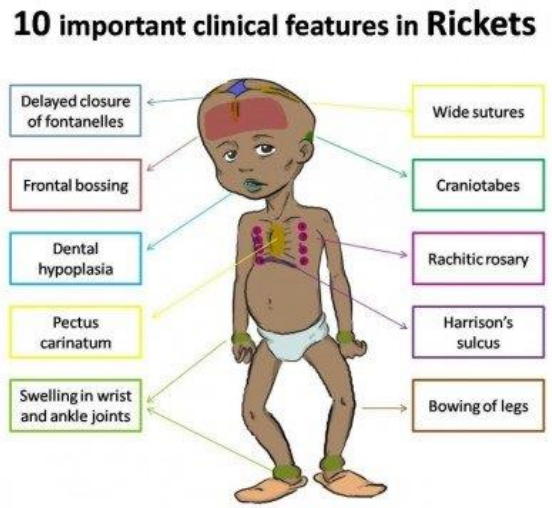
____“Barrel chest”

____Normal chest

Rickets

Is a disease in children of_____age.

The reason for its development is_____



The common symptoms are:

1._____

2._____

_____

3._____

4._____

5._____

6._____

7._____

8._____

What does it mean Sulkowich test and its interpretation_____

_____

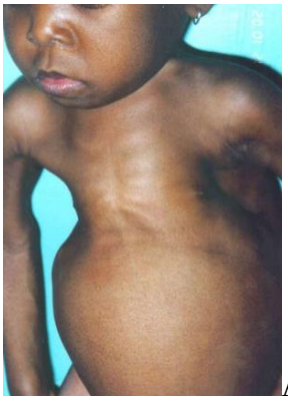
_____

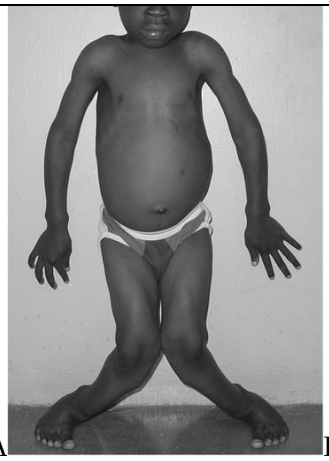
Other helpful tests for the diagnostics:

_____

_____

_____


A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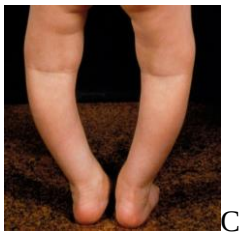
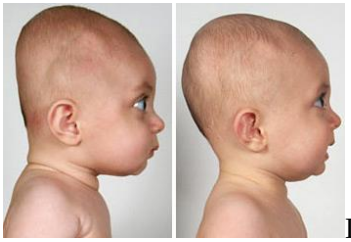
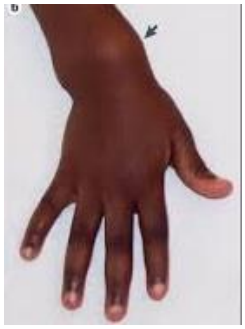

C


D


E


F

Name the symptoms at the pictures:

A_____

B_____

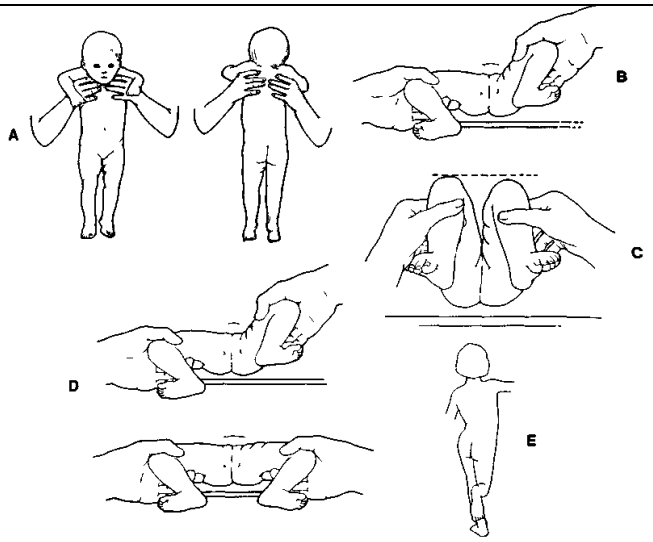
C_____

D_____

E_____

F_____

Figure 4: Tests for detecting congenital dislocated hip



Label:

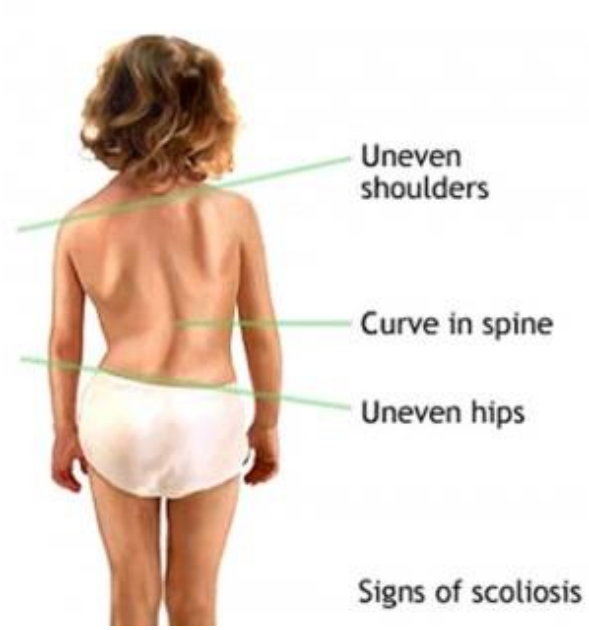
_____ Allis sign

_____Asymmetric thigh and gluteal folds

_____ Barlow test

_____ Ortolani test

_____



Scoliosis – is_____

Signs of scoliosis:

_____

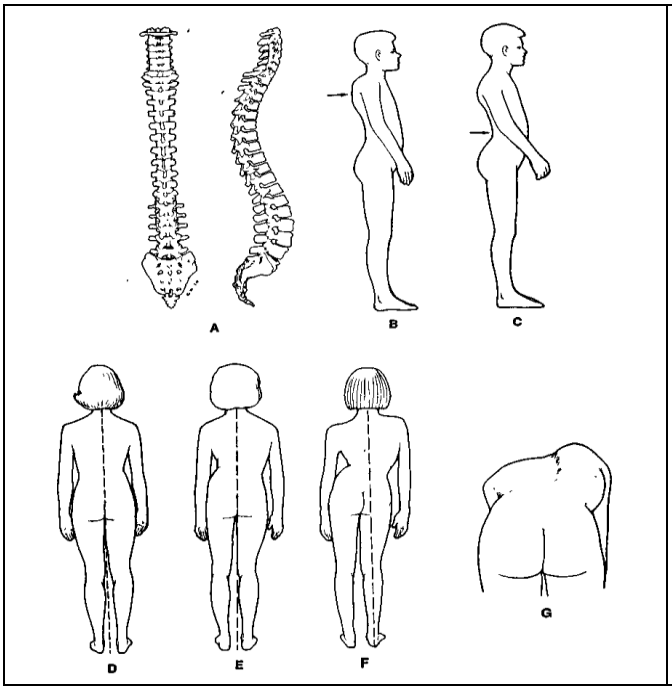
_____

_____

_____

_____

Figure 5: Defects of spinal column:



Label:

_____ Kyphosis

_____ Lordosis

_____ Normal spine

_____ Severe scoliosis in balance

_____ Mild scoliosis in balance

_____ Normal spine in balance

_____ Rib hump and flank asymmetry seen in flexion due to rotary component

Definitions (Part I)

Match the definitions in *Column I* with the correct words in *Column II*

Column I	*Column II*
_____1 permanent eversion of the foot, so that only the inner side of the sole rests on the ground; usually combined with a breaking down of the plantar arch	A kyphosis
_____2 stiffening or fixation of a joint	B spasm
_____3 a wasting of tissues, organs, or the entire body; e.g., the wasting of muscles due to disuse of a fractured limb	C lordosis
_____4 range of motion of the patient's joints; (performed by another person – the patient does not activity move the joints)	D varus deformity
_____5 range of motion of a patient's joints when the patient actively moves the extremities, instead of having the extremities moved by another person	E valgus deformity
_____6 a curvature of the spine; humpback; hunchback; an abnormal curvature of the spine, with convexity backward due to caries and destruction of the bodies of the affected vertebrae	F atrophy
_____7 an exaggerated anteroposterior curvature of the spine, generally lumbar, with the convexity pointing anteriorly	G passive range of motion
_____8 inversion of the foot, so that only the outer side of the sole touches the ground; there is usually more or less talipes equinus associated with it	H ankilosis
_____9 an involuntary convulsive muscular contraction; cramp	I scoliosis
_____10 lateral curvature of the spine	J active range of motion

Definitions (Part II)

Match the definitions in *Column I* with the correct words in *Column II*

Column I	*Column II*
_____**1**webbing together of fingers or toes	A polydactyly
_____**2** blood in a joint	B hemarthrosis
_____**3** funnel chest	C pectus excavatum
_____**4** a deformity of the ribs that results from the pull of the diaphragm on ribs weakened by rickets or other softening of the bone	D syndactyly
_____**5** the presence of more than five digits on either hand or foot	E Harrison's groove
_____**6** a test for dislocation of the hip in the newborn in which the examiner flexes the infant's legs at the hips and bends the knees; in this position he proceeds to abduct the legs while keeping his fingers over the hip socket – a clicking sound or the palpable sensation of the femur slipping in and out of the socket indicated a possible dislocation	F Allis's sign
_____**7** a blood cyst of the scalp in a newborn infant, due to an effusion of blood beneath the pericranium; it does not usually cross suture lines	G barrel chest
_____**8** a chest permanently the shape of a barrel during full inspiration; seen in cases of emphysema	H cephalohematoma
_____**9** the uneven height of the 2 patellias when the person is lying on his back with knees totally flexed and feet on the table	I Ortolani's sign
_____**10** localized, progressively destructive disease of the teeth that starts at the external surface (enamel) with the apparent dissolution of the inorganic components by organic acids	J caries
_____**11** small head when head circumference more that 2 standart diviations below the mean for age, sex, race and gestation and reflects a small brain	K microcephali

Criteria for assessing the condition of muscular system is as follow:

1._____
2._____
3._____
4._____
5._____
6._____

Fill the table **Indicators of muscle mass in children**

The degree of development	*In a resting position*	*During exertion*
Weak development	Mass of all muscle is	Muscle volume changes are Abdomen is
Average development	Muscles of the trunk are Limbs are	Changes of form and volume of muscles
Good development	Muscles of the hole body are	Changes of muscles

Muscle strength is_____
_____

Equipment for the muscle strength measurement in school age children is_____
Normal muscle strength is said to be_____
Unsatisfactory muscle strength is said to be_____
Muscle tone is_____
_____

Normal muscle tone is said to be_____
Disorder of muscle tone can be_____

Variants of violation in muscle tone:

Variant	*Definition*	*Example of cases*

Practical Skills

Examine the musculoskeletal system of three children and record findings on the check list provided.

CHECK LIST

Head: Inspection and Palpation

The following list should be filled in for each inspection and palpation required for the learning activities.

Sex _____

Age_____

Head circumference: _____

	Yes	No	Describe
Head symmetrical			
prominent bulges			
prominent forehead			
shape of head:			
normal			
abnormalities			
Fontanel:			
anterior: open			
closed			
size			
shape			
posterior: open			
closed			

CHECK LIST
Musculoskeletal System: Inspection and Palpation
Sex_____
Age_____

	Yes	No	Describe (where appropriate)
Ability to carry out ADL: able to walk, stand, sit up, rise from sitting position, lie down, pinch, climb, grasp, lean over (in child – jump and skip)			
able to comb hair, brush teeth, feed, wash, and dress self, carry out toilet hygiene, etc.			
Gait smooth, coordinated, rhythmic			
painful			
limp			
Spine all spinous processes palpable			
normal curvature			
abnormal curvature			
back pain/tenderness			
normal response to sciatic stretch test			

Length of extremities
length same on both sides _____
discrepancy between length of right
and left sides (over 1 cm)_____

Joints (include all joints)

pain or tenderness_____

full range of motion_____

abnormal mobility or unusual movements_____

heat_____

redness_____

pain on motion_____

effusion_____

swelling or deformity_____

instability_____

ankylosis_____

congenital defects_____

Muscle strength

normal against gravity_____

normal against resistance_____

symmetrical for extremities_____

Condition of tissues surrounding joints

muscle atrophy_____

skin changes_____

swelling_____

contractures_____

Theme: Anatomical and physiologic features of the respiratory system in children. Physical examination of the respiratory system. Semiotics of the respiratory system diseases in children

Theoretic part:

1. What is clinical value of embryonic periods in development of the respiratory system?
2. What are anatomical and physiologic features of the respiratory system in children?
3. What is normal respiratory rate in children different age groups?
4. Character, depth, rhythm, rate and type of breathing. Pathologic patterns of the respiration, its graphical imaging (Cheyne-Stokes breathing, Biot's breathing, Kussmaul breathing), tachypnea, bradypnea, apnea, dispnea and its patterns.
5. Shape of the chest and its clinical value.
6. Topographic percussion, the lower border of the lungs in children.
7. Comparison percussion of the lungs in children.Percussion sounds and their characteristics (resonance, hyperresonance, tympany, flatness, dullness).
8. Auscultation of the lungs. Characteristics of breath sounds (vesicular, bronchovesicular, bronchial, tracheal); adventitious lung sounds (fine and coarse crackles, wheezes, rhonchi); pleural rub, bronchophony.
9. Clinical manifestation main diseases of the respiratory system in children.

Practical part:

1. Gather appropriate health history information for a child with a respiratory disorder.
2. Observe the skin, oral and nasal mucosa, the shape of the fingernails, and the shape of the chest and way in which it moves. Describe the assessment findings.
3. Demonstrate how to palpate the chest (the range and symmetry of respiratory movement, tactile fremitus).
4. Count the respiratory movements in children of different age.
5. Demonstrate percussion and auscultation of the respiratory system in children different age.

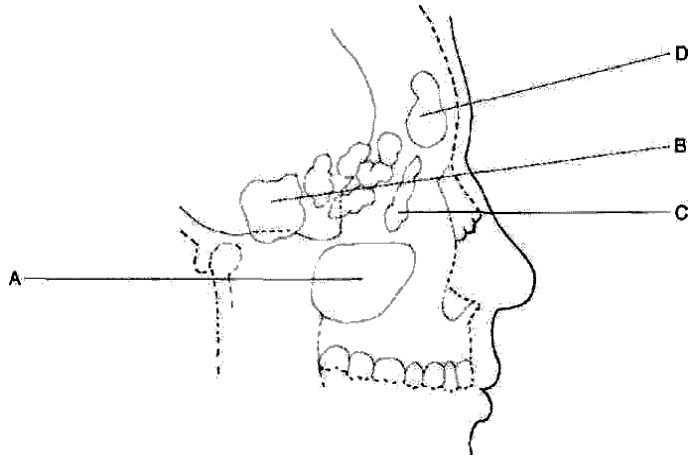
The recommended literature:

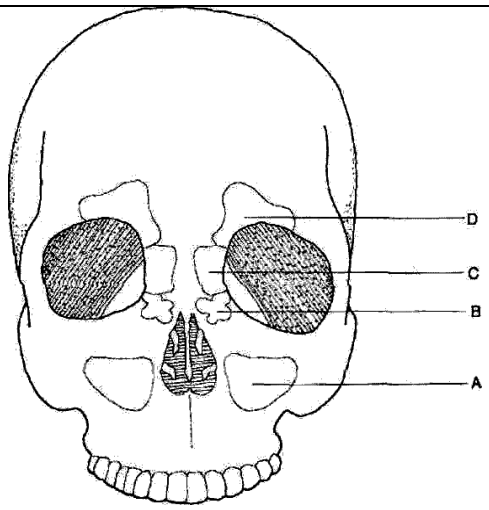
1. Lecture
2. T. Kapitan. Propaedeutics of children's diseases and nursing of the child: Textbook for students of higher medical educational institution. Vinnitsa. 2010. P. 247–307.
3. Patients examination and semiotics of pediatric diseases (modul 2): Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics: підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.

Fill table 1: **Anatomical physiological features of the respiratory system in newborn and infant**

	Anatomical and physiological features of the RS in newborn and infant	**Their values: What disorders do these peculiarities promote?**
Nasal structures		
Paranasal sinuses		
The pharynx		
The larynx		
The trachea and large bronchi		
The lungs		
Alveoli		

Figure 1:Paranasal sinuses





Label:

1. frontal_____
2. ethmoid ___
3. sphenoid ___
4. Maxillary_____

When is it formed:

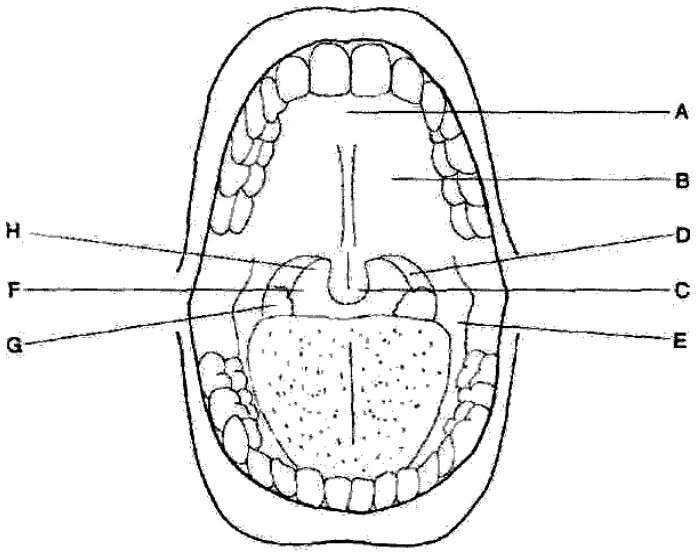
_____1. frontal sinus

_____2. ethmoid sinus

_____3. maxillary sinus

_____4. sphenoid sinus

Figure 2: Structures in the mouth and pharynx



Label:

_____1. anterior tonsillar pillar

_____2. posterior tonsillar pillar

_____3. palatine tonsil

_____4. uvula

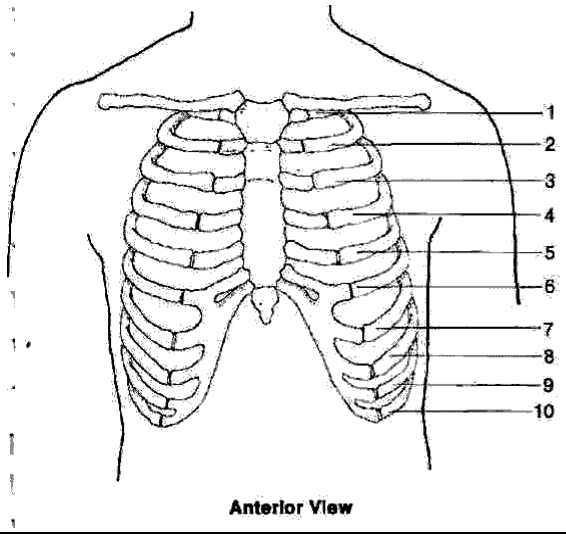
_____5. palatine arch

_____6. posterior pharyngeal wall

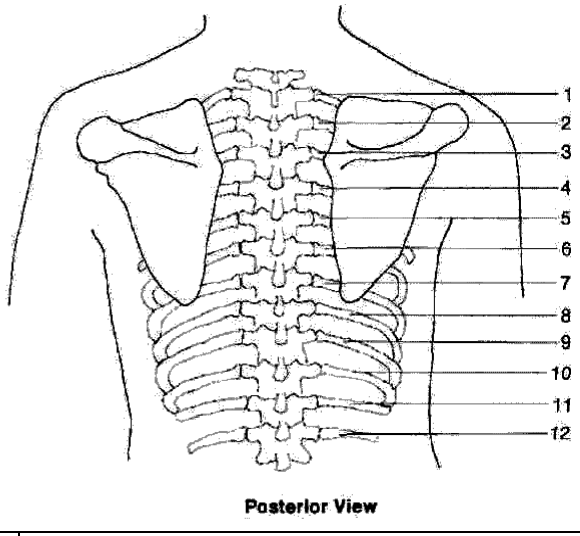
_____7. hard palate

_____8. soft palate

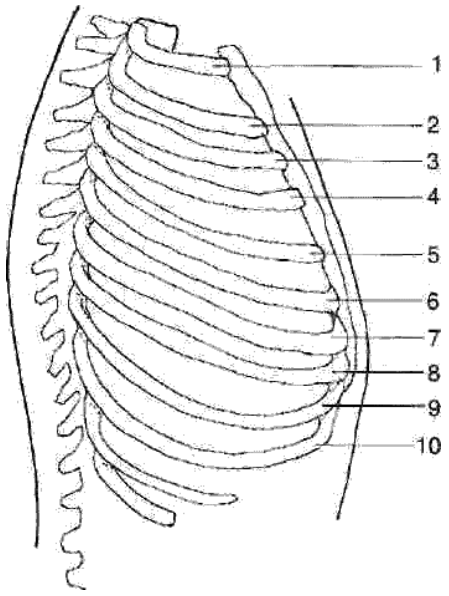
Figure 3: Draw and label projections of the lung's lobes in all views.



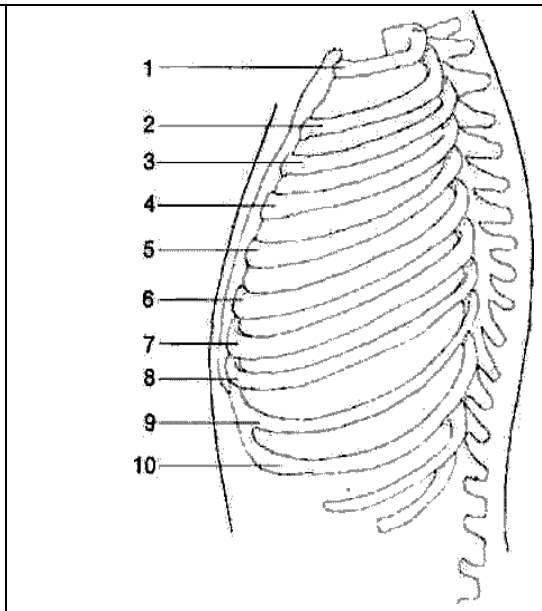
Anterior View



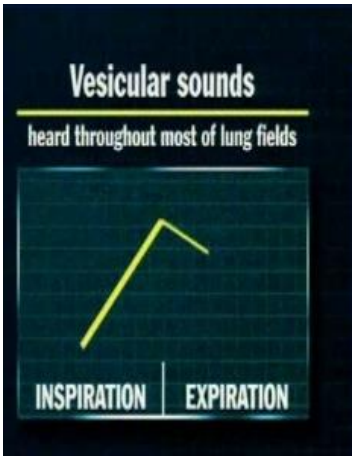
Posterior View



Right Lateral View



Left Lateral View



Normal respiratory rate values:
Newborn –
Up to 1 year old infant –
Up to 5 years old –
Up to 10 years old –
More than 12 years old –

Normal duration for more accurate respiratory rate calculation is_____

Definitions

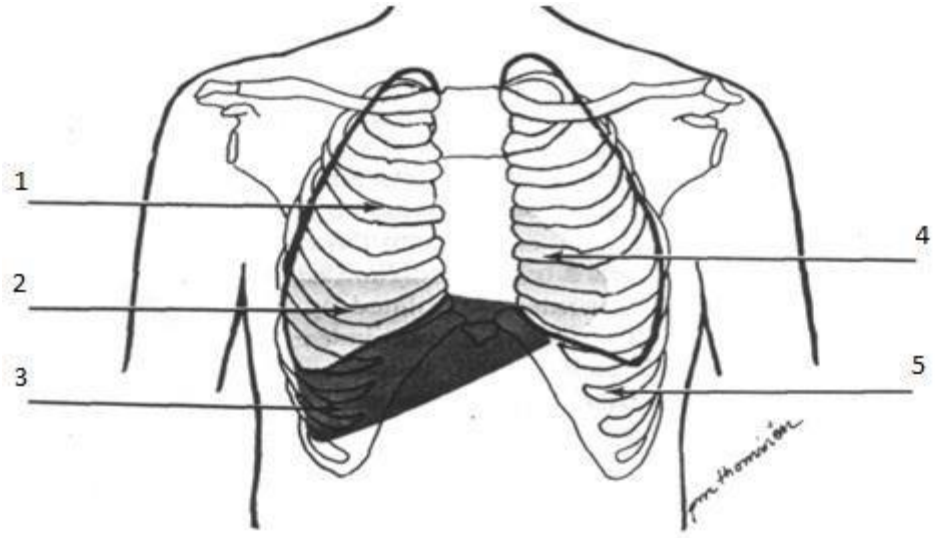
Match the definitions in *Column I* with the correct words in *Column II*

Column I	*Column II*
____1 the pattern of breathing characterized by a gradual increase in depth and sometimes in rate, followed by a decrease resulting in apnea; often associated with patients in terminal stages of illness	A. Biot's respiration
____2 jerky and irregular respirations usually associated with increased intracranial pressure	B. Kussmaul respiration
____3 deep, rapid respiration characteristic of the air hunger of diabetic coma	C. Cheyne-Stokes respiration

Review Questions (inspection and palpation):

1. Costal breathing in infants may suggest pathological problems in the (chest; abdomen).
2. What should the ratio of the respiration to the pulse be in infant?_____
3. A normal respiratory rate for an adolescent is 30 (true, false).
4. A normal respiratory rate for a newborn might be 30 (true, false).
5. An infant's respiration is primarily (abdominal, costal).
6. Pneumonia would cause (increased; decreased) vocal fremitus.
7. When testing for vocal fremitus, the examiner usually asks the patient to say_____

Figure 4: Percussion sounds found in normal thorax (Label).



_____Tympanic

_____Dullness

_____Resonance

_____Flatness

Fill table 2: **Percussion sound**

	Example location	**Pathologic examples**
Flatness		
Dullness		
Resonance		
Vesicular resonance		
Tympanic		

Peculiarities of lungs apex percussion in children:
Under 10 years old_____
_____
10 years old and more_____
_____

Fill table 3: **Characteristics of Breath Sounds**

Breath Sounds (list)	**Locations Where Heard Normally**
1.	
2.	
3.	
4.	

Fill table 4: **Additional Sounds**

Additional Sounds (list)	**These sounds are characteristic of what disease?**
1.	
2.	
3.	
4.	
5.	

Review Questions (percussion and auscultation):

1. Symmetrical areas of a normal chest will never differ in the sound of their percussion notes (true or false).
2. The only area in the chest where one would normally find tympany is over the _____
3. The normal diaphragmatic excursion is_____cm.
4. In what type of normal breath sound is the inspiratory component more intense, higher in pitch, and longer in duration (by a ratio of 3:1) than that of expiration?_____
5. In children, vesicular sounds are usually (more; less) harsh than in adults.
6. Diminished vesicular breath sounds are heard normally in the (upper; lower) portions of the lungs.
7. Bronchial sounds are usually (louder; softer) than vesicular sounds.
8. When alveoli are filled with fluid or tissue, bronchophony is (more; less) likely.
9. Asthmatic breath sounds have longer (expiratory; inspiratory) phases.
10. Pleural friction rub (appears; disappears) when the breath is held.

Complaints and its characteristics

Specific	General

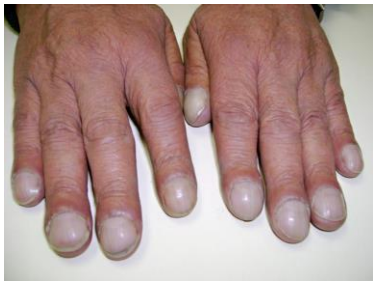
Methods of RS examination

Clinical: 1._____
2._____
3._____
4._____
5._____

Paraclinical:

Laboratory	Instrumental

Skin coloration typical for respiratory pathology _____
_____



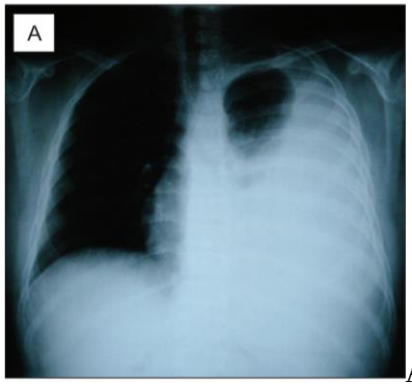
Name the symptoms_____
They are attributes of_____
and develops due to_____

Describe ***compelled positions*** of the patient with respiratory disease, which can help the doctor to assume the diagnosis:

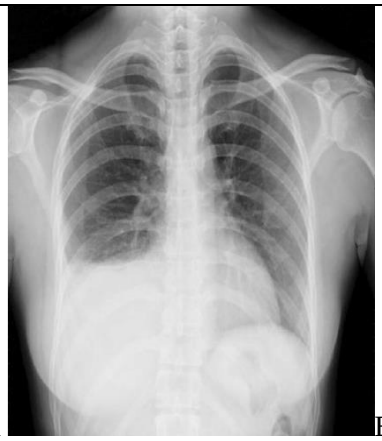
1._____
_____

2._____
_____

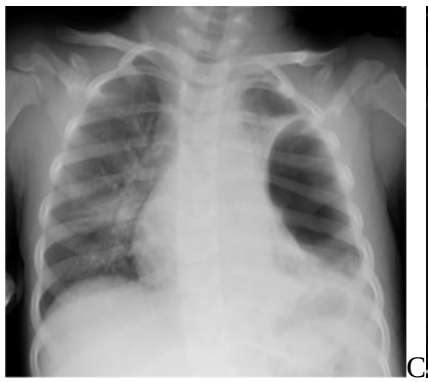
Chest X--ray



A



B



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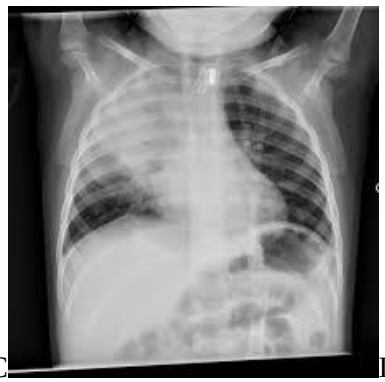

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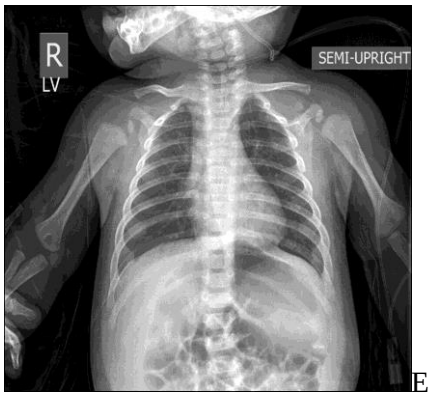
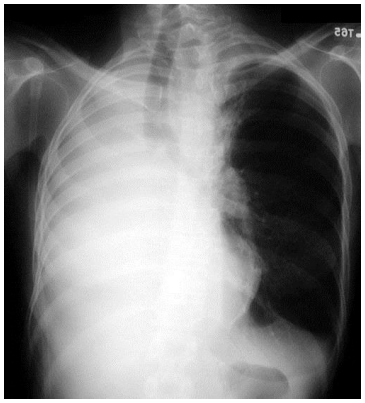


E



F

Label:

____Right upper lobe pneumonia

____Pneumothorax

____Pleural effusion

____Pulmonary edema

____Bronchiolitis

___Atelectasis

CHECK LIST

Chest and Lungs: Inspection

The following is a check list to be used by the student when doing the chest and lung inspections required. The following list should be filled in for each inspection required in the learning activities (three children of varying ages).

Sex _____

Age_____

	Yes	No	Comments
Configuration Is this thorax: a barrel chest			
a funnel chest			
a pigeon chest			
Is the backbone: kyphotic			
scoliotic			
kyphoscoliotic			
lordotic			

Respirations

Rate ____

What is the normal for this age?_____

Rhythm: regular _____ irregular_____

Are they: abdominal _____ costal _____

What is normal for this age?

(abdominal or costal) _____

Are there:

supraclavicular retractions _____

substernal retractions____

intercostal retractions____

Chest and Lungs: Palpation

Describe all palpable findings in the skin, muscle, and bone of the thorax, being sure to locate them exactly according to interspace and/or rib. Include also your findings on tactile fremitus, respiratory excursion, costal angle.

_____

_____

_____

_____

_____

Chest and Lungs: Percussion

_____

_____

_____

_____

_____

Chest and Lungs: Auscultation

1 Describe exactly the area in which you heard the following sounds.

2 Describe any asymmetry of auscultation, explain it, and state whether it is normal.

Sound	**Area**	**Is this sound normal in this area?**		
		Yes	**No**	**Describe; Explain**
vesicular sounds				
bronchial sounds				
bronchovesicular sounds				
tracheal sounds				
rales				
sonorous rales				
crepitant rales				
wheezing				
bronchophony				

Matching specific kind of cough with associated diseases:

1	Barking cough	A	Pertussis
2	Brassy cough	B	pleuritis
3	Whooping night cough	C	Nosepharingitis
4	Dry painful	D	Tuberculosis lymphadenitis, tumor of mediastinum
5	Dry nonproductive	E	Laryngotracheatis, croup

Write typical signs of:

Acute laryngotracheitis, (croup)

_____
_____
_____

*Pneumonia*_____
_____
_____
_____
_____

*Asthma*_____
_____
_____
_____

*Respiratory failure*_____
_____
_____
_____
_____
_____

Theme: Anatomical and physiological features, physical examination of cardiovascular system in children. Semiotics of CV diseases

Theoretical part

1. Fetal blood circulation and postnatal circulatory changes. Terms of closing of the fetal communications.
2. Anatomical-physiological features of heart and blood vessels in children.
3. The heart rate and blood pressure in children of different age.
4. Inspection of cardiovascular system in children (color of the skin and mucous membranes, the pulsation of carotids and jugular veins, an heart bulge, clubbing, edema).
5. Palpation of cardiovascular system (the apex beat, its characteristics, thrill, pulse and its characteristics).
6. Percussion of the heart in children of different ages, the causes of displacement the borders of cardiac dullness.
7. Auscultation of the heart (sounds, rhythm; murmurs).
8. The basic symptoms of cardiovascular system disorders in children (cyanosis, bradycardia, tachycardia, murmur, premature contraction).
9. Measurement of blood pressure; normal levels of blood pressure in children of different ages.
10. Instrumental methods of examination of cardiovascular system in children.
11. Semiotics of the congenital heart diseases in children (atrium and ventricular septal defects, Fallot's tetralogy, coarctation of aorta, patent ductus arteriosus).
12. Clinical symptoms of an acute and chronic congestive heart failure.

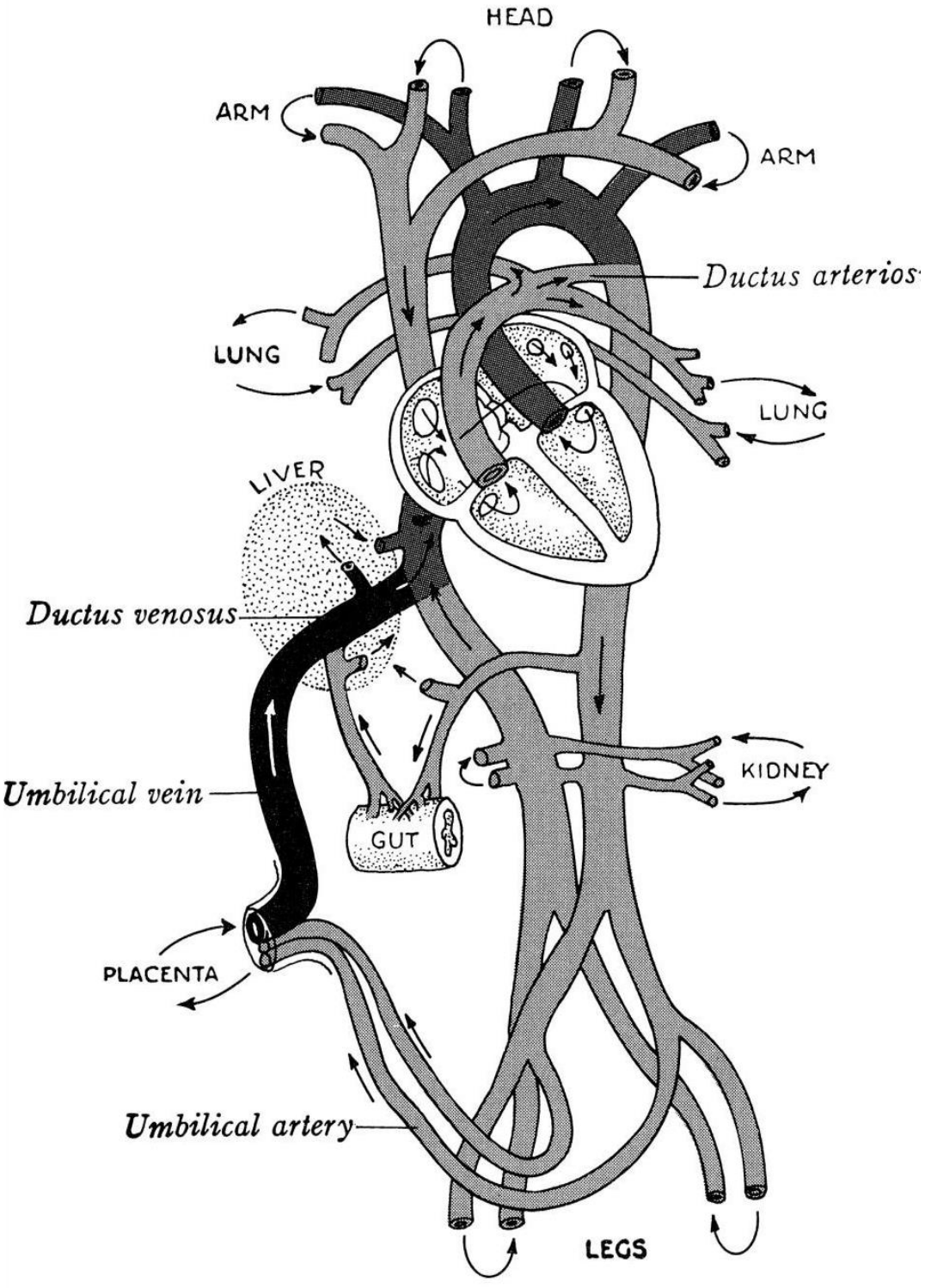
Practical part:

1. The anamnesis of diseases in patient and his parents.
2. Inspection of the skin, mucous membranes, fingers, revealing of legs for edema, shape of thorax; their abnormalities
3. Palpation of the apex beat and trills, possible precardial visual pulsation, their characteristics
4. Count up a pulse rate, its characteristics description.
5. To determine the border of cardiac dullness in children of different ages.
6. Auscultation of the heart.
7. To determine arterial pressure on the upper end lower extremities.

The recommended literature:

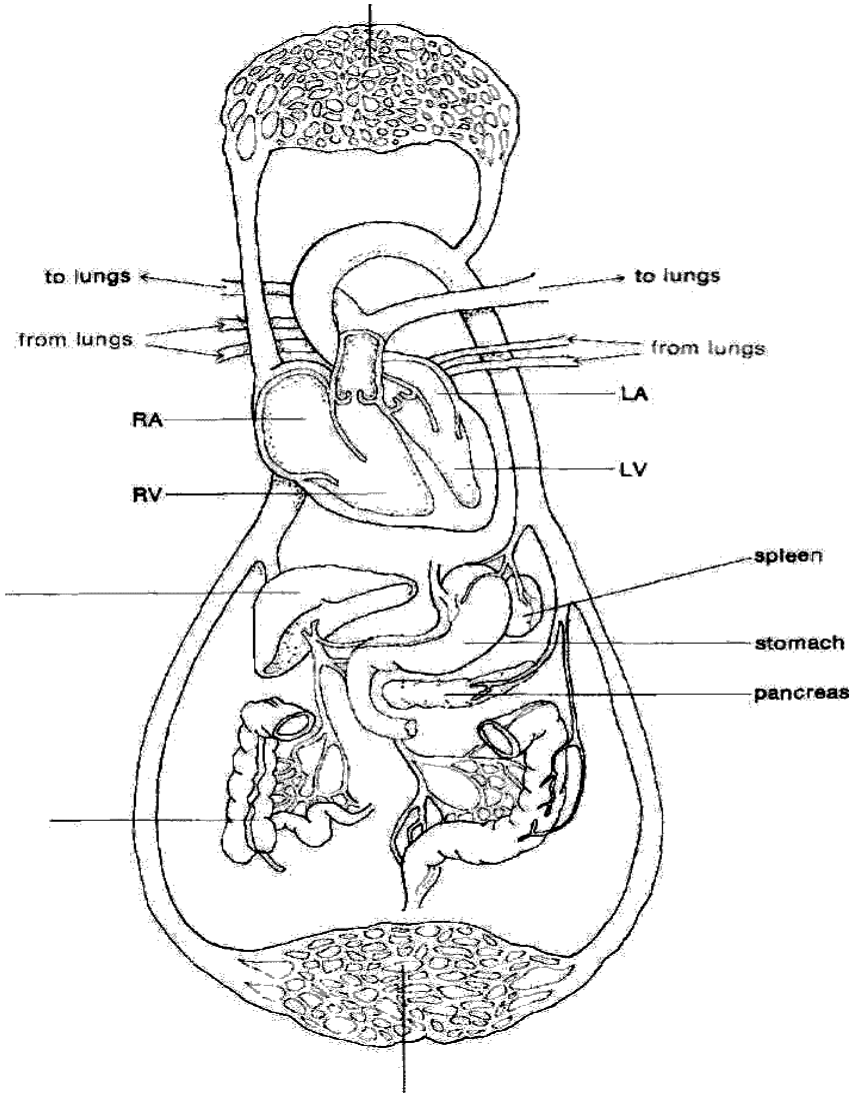
1. Lecture
2. T. Kapitan. Propaedeutics of children's diseases and nursing of the child: Textbook for students of higher medical educational institution. Vinnitsa, 2010. P. 247–307.
3. Patients examination and semiotics of pediatric diseases (modul 2): Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics: підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.

1. Name fetal communications, which should be closed in postnatal period:



Plan of the human circulation before birth

2. **Pulmonary and systemic circulation.** In the schematic diagram, trace pulmonary circulation in ***blue*** marking pencil and systemic circulation **in *red;*** use ***arrows*** to indicate direction of flow.



3. Fill table: **Anatomical physiological features of the cardiovascular system in newborn and infant**

	Describe anatomical physiological features of the CVS in newborn and infant	**Their values:**
Heart beats		
Blood pressure		
The size of the heart		
Position of the heart		
The thickness of ventricle walls		
Wide of large vessels (aorta and truncus pulmonalis)		
The apex of the heard localized		

4. **Review Questions**

1. The electrical conduction system that controls the rhythm of heart contractility consists of the _____, _____, _____, and _____.
2. The first heart sound (S1) is produced by closure of the_____valve and tricuspid valve.
3. The second heart sound (S_2) is produced by closure of the_____valve and the pulmonic valve.
4. A third heart sound (S_3) may be produced by_____.
5. Occasionally one hears a fourth heart sound (S_4), which marks_____.
6. Symptoms of left-sided cardiac failure include _____, _____, and _____.
7. Right-sided failure is characterized by _____, _____, _____.
8. What are palpable vibrations most commonly produced by the flow of blood from one chamber of the heart to another through a narrowed or abnormal opening, such as a stenotic valve or a septal defect?_____.
9. Heart sounds, which are produced by vibrations within the heart chambers or in the major arteries from the back and forth flow of blood_____.

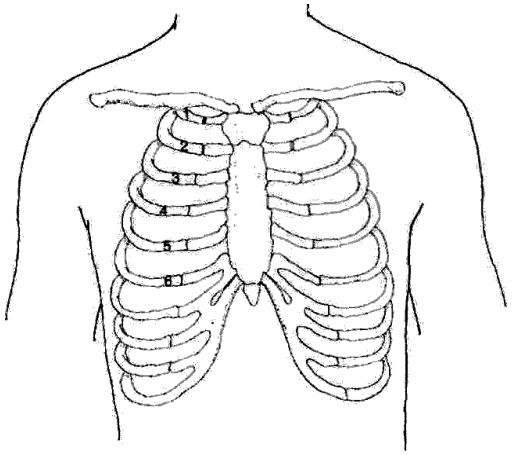
5.Fill the table:

	Average pulse rates at rest (beats/minute)	**The systolic and diastolic blood pressure** (mm Hg)
Newborn		
1-yr-old infant		
5-yr-old child		
10 years		
16 years		

6.Fill the table: **Borders relative heart dullness in child**

Border	Age of child		
	Till 2 years	2–7 years	7–12 years
Right			
Upper			
Left			

7. On the diagram below, outline the borders of cardiac dullness as you would expect to percuss them in a normal 5-year-old child.

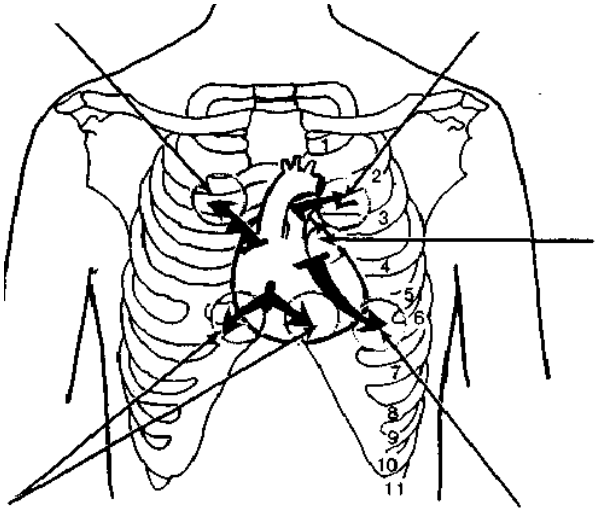


8. Definitions

Match the definitions in *Column I* with the correct words in *Column II.*

Column I	*Column II*
_____1 difficulty or distress in breathing; frequently rapid breathing, usually associated with serious disease of the heart, lung, or nervous system	1. Orthopnea
_____2 a dark bluish or purplish coloration of the skin and mucous membrane due to deficient oxygenation of the blood in the lungs	2. precordiac bulge
_____3 discomfort on breathing in any but the erect sitting or standing position	3. ascites
_____4 a protrusion in the epigastrium and anterior surface of the lower part of the thorax	4. Central cyanosis
_____5 broadening and thickening of the ends of fingers, seen in chronic pulmonary disease	5. clubbing
_____6 an accumulation of serous, high-protein fluid in the peritoneal cavity	6. Dyspnea
_____7 the difference between apical pulse rate and peripheral pulse rate	7. Thrill
_____8 the vibration accompanying a cardiac or vascular murmur; can be felt by palpation; fremitus	8. Pulsus alternans
_____9 a pulse regular in time, but with alternate beats stronger and weaker; often detectable only with a sphygmomanometer and usually indicating serious myocardial disease	9. Pulse deficit

9. Auscultation **(Label areas that describe the relation of heard sounds to chest wall).**



10. Definitions

Match the definitions in *Column I* with the correct words in *Column II.*

Column I	*Column II*
___1 the double sound caused by the slightly asynchronous closing of two heart valves	A. innocent murmur
___2 a normal arrhythmia associated with respirations; the heartbeat becomes faster during inspiration and slower during expiration	B. Splitting
____3 murmur caused by a pathological condition	C.
____4 a murmur or soft sound heard on auscultation of the heart that is not caused by or indicative of organic heart disease	D. organic murmur E. fibrillation
____5 fine, rapid, quivering movements of cardiac muscle that replace the normal myocardial contraction	F. sinus arrhythmia

11.***Review Questions***

1. What can you have an 11-year-old child do to help you decide if his arrhythmia is a sinus arrhythmia?_____

_____

2. The difference between the systolic and diastolic blood pressure is the _____

_____

3. The blood pressure cuff size should not be more than_____or less than the length of the upper arm.

4. List four positions the patient should assume during a complete cardiac exam. _____

_____

_____

5. The carotid pulse is synchronous with (S_1; S_2) – true or false

_____

6. What things may cause an increase in the intensity of S_1

_____

7. A split of S_2 is best heard _____

_____

8. A normal split of S_2 is widest with (inspiration; expiration)

9. Three abnormal sounds that can be detected by auscultation of the heart are:

_____

_____

10. All murmurs should be evaluated carefully and recorded with regard to:

_____

_____

11. Four characteristics of murmurs, which mean that they are more likely to be innocent are:

_____

_____

Complaints and their characteristics

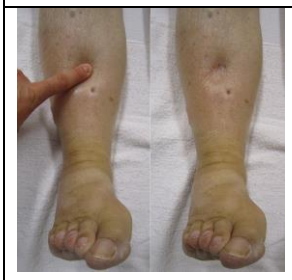
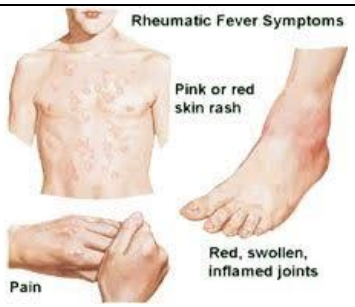
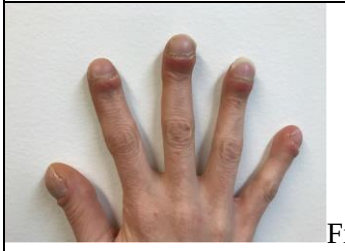
Specific	General

Typical position in a bed_____

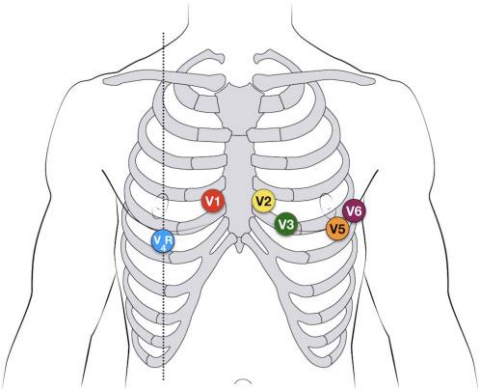
_____

_____

Main symptoms of cardiac diseases

 Skin color	**Characteristics:**
 Cardiac edema	
 Rheumatic fever rash	
 Fingers and nails changes	
 Physical development	

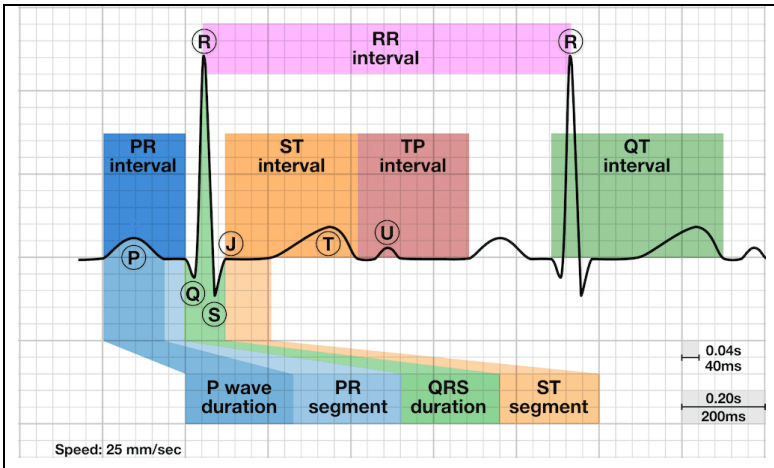
Additional methods of examination CVS in children



ECG lead placement:

_____
_____
_____
_____
_____
_____
_____
_____

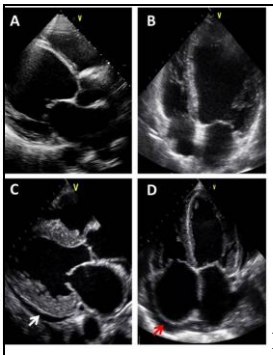
ECG



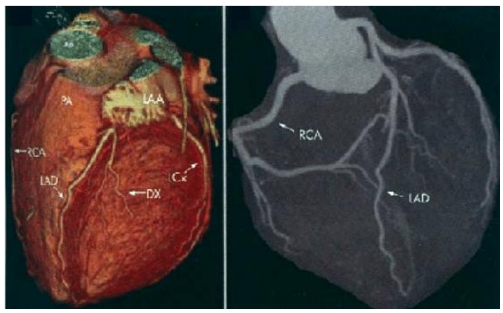
Interpret responsibilities of the main components (intervals, waves)

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Name other additional methods of CVS investigation



1.



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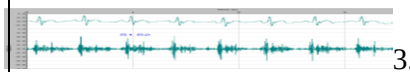

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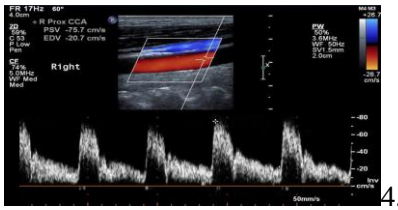

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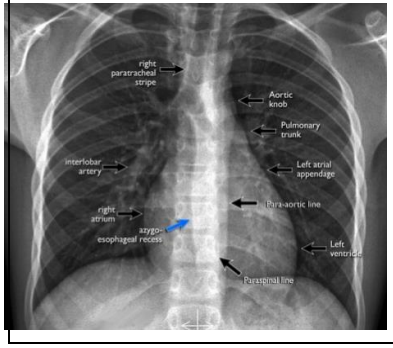

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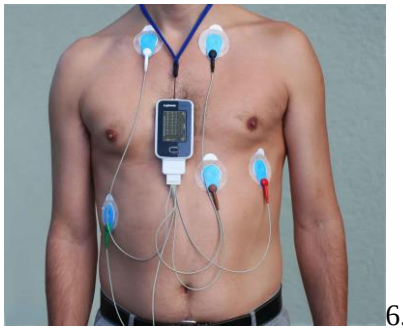


6.

1 –

2 –

3 –

4 –

5 –

6 –

CHECK LIST *Cardiovascular System:*

*Inspection (*Describe all findings of visual observation related to the cardiovascular system)

_____
_____
_____
_____

*Palpation*_____
_____
_____
_____
_____

*Percussion*_____
_____
_____
_____
_____

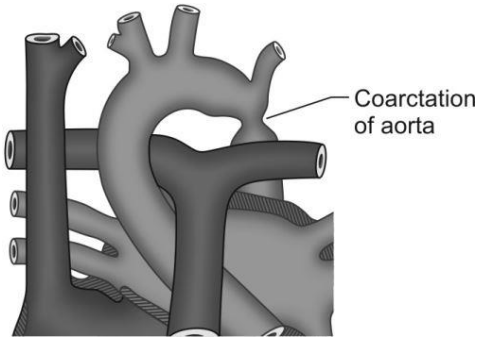
*Auscultation*_____
_____
_____
_____
_____

12.Fill table: **Classification of congenital heart disease (CHD)**

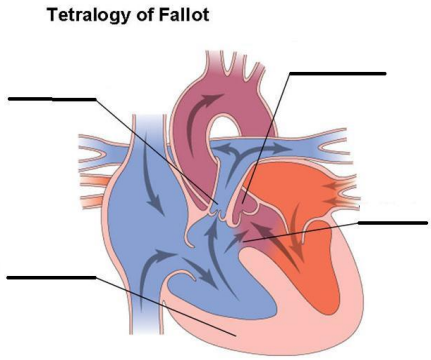
Acyanotic		**Cyanotic**
Left-to-right shunts	Outflow obstruction	1
1	1	2
2	2	
3	3	

13.Congenital heart disease – Symptoms:_____
_____
_____
_____
_____

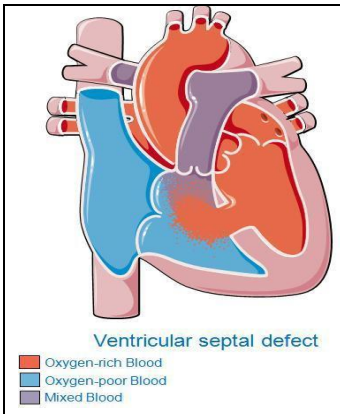
14. Describe clinical signs of coarctation of aorta.



15. Label four abnormalities tetralogy of Fallot (TOF) and write main signs of this disorder.



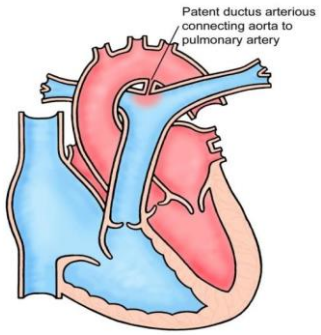
16. Describe hemodynamic disorders of ventricular septal defect (VSD) and write clinical manifestation of disease.



hemodynamic disorders

Symptoms

17. Describe hemodynamic disorders of patent with ductus arterious (PDA) and write clinical manifestation of disease.



hemodynamic disorders

Symptoms

18.What are clinical manifestations of congestive heart failure?

Theme: Anatomical-physiological peculiarities of digestive system in children. Examination of digestive system. Semiotics of main digestive system diseases

1. What Anatomo-physiological features of Digestive system (DS) in children do you know?
2. Draw topographical zones of abdomen, painful points in digestive system's diseases.
3. Characterize (describe) additional methods of investigations of GIT and their results depending on child's age.
4. DS disease syndromes (definition, clinical symptoms): dyspepsia, abdominal pain, exicosis, malabsorption, jaundice, diarrhea, abdominal masses.
5. Semiotics of DS diseases.

Practical skills:

1. Mouth cavity examination.
2. Palpation of liver (bimanual).
3. Superficial palpation, deep palpation of bowels (intestines)/
4. Technique of abdominal painful points diagnostics and symptoms of gall bladder disorders (Kehr's point, Mussy symptom, Ortner's, Murphy's symptoms)/
5. Definitions of abdominal zones, the painful points in pancreas pathology (Chauffard's zone, Desjardin's point, Mayo-Robson's point)/
6. The painful points in peptic ulcer of stomach and duodenum (Boas's symptoms)/
7. Livers percussion by Kurlov.
8. Percussion and palpation of bowels (intestines)/
9. Shchotkin-Blumberg symptom, Rovsing symptom.
10. Interpretation of laboratory results: blood count, Urinalysis, Biochemical assays (bilirubin, SGPT), Hp tests, abdominal instrumental methods: pH-monitoring, endoscopy, ultrasonography).

The recommended literature:

1. Lecture
2. T. Kapitan. Propaedeutics of children's diseases and nursing of the child: Textbook for students of higher medical educational institution. Vinnitsa, 2010. P. 247–307.
3. Patients examination and semiotics of pediatric diseases (modul 2) : Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics: підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.

1. Matching:

Anatomical - physiological Features of DS in child	**Clinical significance of DS features**
1. The stomach bottom and cardiac division are immature in newborns and infants. There is the functional insufficiency of cardiac sphincter closing function. The efferent part of esophagus is situated over the diaphragm in the chest. In small children it communicates with stomach through the wide hole in the diaphragm. Also the esophagus is short in infants and opens on a top of the gastric bag and it exaggerates the functional insufficiency of cardiac sphincter closing function in early children.	**A.** The low caloric and liquid type of early children meals – mainly breast or cow milk. The intestinal loops lies more portably because comparatively big liver occupies big volume of abdominal cavity in infants and at the same time the pelvis is not developed yet.
2. The pyloric sphincter of stomach is developed well since child`s delivery. The condition when the pyloric sphincter is strong and cardiac is weak can allow to compare the stomach in small children with "open bottle".	**B.** The predisposes young children to intestinal intussusceptions.
3. The small intestine has comparatively greater length in calculation on body growth in early children (aged less than 3 years) in comparison with adult persons.	**C.** The change of baby`s position from standing to lying can provoke easy vomiting and food regurgitations.
4. The age dependent mobility of the caecum mesentery	**D.** Small children to very easy vomiting.
5. Rectum is also comparatively long and can occupies all the small pelvis in infants. The ampoule of rectum is nearly undeveloped in newborns. The fatty cellular masses surrounded the rectum are seemed absent.	**E.** It leads to high mobility of the rectum and predisposes to easy organs` prolapses

1._____ 2._____ 3._____ 4._____ 5._____

2. **The main features of oral cavity in infants are:**

Size_____

Lips development_____

The mucus membrane _____

_____

Vascularization _____

Salivation_____

The tongue _____

Buccae of Bitchat_____

_____

Esophagus features

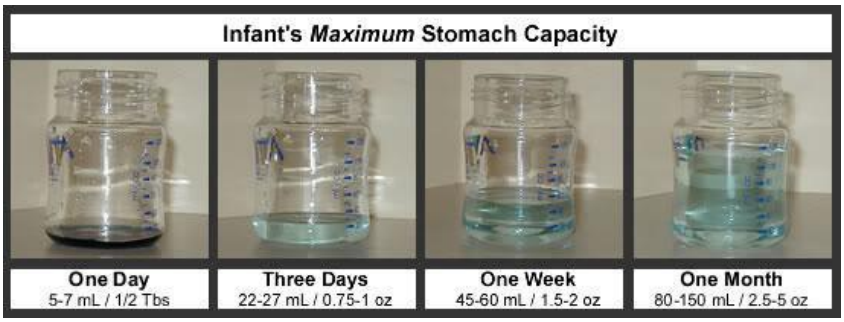
Form is _____

Vascularization _____

Muscular fibers and elastic tissue development _____

Stomach features

Stomach physiological volume



The stomach physiological volume is

_____ml in 1 yr old baby,

_____ml in 3 yr old child,

_____ml in 10-12 yr old child.

Mucus membrane vascularization_____

Secreting cells development:

Chief_____

Parietal_____

Goblet_____

Acidity of the stomach juice is_____, promoted by the enzyme called _____and reaches to the adults level to the____year.

The _____ enzyme provide the splitting of _____and its activity increases/decreases with the time.

How can you explain good digestion of lipids in children, getting natural feeding?

Answer_____

_____

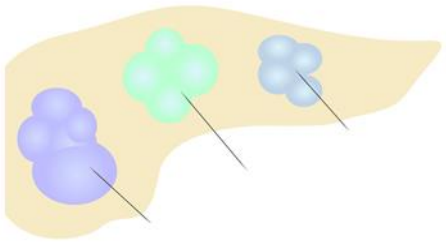
In a newborn a slight acidic reaction in the stomach is supported by _____.

The pancreas peculiarities

Differentiation of the cells is_____

Vascularization_____

Label main pancreatic enzymes and their main characteristics

Types of pancreatic enzymes 	

Liver features:

Functional activity development_____

Differentiation of parenchyma _____

Vascularization_____

Connecting tissue development_____

Liver functions and their development in children:

Function	Its development

Specific features of the bile in childhood:

1) _____ bile acid value;

2) relative prevalence of taurocholic acid over glycocholic one whose volume increases with age and provide much _____ antiseptic properties of bile;

3) a high content of _____.

Small intestine peculiarities

Mucus membrane vascularization _____

Rate of epithelialization_____

Muscle fibers (especially longitudinal) are _____

Permeability is higher / lower

High/Low absorption of fat _____ is an enzyme essential to the complete digestion of lactose.

Give definition and clinical significance for

The extracellular intestinal digestion:

_____

_____

_____

Membranous digestion:

_____

_____

_____

The intracellular digestion:

_____

_____

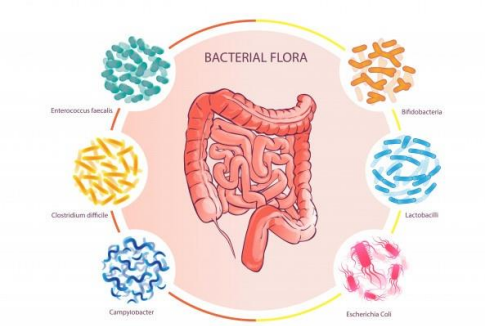
_____

Phases of microflora formation

1 – _____ – 10–20 hours after birth

2 – _____ – 2–4 days

3 – _____ – 6 months. up to 2 years



Note the main functions of gut microflora:

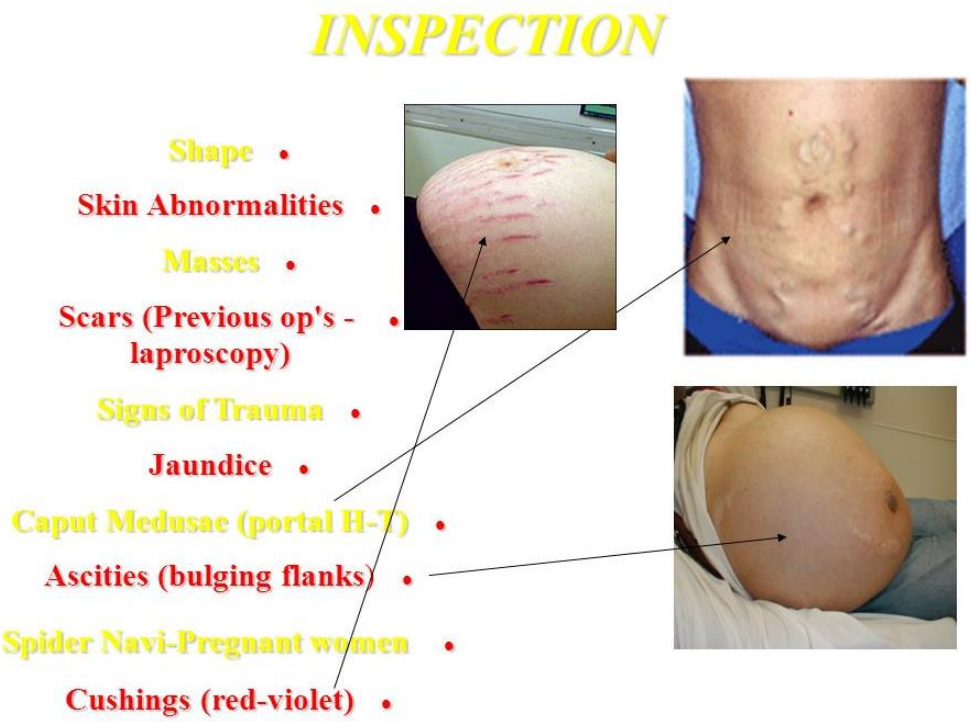
1.	5.
2.	6.
3.	7.
4.	8.

How many defication should a newborn have in one day? _____

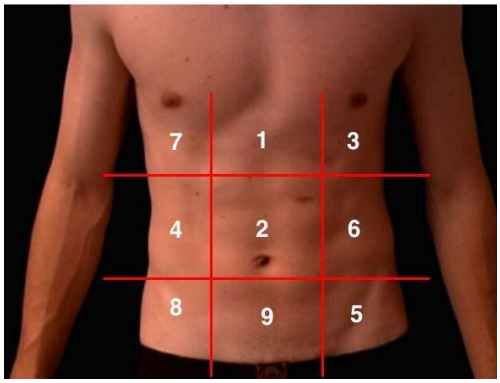
Matching stool's features depending on feeding in infants:

1. Healthy breastfed stool	A. Pasty, peanut butter-like poop on the brown color spectrum: tan- brown, yellow-brown, or green-brown. It's more pungent than poop from breastfed babies and a little less pungent than poop from babies who are eating solid food, but you'll recognize the smell.
2. Healthy formula-fed stool	B. Poop is brown or dark brown and thicker than peanut butter, but still mushy. It's also smellier.
3. Solid-food stool	C. Poop is yellow or slightly green and have a mushy or creamy consistency. It may be runny enough to resemble diarrhea. Poop typically looks like Dijon mustard and cottage cheese mixed together and may be dotted with little seed-like flecks. Interestingly, its smell isn't half bad.

1._____;2._____; 3._____

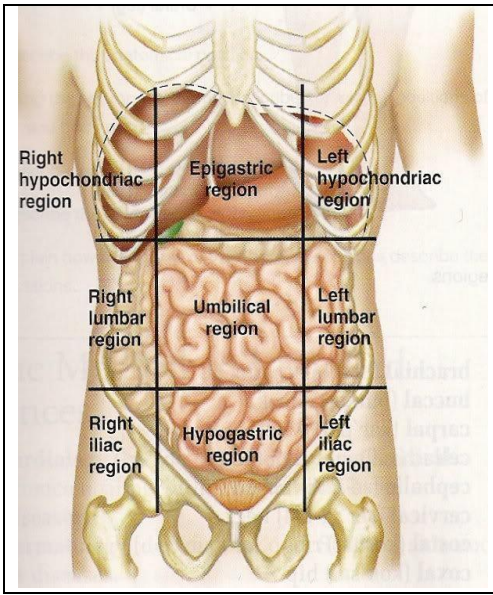


Name the abdominal wall regions:



1_____
2_____
3_____
4_____
5_____
6_____
7_____
8_____
9_____

Name organs projection on the abdominal wall regions:



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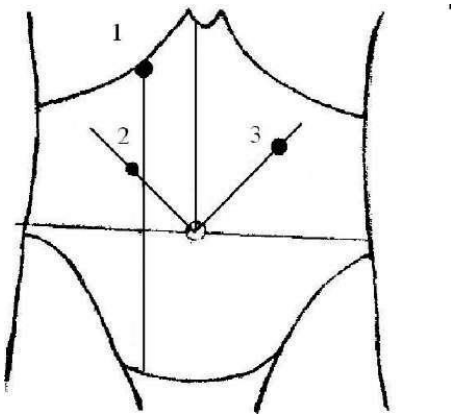


Kehr's point_____

Desjardin's point_____

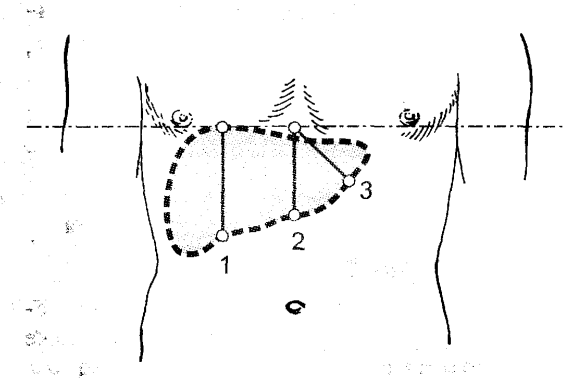
Mayo-Robson's point_____

Match symptoms and descriptions:

A_____ B_____ C_____ E_____ F_____

Name of symptom	Description
A. Murphy's	1. are the increases of painfulness at the rapid taking away of fingers by which a front abdominal wall is pressed on. This symptom is matters very much in diagnostics of peritonitis.
B. Kehr's	2. is a delay of breathing during palpation of gall- bladder on inhalation.
C. Ortner's	3. is painfulness at palpation between the legs (above a collar-bone) of right nodding muscle.
D. Mussy's	4. is painfulness at the easy pushing on right costal arc by the edge of palm.
E. Rovsing's sign	5. is strengthening of pain at pressure on the area of gall-bladder, especially on deep inhalation.
F. Blumberg's	6. i s a continuous deep palpation starting from the left iliac fossa upwards (anti clockwise along the colon) may cause pain in the right iliac fossa, by pushing bowel contents towards the ileocaecal valve and thus increasing pressure around the appendix.

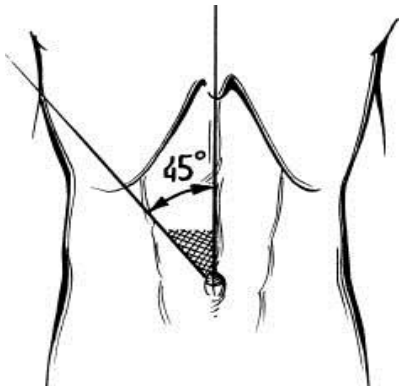
Describe steps of liver percussion by Kurlov:



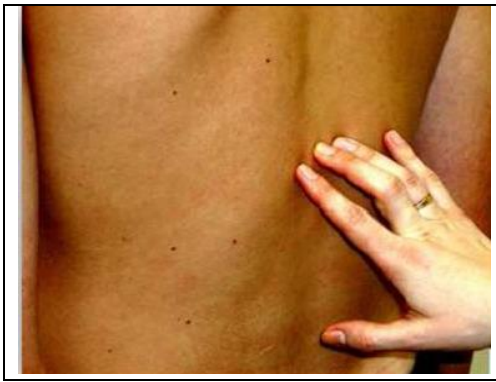
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Normal parameters of liver sizes by Kurlov's method depending on the age (cm):

Line of measurement	Age of the child (years)			
	1–3	3–7	7–12	Older than 12



Name this zone_____



<u>Boas's symptoms</u>

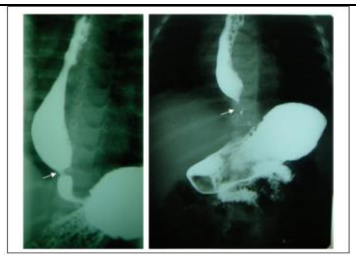
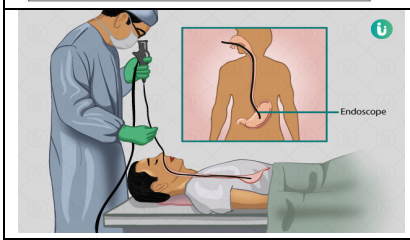
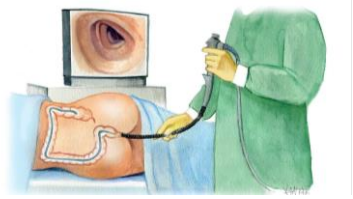
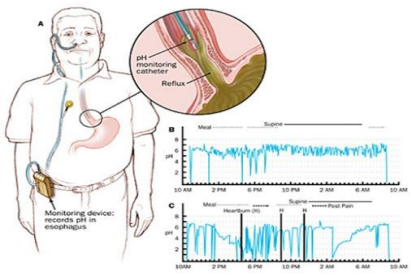
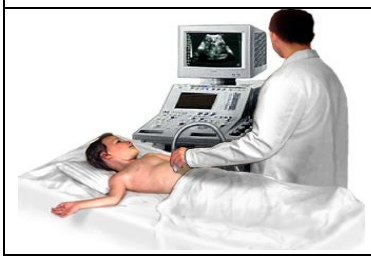
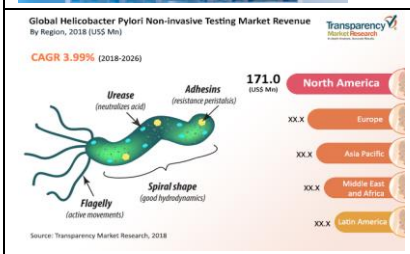
Pain appears at pressing on the processus transversus _____ vertebras (detect diseases of gall bladder and stomach)

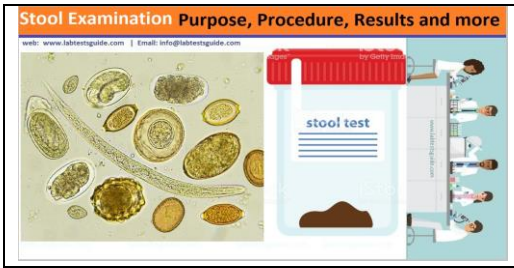
Accumulation of liquid in the abdominal cavity (ascites) is shown at percussion by _____ sound in _____ position of the patient.

What cause these percussion sounds in the patient with ascites?

_____
_____
_____
_____
_____
_____
_____

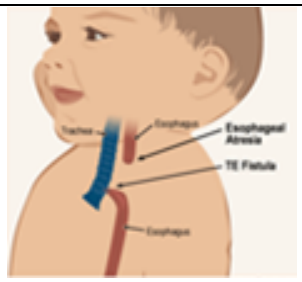
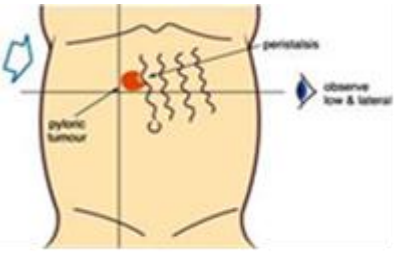
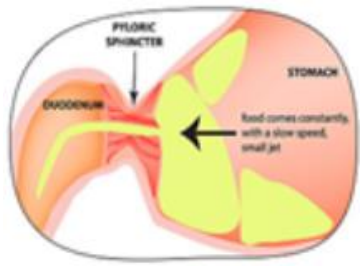
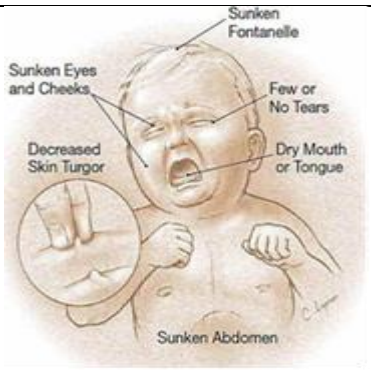
Name methods and note their role in the DS examination

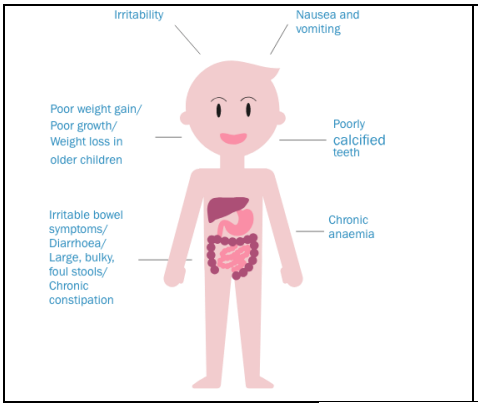
	
	
	
	
	
	
	
	

	
OTHER	

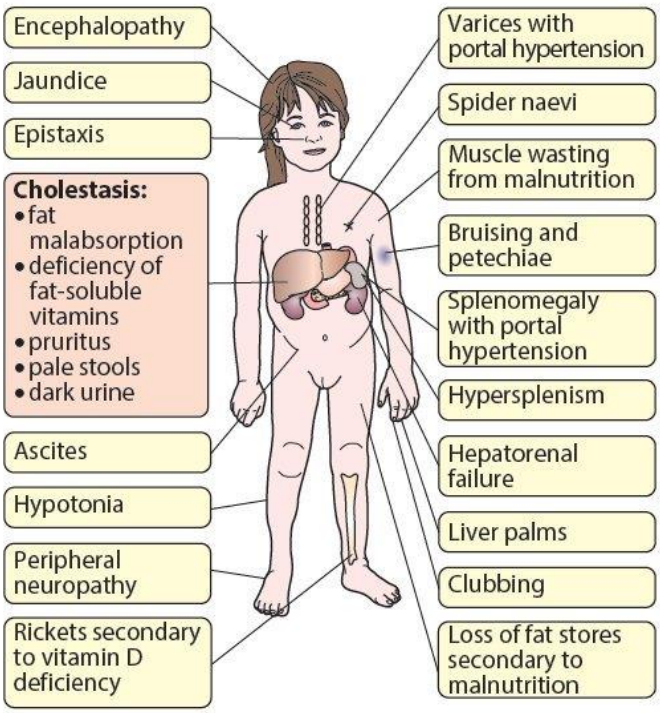
Semiotics of DS diseases

Name the syndromes and note their clinical symptoms



Hepatic dysfunction



Clinical features of liver disease. In addition, these children may have growth failure and developmental delay.

What's functional gastric dyspepsia?

_____

_____

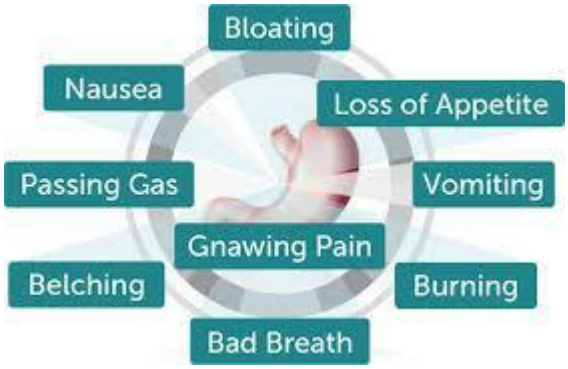
_____

Symptoms of functional gastric dyspepsia are

_____

_____

What is the reason for the development of these symptoms?



_____

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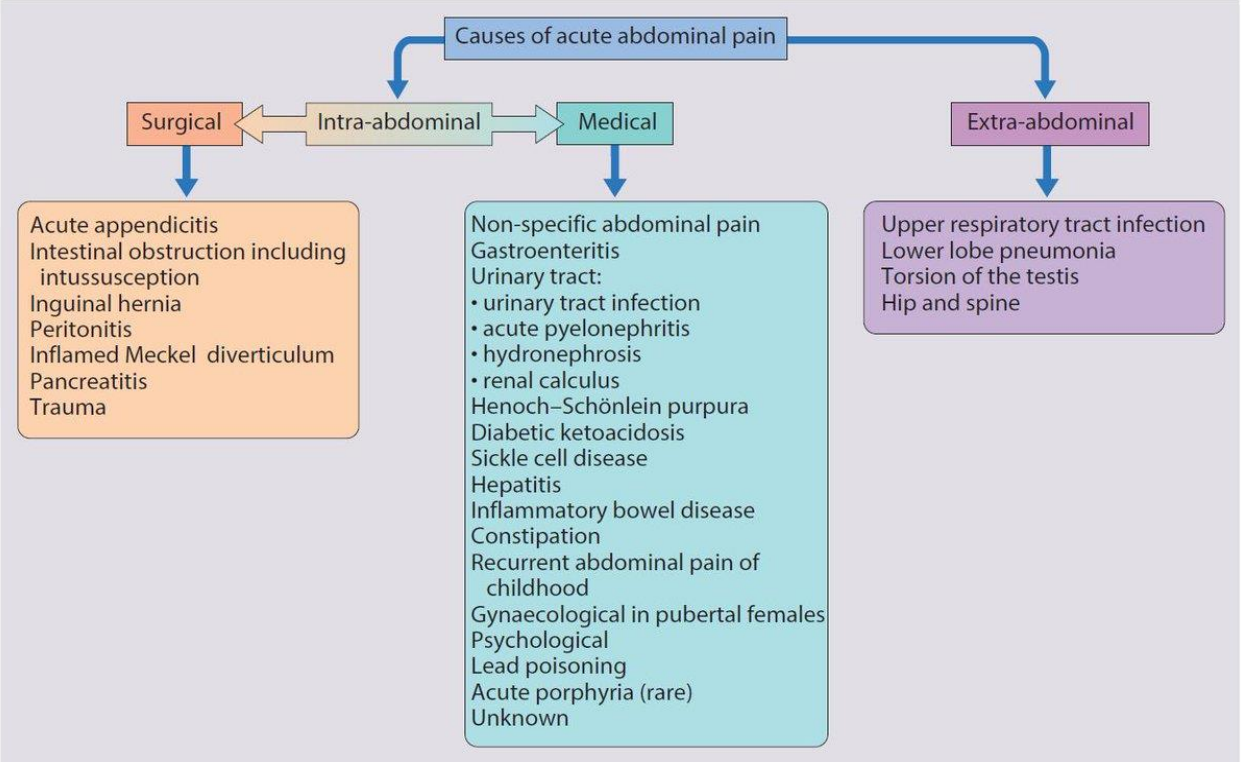


What Are the Symptoms of an Ulcer disease?

_____

_____

_____

_____

An ***ulcer disease*** may either have or not have symptoms. When symptoms occur, they may include (mark what is correct):

- A gnawing or burning pain in the middle or upper stomach between meals or at night
- Bloating
- Heartburn
- Nausea or vomiting
- Exicosis

In severe cases, symptoms can include:

- Dark or black stool (due to bleeding)
- Severe pain in the mid to lower abdomen
- Vomiting blood (that can look like "coffee-grounds")
- Weight loss
- Severe pain in the mid to upper abdomen

What is the diagnosis?

Exam Digestive system in the patient:

Inspection:

the oral cavity mucosa _____

throat _____

tonsils _____

tongue _____

teeth (temporary, permanent, teeth formula, caries) _____

Shape and size of the abdomen _____

visible peristalsis _____

respiratory movement _____

umbilical veins hernia _____

Palpation superficial (location of painful points):

masses areas of tenderness _____

muscular resistance _____

Softness of abdomen _____

abdominal distension _____

tense abdomen _____

"acute"/surgical abdomen _____

Deep palpation.

Palpation of the large intestine _____

_____

_____

Palpation of the small intestin _____

_____

_____

Liver palpation: _____

_____

_____

_____

Spleen palpation _____

_____

_____

_____

Percussion of the abdomen: _____

_____

Liver percussion by Kurlov: _____

_____

_____

Detect ascites _____

_____

Auscultation: _____

_____

Stool _____

_____

Theme: Anatomo-physiological features of urinary system. Examination of urinary system. Semiotics of Urinary System disease

Theoretical part:

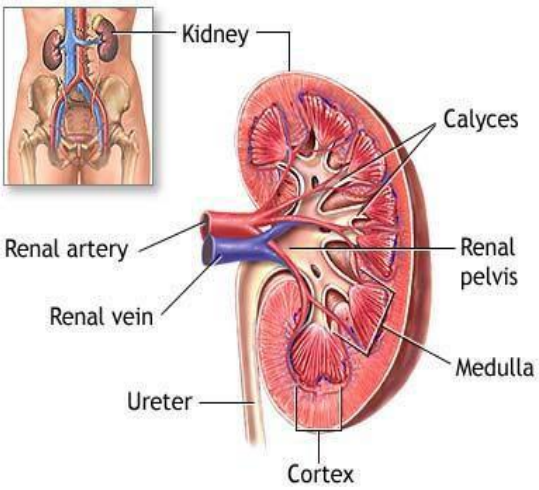
1. What is the clinical meaning of APF of urinary system organs in children? What are features of **uropoiesis** and urinary **excretion**?
2. The abnormality of embryogenesis of urinary system organs.
3. What are risk factors of urinary system disease?
4. What are the quantitative and the qualitative dates of diuresis and urination depending on age?
5. What is characteristic of urinalysis? (hematuria, erythrocyteuria, leucocyteuria, proteinuria, cylinderuria, glucosuria).
6. Characterize tests of renal function: glomerular filtration rate (creatinine clearance), urinary concentration test, tubular reabsorption.
7. Define the terms: oliguria, polyuria, anuria, dysuria, enuresis.
8. What is data of serum creatinine and serum K, Na, pH, protein?
9. What are criteries of bacteriuria?
10. What are symptoms of toxic, pain, dysuric, edematic, urinary syndrome?
11. What paraclinical methods of examination of renal system in children do you know.
12. What are clinical symptoms of urinary system diseases?

Practical skills:

- Inspect of abdomen and lumbar region
- Edema determination
- Arterial blood measurement
- Assessment of physical development
- Palpation of kidneys (by Obraztsov- Strazhesko; by Israel; by Botkin in vertical position)
- Inspect external female and male genital organs.
- Assessment results of urinalysis, urine analyses by Nechiporenko, tests of renal function – lomerular filtration rate (creatinine clearance), urinary concentration test, tubular reabsorption, microbiological diagnostics (bacterial inoculation).
- Assessment results of serum creatinine and serum K, Na, pH, protein
- Assessment results of X-ray examination, ultrasound examination, excretory urography.

Recommended literature:

1. Lecture
2. T. Kapitan. Propaedeutics of children's diseases and nursing of the child : Textbook for students of higher medical educational institution. Vinnitsa, 2010. P. 247–307.
3. Patients examination and semiotics of pediatric diseases (modul 2): Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics : підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.



Name structures and organs of:

uropoiesis _____

_____

_____

_____

urinary excretion _____

_____

_____

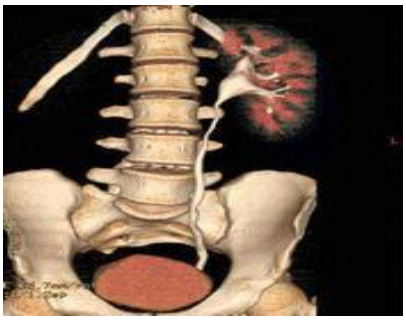
_____

_____

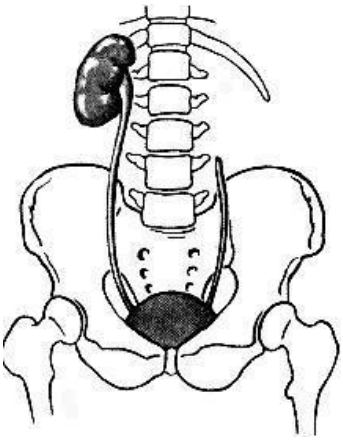
Describe the Adult Derivatives of Embryonic Kidney Structures

Embryonic Structure	Adult Derivative
Ureteric bud (metanephric diverticulum)	
Metanephric mesoderm	

Name absence of the kidney and ureter

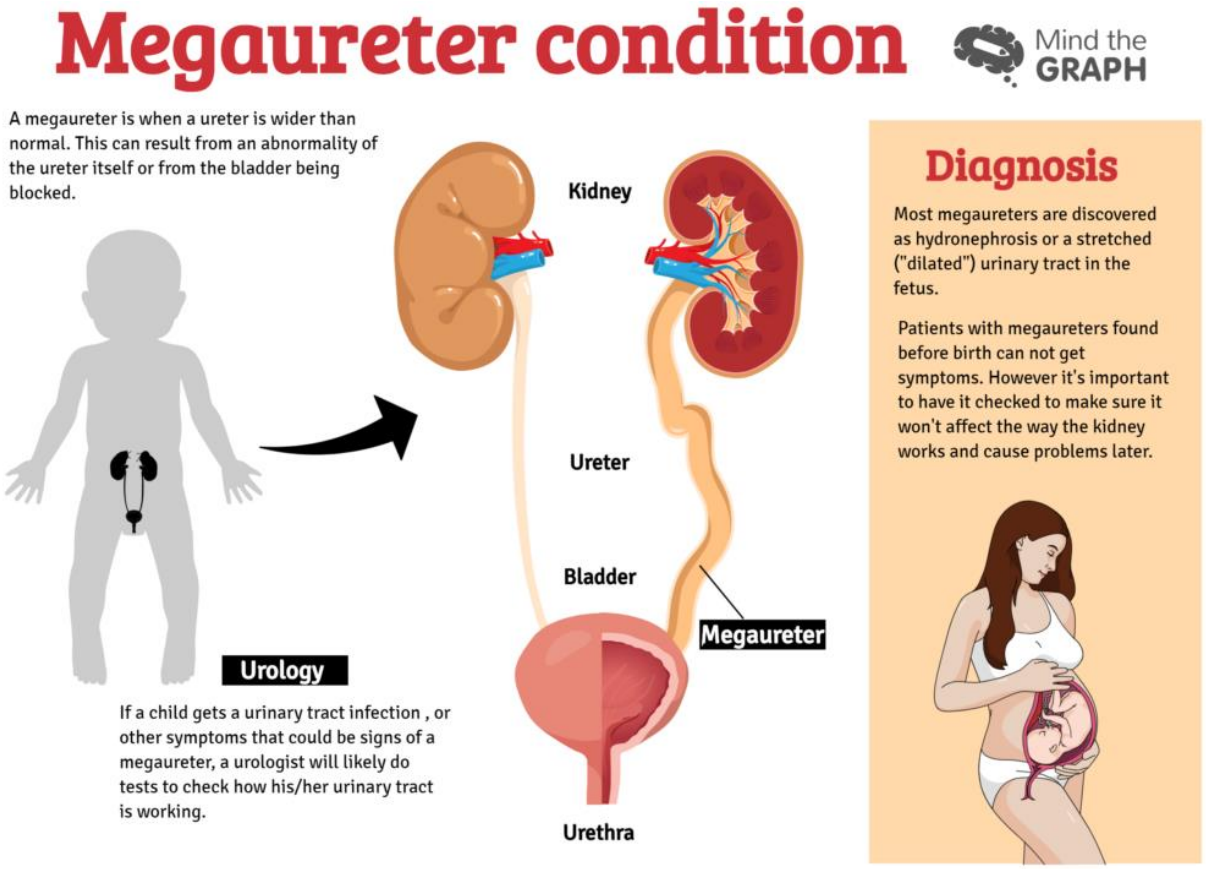


Name the pathology, when the kidney is absent and ureter is present



Renal cortical dysembriogenesis signs:

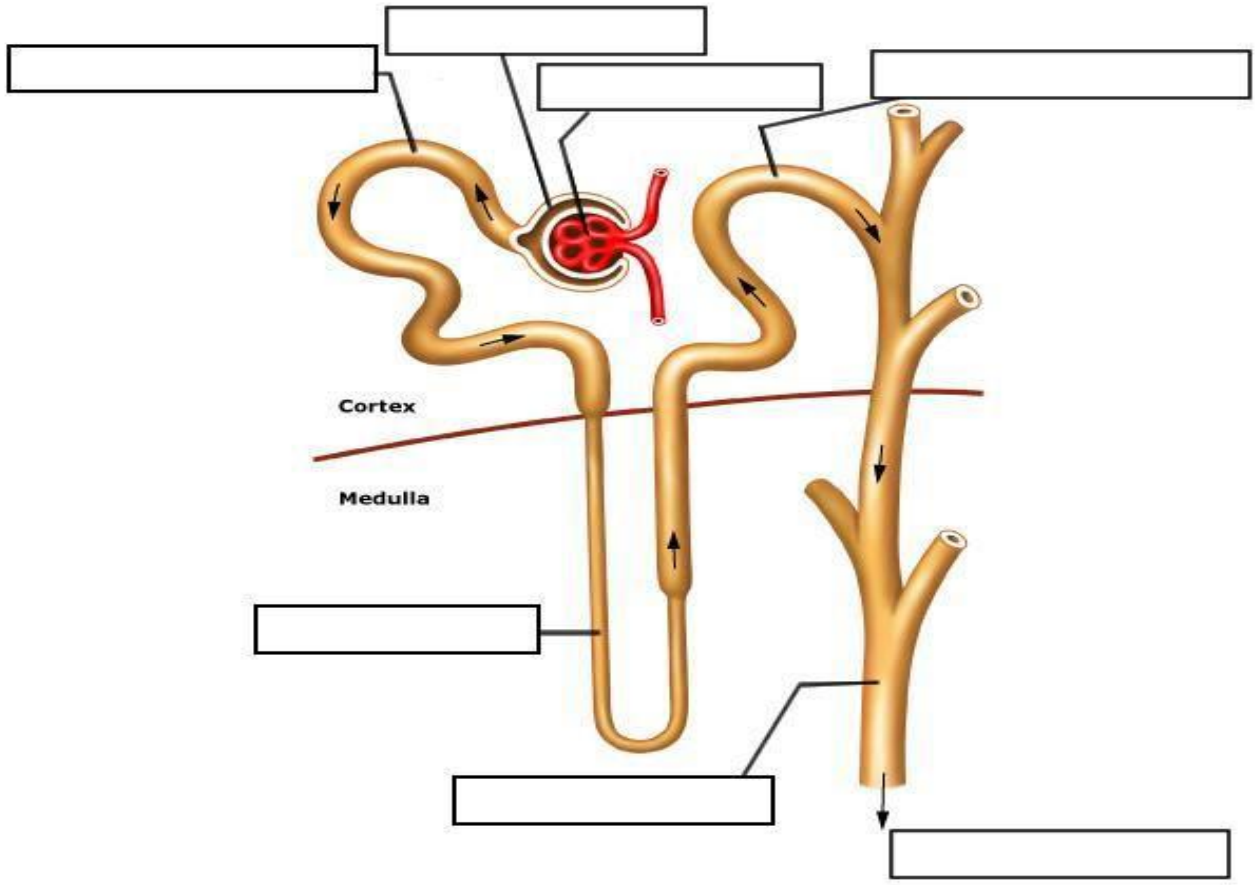
1_____
2_____
3_____
4_____



Characterize risk factors of USD (urinary system diseases)

Sex	
Age	
Congenital abnormalities of the UT	
Anatomic abnormalities	
Factors, which can cause UT obstruction	
Other	

Name and label:_____

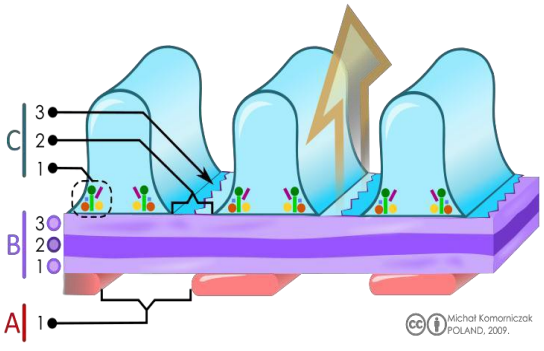


The glomerular filter consists of (Match with the corresponding letter):

_____are podosytes (1. enzymatic and structural protein 2. filtration slit 3. Diaphragm).

_____are the endothelial cells of the glomerulus (vessel) (1. pore (fenestra).

_____is glomerular basement membrane (1. lamina rara interna 2. lamina densa 3. lamina rara externa)

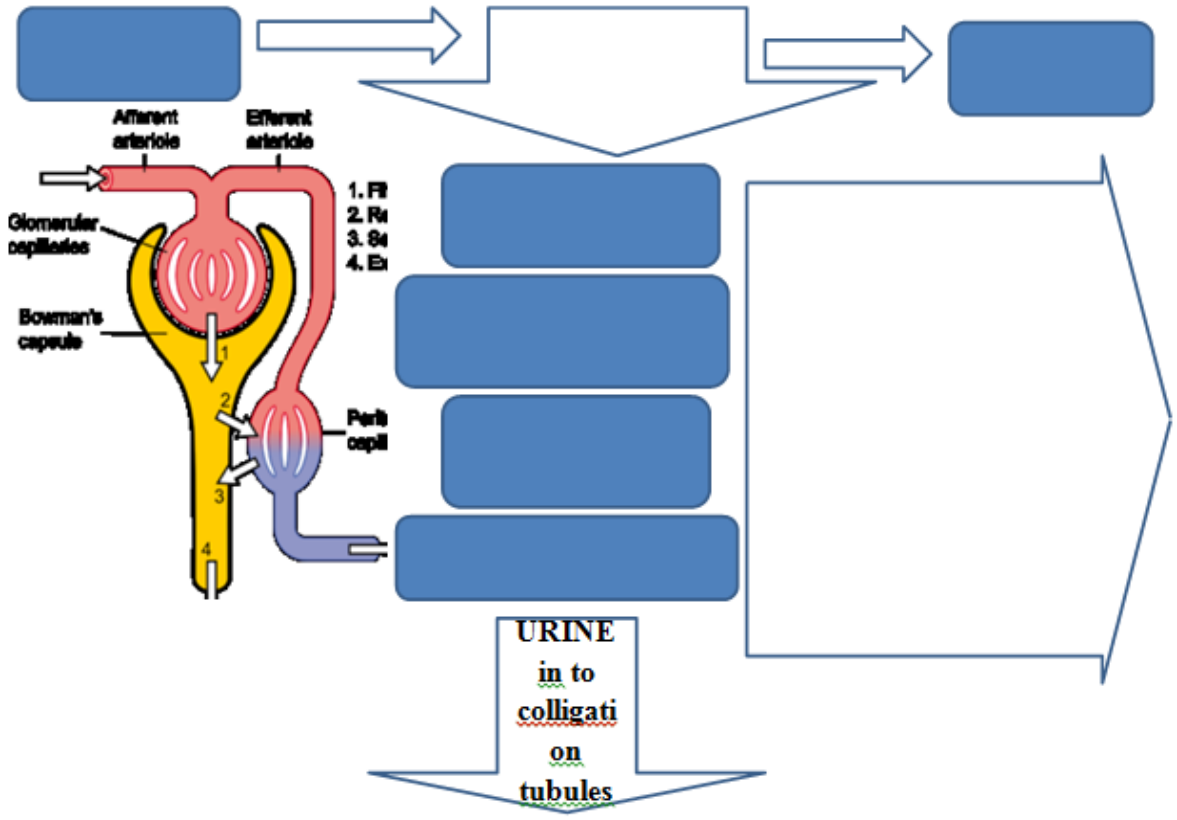


Renal Functions Tests In Clinic (match the following test with the arrow):

- Filtration assessment
- Concentration assessment
- Reabsorption assessment

- tubular reabsorption test
- glomerular filtration rate (GFR) test
- specific gravity test
- creatinine in serum

Physiological bases of uropoesis in children (complete the chart):



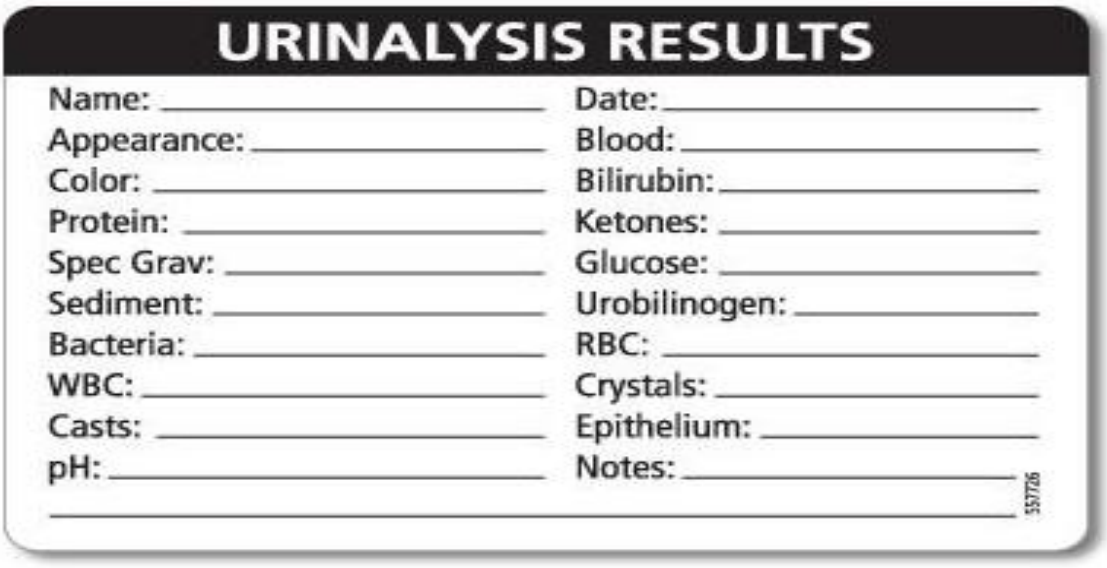
Semiotics Of Urine Syndrome with nephron affection (complete the chart):

The diuresis is _____

The daily diuresis _____ ml/kg of body weight per day

The hourly diuresis _____ ml/kg of body weight per hour

What are normal characteristics of urinalysis of 5 y.o. child? (complete the chart):



Note normal values for urinalysis by Nechiporenko

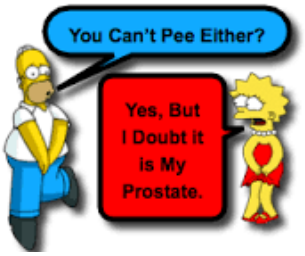
RBC in 1 ml	WBC in 1 ml	Casts in 1 ml

What is hematuria_____

What is leucocyteuria_____

What is proteinuria_____

What is glucosuria_____



Define the terms <u>DIURESIS DISORDERS</u>:

Oliguria_____
Polyuria _____
Anuria _____
Dysuria _____
Enuresis _____

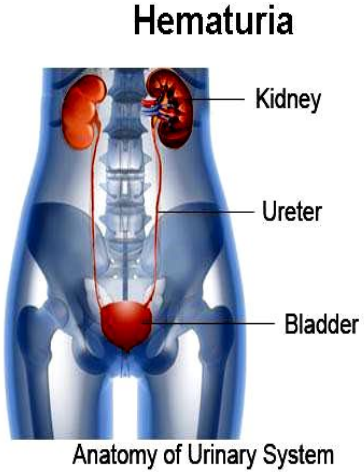
Define place of breakage if (match the following place with the arrow)

The Glomerular Proteinuria

The Tubular Proteinuria

The Prerenal proteinuria

Define place of breakage if (match the following place with the arrow)

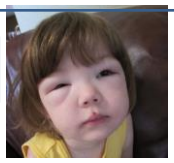


The Renal painless hematuria

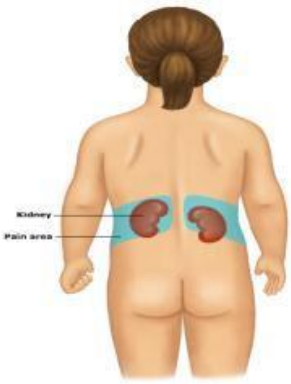
The Postrenal (painful) hematuria

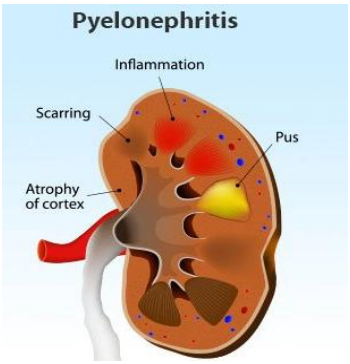
Clinical signs of renal diseases (glomerulonephritis) (complete the chart):

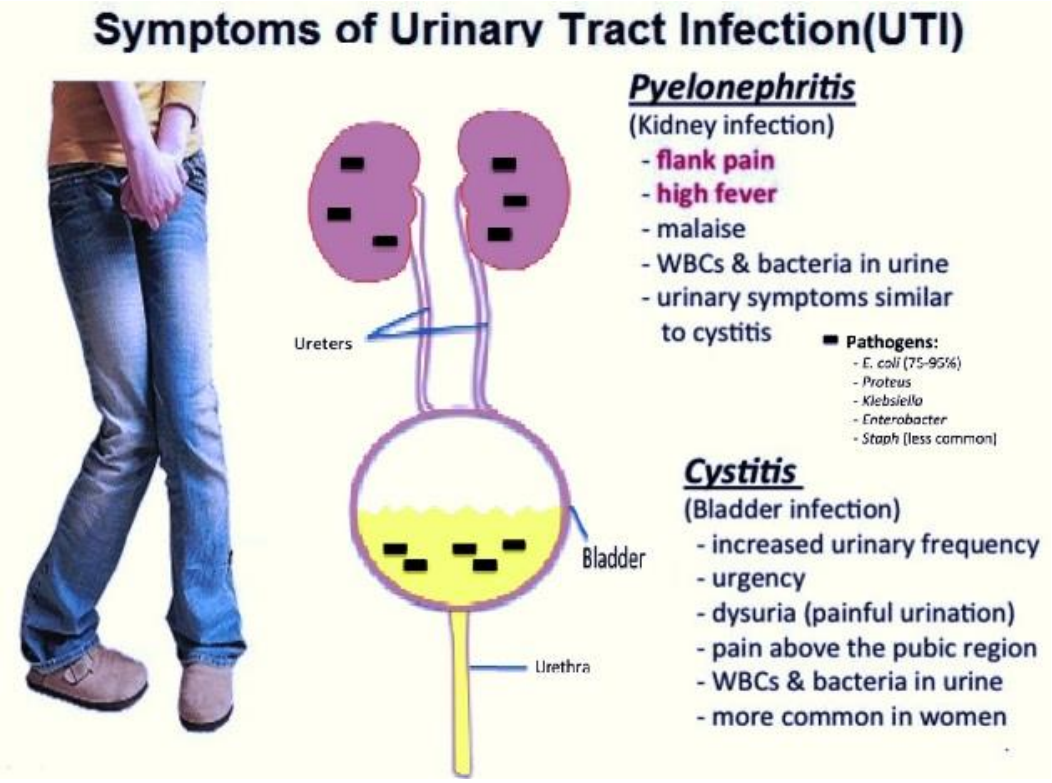
The urination frequency_____and
urine color changes _____



The clinical signs allowing to suspect the urinary tract inflammation disease (pyelonephritis) (complete the chart):







Peculiarities of the newborn's urine

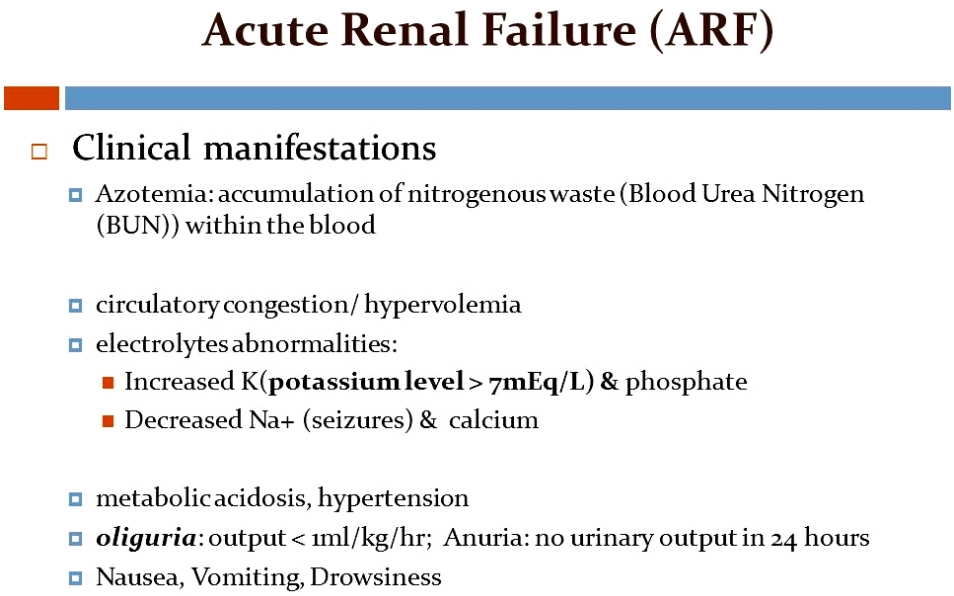
What are criterias of bacteriuria?

What test can you use for diagnostic bacteriuria?

What laboratory tests can be informative for the diagnosis of glomerulonephritis?

What laboratory tests can be informative for the diagnosis of pyelonephritis?

Clinical and laboratory signs of acute renal failure syndrome



Review Questions

True — False (correct what is false)

Symptoms of Acute renal failure

Decreased kidney function (electrolyte imbalance) _____

Obstruction in the UT _____

Blood in urine _____

Increased urine output _____

Hyperhydratation _____

Detectable abnormal mass _____

Poor appetite _____

Cyanotic skin _____

Diagnostics can be done with:

Routine laboratory test (creatinine and blood urea nitrogen) _____

Routine laboratory test (transaminase and general blood test) _____

Ultrasound of the kidney _____

Bacteriological test_____

Kidney biopsy _____

Uretherography _____

CT scan _____

Genetic test _____

Symptoms of Chronic renal failure (CRF)

Until very kidney function remains, CRF may not developed _____

Anemia, increased level of phosphates in serum blood _____

Leucocytosis _____

Dry skin _____

Poor appetite _____

Vomiting _____

Bone pain _____

Uric taste in mouth _____

Hemorrhagic rush on the skin _____

Interpreting a Urinalysis

DIPSTICK

Helps identify if patient is hydrated / dehydrated

Marker for common bacterial pathogens *

Marker for white blood cells in the urine

MICROSCOPIC ANALYSIS

White blood cells

Red blood cells

Test Name	Reference Range
Urinalysis rflx Microscopic	
Color	YELLOW
Appearance	CLEAR
Specific Gravity	1.001-1.035
pH	5.0-8.0
Glucose	NEGATIVE
Bilirubin	NEGATIVE
Ketone	NEGATIVE
Occult Blood	NEGATIVE
Protein	NEGATIVE
Nitrite	NEGATIVE
Leukocyte Esterase	NEGATIVE
Urine Microscopic	
WBC	<=5 WBC/HPF
RBC	<=2 RBC/HPF
Squamous Epithelial	<=5 HPF
Bacteria	NONE SEEN HPF
Crystals	NONE SEEN HPF
Triple Phosphate Crystals	NONE SEEN HPF
Casts	NONE SEEN LPF
Yeast	NONE SEEN HPF

* E Coli, Klebsiella and Proteus produce nitrite from nitrate.
Pseudomonas, enterococci and coagulase negative staphylococci do not.

Examine Urinary System in patient:

Inspection of lumbar region: _____

_____

Bimanual palpation of kidneys: _____

_____

_____

_____

Palpation and percussion of the urinary bladder: _____

_____

_____

_____

Painful points: _____

_____

Pasternatsky sign _____

Pain on urination _____

Hematuria _____

Nocturia _____

Polyuria _____

Assess:

Sample Urinalysis #1

Test Name	In Range	Out Of Range	Reference Range
Urinalysis rflx Microscopic			
Color	YELLOW		YELLOW
** Please note change in unit of measure and reference range(s). **			
Appearance		CLOUDY	CLEAR
Specific Gravity	1.019		1.001-1.035
pH	7.5		5.0-8.0
Glucose		3+	NEGATIVE
Bilirubin	NEGATIVE		NEGATIVE
Ketone	NEGATIVE		NEGATIVE
Occult Blood		TRACE	NEGATIVE
Protein		3+	NEGATIVE
Nitrite	NEGATIVE		NEGATIVE
Leukocyte Esterase		1+	NEGATIVE
Urine Microscopic			
WBC		>60	<=5 WBC/HPF
RBC	0-2		<=2 RBC/HPF
Squamous Epithelial	NONE SEEN		<=5 HPF
Bacteria		MANY	NONE SEEN HPF
Crystals		FEW	NONE SEEN HPF
Triple Phosphate Crystals	FEW	ABN	NONE SEEN HPF
Casts	NONE SEEN		NONE SEEN LPF
Yeast	NONE SEEN		NONE SEEN HPF

Assessment:_____

_____

_____

_____

_____

Sample Urinalysis #2

Test Description	Results	Abnormal	Reference Range	Units	Lab
Urinalysis W Micro rflx Cult			Result: 4/29/2016 3:24 AM		Status: F
Color	YELLOW		YELLOW		SLN
Appearance	**TURBID**	**A**	**CLEAR**		**SLN**
Specific Gravity	1.025		1.005-1.030		SLN
pH	6.0		5.0-8.0		SLN
Glucose	NEG		NEG	mg/dL	SLN
Bilirubin	NEG		NEG		SLN
Ketone	NEG		NEG	mg/dL	SLN
Blood	**LARGE**	**A**	**NEG**		**SLN**
Protein	**100**	**A**	**NEG**	**mg/dL**	**SLN**
Urobilinogen	0.2		0.0-1.0	mg/dL	SLN
Nitrite	**POS**	**A**	**NEG**		**SLN**
Leukocyte Esterase	**LARGE**	**A**	**NEG**		**SLN**
Squamous Epithelial/ HPF	FEW		RARE		SLN
Crystals	Calcium Oxalate crystals noted		NONE SEEN		SLN
Casts	NONE SEEN		NONE SEEN		SLN
WBC	**>50**	**A**	**<3**	**WBC/hpf**	**SLN**
RBC	**7-10**	**A**	**<3**	**RBC/hpf**	**SLN**
Bacteria/ HPF	**MANY**	**A**	**RARE**		**SLN**

Assessment:_____

_____

_____

_____

_____

Sample Urinalysis #3

Characteristics	Case 1	Case 2
Age	8y 8m	9y 5m
Gender	F	F
BMI, kg/m^2	11.11	16.71
Chief complaint	Unconsciousness	Unconsciousnes
Urine output, mL/kg/hr	0.06	0.9
Type of dialysis	CAPD	CAPD
Blood gas analysis		
pH	6.99	7.1
HCO_3	4.6	6.9
Glucose level, mg/dL	233	679
Urinalysis		
Protein	Negative	Positive
Glucose	Negative	Positive
Ketone	Negative	Positive
Glomerular filtration rate, mL/min		
Initial	20	18.89
Pre-CAPD	21.85	11.27
Post-CAPD	227.59	129.29

Assessment:

Case1_____

Case2_____

Sample Urinalysis #4

Test Description	Results	Abnormal	Reference Range	Units	Lab
Urinalysis w Micro rflx Cult			Result: 4/22/2016 1:58 AM		Status:
Color	YELLOW		YELLOW		SLN
Appearance	**CLOUDY**	**A**	**CLEAR**		**SLN**
Specific Gravity	1.021		1.005-1.030		SLN
pH	7.5		5.0-8.0		SLN
Glucose	NEG		NEG	mg/dL	SLN
Bilirubin	**SMALL**	**A**	**NEG**		**SLN**
Ketone	NEG		NEG	mg/dL	SLN
Blood	NEG		NEG		SLN
Protein	NEG		NEG	mg/dL	SLN
Urobilinogen	1		0.0-1.0	mg/dL	SLN
Nitrite	NEG		NEG		SLN
Leukocyte Esterase	**SMALL**	**A**	**NEG**		**SLN**
Squamous Epithelial/ HPF	NONE SEEN		RARE		SLN
Crystals	NONE SEEN		NONE SEEN		SLN
Casts	NONE SEEN		NONE SEEN		SLN
WBC	**7-10**	**A**	**<3**	**WBC/hpf**	**SLN**
RBC	0-2		<3	RBC/hpf	SLN
Bacteria/ HPF	**MANY**	**A**	**RARE**		**SLN**

Assessment:_____

Theme: Morphological and functional features of the blood system in children. Semiotics of main Hematological diseases

1. What is function of the blood?
2. What components of the blood do you know?
3. What are hemopoetic (blood-forming) organs?
4. Methods of examination of the blood system and organs of hemopoesis (complaints, anamnesis, palpation, percussion, auscultation).
5. Features in children.
6. Complete blood count and its interpretation.
7. The normal system of hemostasis.
8. Semiotics of basic diseases of the blood system.

Practical part:

1. Gather complaints, and appropriate health history information for a patient with disorders of the blood.
2. Perform physical examination of the skin, lymph nodes, spleen and liver.
3. Describe representative laboratory studies used to assess the blood system and interpret it.

Recommended literature:

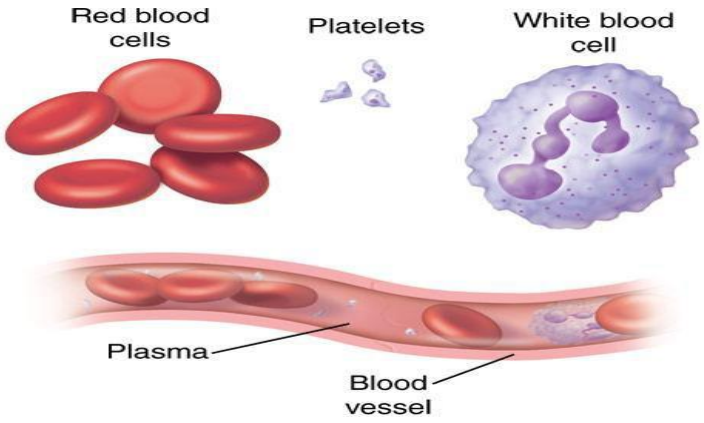
1. Lecture
2. Kapitan T. Propaedeutics of children's diseases and nursing of the child : Textbook for students of higher medical educational institution. Vinnitsa, 2010. P. 247–307.
3. Patients examination and semiotics of pediatric diseases (modul 2) : Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics: підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.
7. Age-related features and pathology of blood in children : manual for students of higher medical educational institutions of the III–IV accreditation levels / V. I. Pokhylko, S. M. Tsvirenko, YU. V. Lysanets ; Ministry of public health of Ukraine, UMSA (Poltava) = Вікові особливості та патологія крові у дітей : навчальний посібник для студентів вищих медичних навчальних закладів III–IV рівнів акредитації / В. І. Похилько, С. М. Цвіренко, Ю. В. Лисанець ; МОЗ України, ЦМК, УМСА. Полтава : Світ книг, 2017. 139 p.

Give the definition:

Blood is_____

Name the main functions of blood:

What components of the blood?



What are the cellular elements?

What is blood plasma? _____

What is hematocrit?

Hematopoiesis is_____

The main stages of embryonic hematopoiesis

I (3–6 wk)_____

II (6 wk – 5 months)_____

III (4–5 months) _____

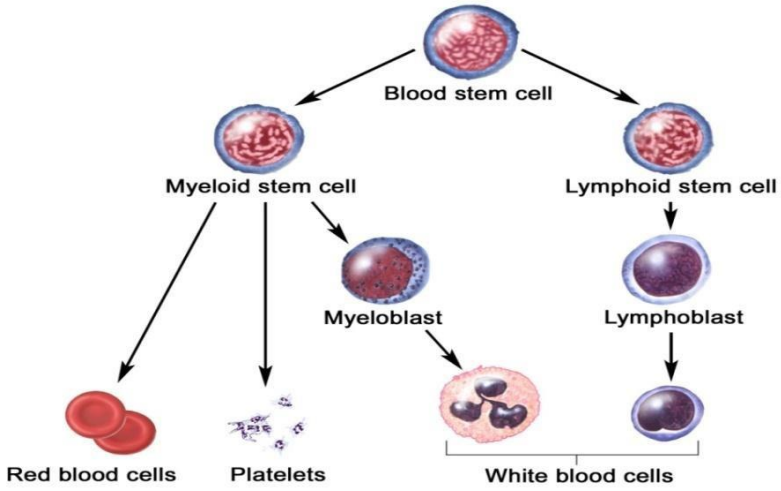
Hematopoiesis after birth

The main source for the formation of all blood cells types are:

newborn _____

4 years _____

12–15 years and adult - _____



Erythrocyte system

Definition:

Erythrocytes (RBC)_____

The main functions of erythrocytes:

What are reticulocytes?

Hemoglobin is_____

Fill the table 1: **Types of normal hemoglobin**

Types of hemoglobin	In which period is found, peculiaries
Hb P	
Hb F	
Hb A	

What is Color index? What is normal value?

What is Erythrocyte sedimentation rate? What is normal value?

What is Osmotic fragility of erythrocytes? What is normal value?

Erythrocyte indices:

MCV (mean corpuscular volume)

MCH (mean corpuscular hemoglobin)

Fill the table 2: **Normal Hematologic Values**

Erythrocytes	
Reticulocytes	
Hemoglobin (Hb)	
Color index	
Hematocrit (Hct)	
Erythrocyte sedimentation rate (E.S.R.)	
MCV	
MCH	
RDW	

Leukocyte system

Definition:

Leukocytes (WBC) _____

_____

_____

What is Leukocytes formula_____

_____

_____

The main functions of WBC:

Granulocytes:

- *Neutrophils*_____
- *Eosinophils*_____
- *Basophils*_____

Agranulocytes:

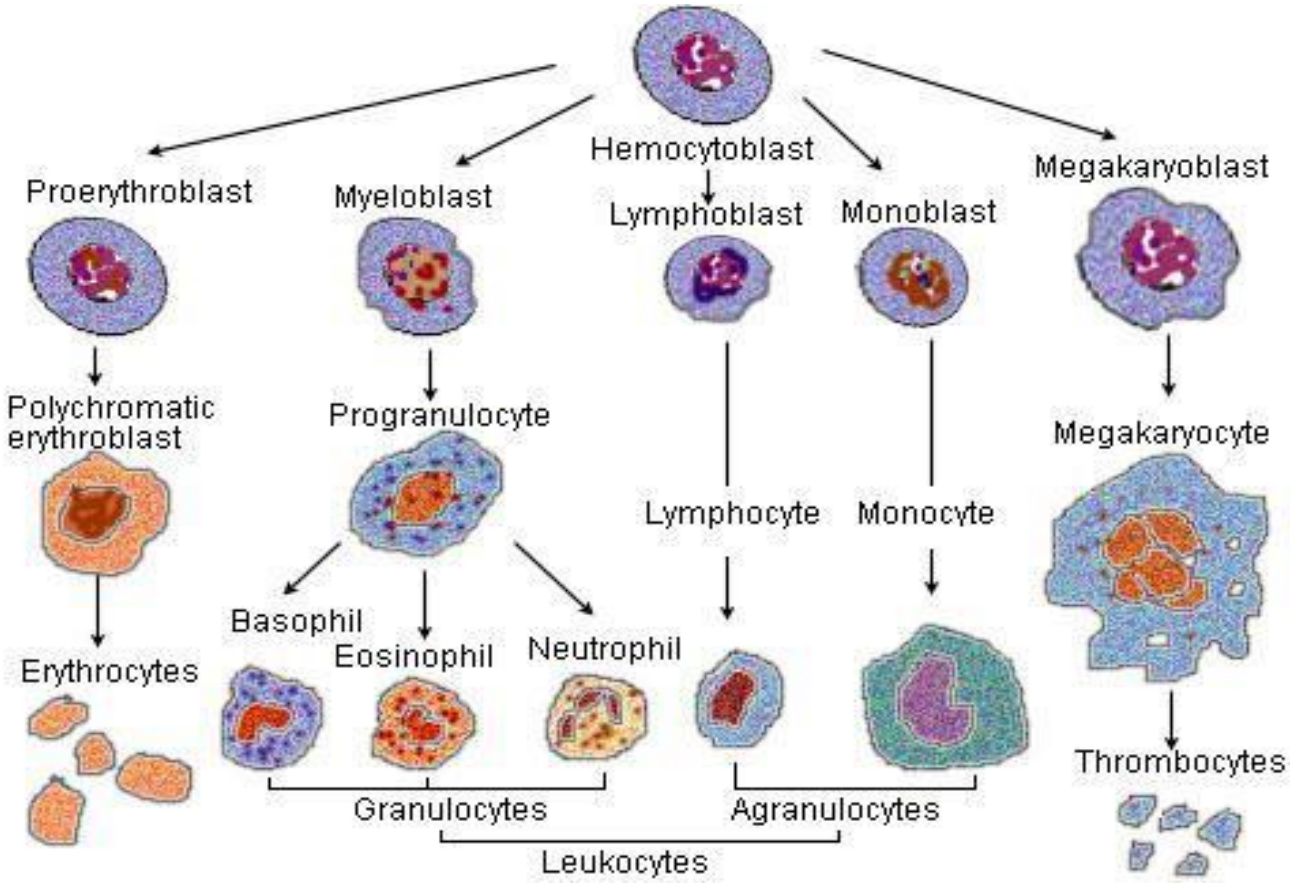
- *Lymphocytes*_____
- *Monocytes*_____

What is Platelets and their functions _____

_____

_____

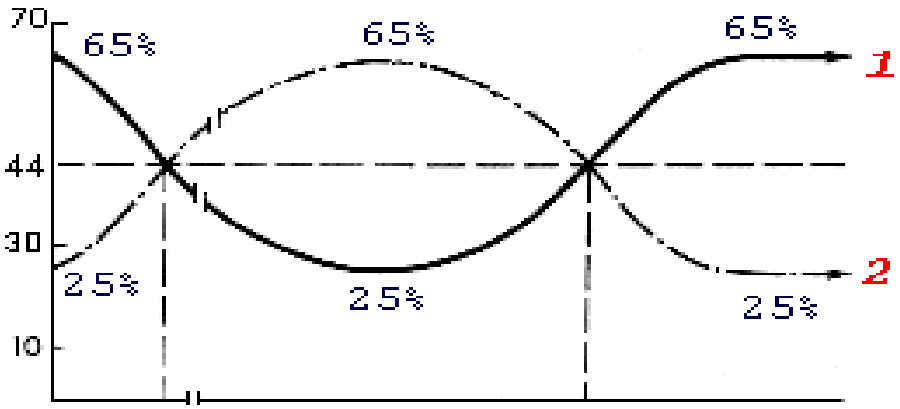
Blood cell lineage



Fill the table 3: **WBC Differential Count**

Age	Leuco-cytes ($\times 10^9$/l)	Baso-philes, %	Eosino-philes, %	Neutrophiles				Lympho-cytes, %	Mono-cytes, %
				myelo-cytes, %	juvenile, %	"bands", %	"segs", %		
3d.									
5d.									
3 yr									
5 yr									
12 yr									

Physiological crosses of WBC



4-5 days **4-5 years**

1. Neutrophils
2. Lymphocytes

Characteristic of peripheral blood of different age children

1. **In newborn:**

2. **In infants:**

3. **Peculiarities of blood in children older 1 year:**

The system of blood coagulation

What is hemostasis?

_____

_____

_____

The process of hemostasis is provided by three main links:

1. _____

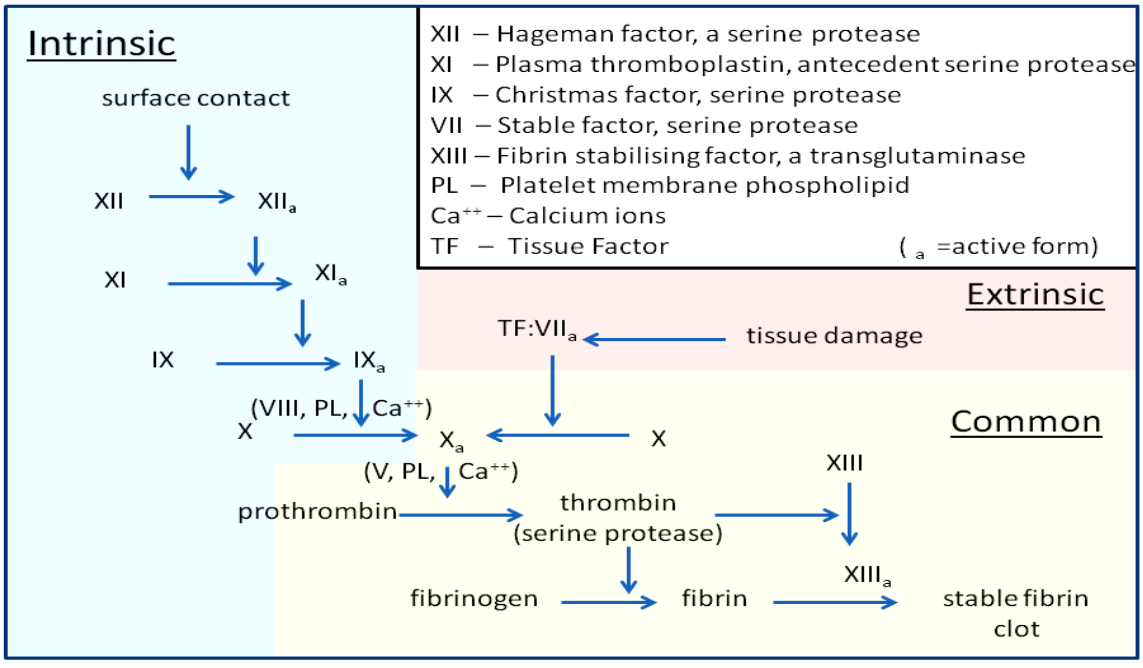
2. _____

3. _____

Fill the table 4: **Blood-clotting factors**

Factor number	Synonyms
I	
II	
III	
IV	
V	
VI	
VII	
VIII	
IX	
X	
XI	
XII	
XII	

The three pathways that makeup the classical blood coagulation pathway



Coagulation tests:

1. Partial thromboplastin time _____
2. Prothrpombin time (PT) _____
3. Thrpombin time _____
4. Concentrationof fibrinogen in plasma _____
5. Bleeding time Lee-White _____
6. Clotting time _____

Semiotics changes of erythrocytes

Definition:

What is erythrocytosis? _____

What is anisocytosis? _____

What is poikilocytosis? _____

What is normohromiya? _____

What is hypochromia? _____

What is hyperchromia? _____

What is polychromatophilia? _____

Fill the table 5: **Changes the content of hemoglobin in the blood (RBC) observed underwhat diseases and conditions**

Reduced values	Increased values

Increased erythrocyte sedimentation rate observed at:

1. _____
2. _____
3. _____
4. _____
5. _____

Semiotics changes of leukocytes

Definition:

What is leukocytosis? _____

_____

What is leukopenia?

_____

_____

Definition:

Leukocyte formula shift to the left

_____

_____

_____

Leukocyte formula shift to the right

_____

_____

_____

Definition:

Lymphocytosis _____

_____

Lymphopenia_____

_____

Monocytosis_____

_____

Monotsitopeniya_____

_____

Basophilia_____

_____

Bazopeniya_____

_____

Eosinophilia_____

_____

Eosinopenia_____

_____

Fill the table 6: **Reasons for changes in the number of certain types of WBC**

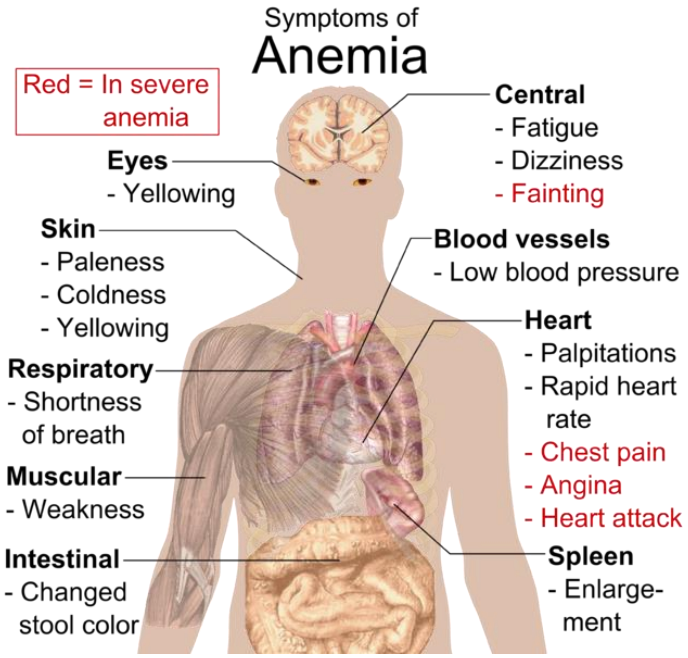
Types of leukocytes	Causes reduction	Reasons for elevation
Eosinophils		
Basophils		
Neutrophils		
Lymphocytes		
Monocytes		

What is the leukemoid reaction?

Semiotics of basic diseases of the blood system

Definition: **Anemic syndrome:**

What are the main symptoms of Anemic syndrome ?



Fill the table 7: **Comparative characteristic of anemias**

Type of anemia	Causes	Clinical manifestations,	Laboratory indicators
Posthemorrhagic			
Iron deficiency			
Hemolytic			
Hypoplastic and aplastic			

Fill the table 8: **Anemia classification based on Hb level:**

Stage of anemia	Name	Hb level	RBC count
I			
II			
III			

Fill the table 9: **Classification based on color index:**

Hypochromic CI < 0,85	Normochromic CI 0,85–1,05	Hyperchromic CI > 1,1

Definition: **Match the definitions in *Column I* with the correct words in *Column II***

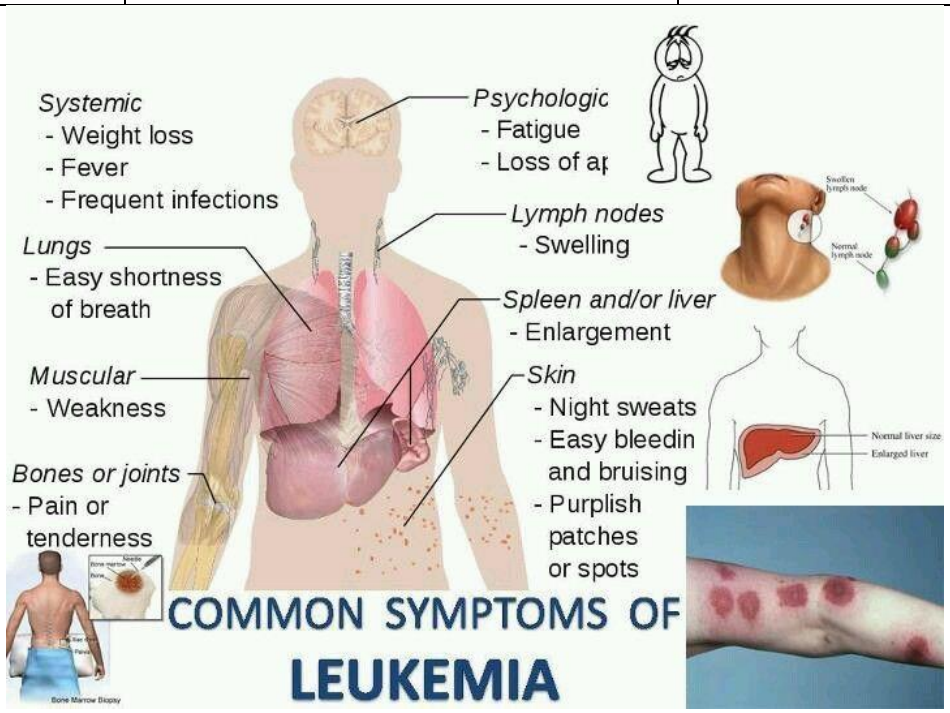
Column I	*Column II*
1. Extreme fatigue, pale skin, weakness, shortness of breath, chest pain, frequent infections, headache, dizziness, inflammation or soreness of your tongue, brittle nails,fast heartbeat, poor appetite	**A.** Iron deficiency anemia
2. Chronic anemia (pallor), mild jaundice, splenomegaly, hepatomegaly. Inflammation or soreness of tongue	**B.** Chronic hemolytic anemia
3. Purpura ("petechiae" and "ecchymoses"), bleeding (bleeding gums, progressive anemia, infections, peripheral blood (pancytopenia), bone marrow (aplasia)	**C.** Aplastic pancytopenia
4. Purpura, bleeding, fatigue, peripheral blood (thrombocytopenia, anemia), blood in urine or stools	**D.** Idiopathic thrombo-cytopenic purpura
5. Unexplained and excessive bleeding from cuts or injuries; many large or deep bruises, pain, swelling or tightness in joints, blood in urine or stool	**E** Hemophilia A
6. Anemia, purpura and bleeding, splenomegaly, hepatomegaly, lymphadenopathy, arthritis and bone pains, prolonged fever, peripheral blood (blast cells)	**F** Acute leukemia

1_____2_____3_____4_____5_____6_____

Definition: **Hemorrhagic syndrome**

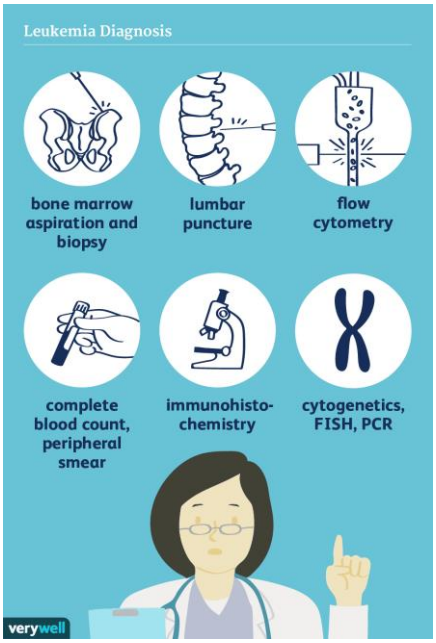
Fill the table 10: **Types of hemorrhagic syndrome**

Type of bleeding	Characteristics	Diseases with such type
With hematomas formation		
Petechial-spotted		
Mixed		
Vasculitis purple		
Angiomatous		



CLASSIFICATION OF LEUKEMIAS

	Acute	Chronic
Myeloid origin	Acute Myeloid Leukemia (AML)	Chronic Myeloid Leukemia (CML)
Lymphoid origin	Acute Lymphoblastic Leukemia (ALL)	Chronic Lymphocytic Leukemia (CLL)



Note laboratory findings, typical for Leukemia

RBC_____

WBC_____

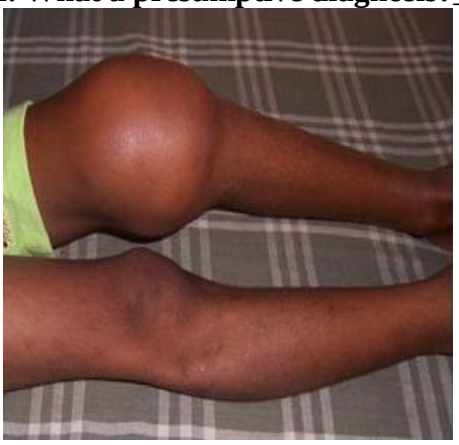
Platelets _____

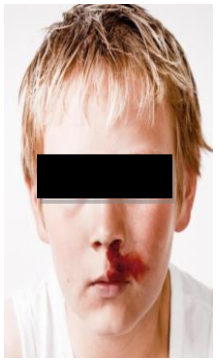
ESR _____

Other_____

Practical Skills

Case 1. What a presumptive diagnosis?_____





Describe the main signs of the disease

_____

Laboratory tests to confirm the diagnosis

_____

Hematology Laboratory

Patient's name……

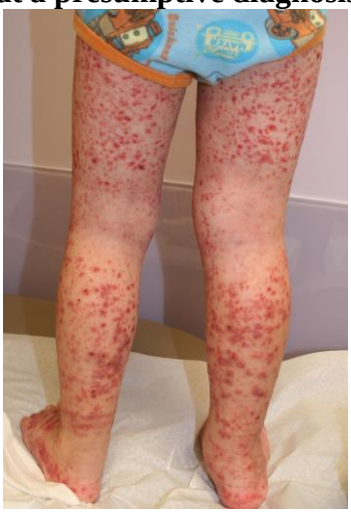
Age……..

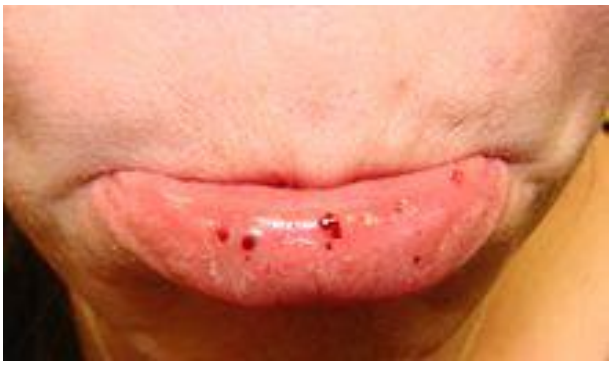
CBC

RBC × 10^{12}/L…….	NEUTRO…. %
Hb g/L……..……....	bands …….. %
Hct……..	segs ……. %
MCV (fl)……...……	LYMPHO….. %
WBC × 10^{9}/L …….....	MONO…….. %
Platelets × 10^{9}/L…….....	EOSINO…….%
ESR (mm/hr)…….....	BASO……%

Conclusion_____

Case 2. What a presumptive diagnosis?





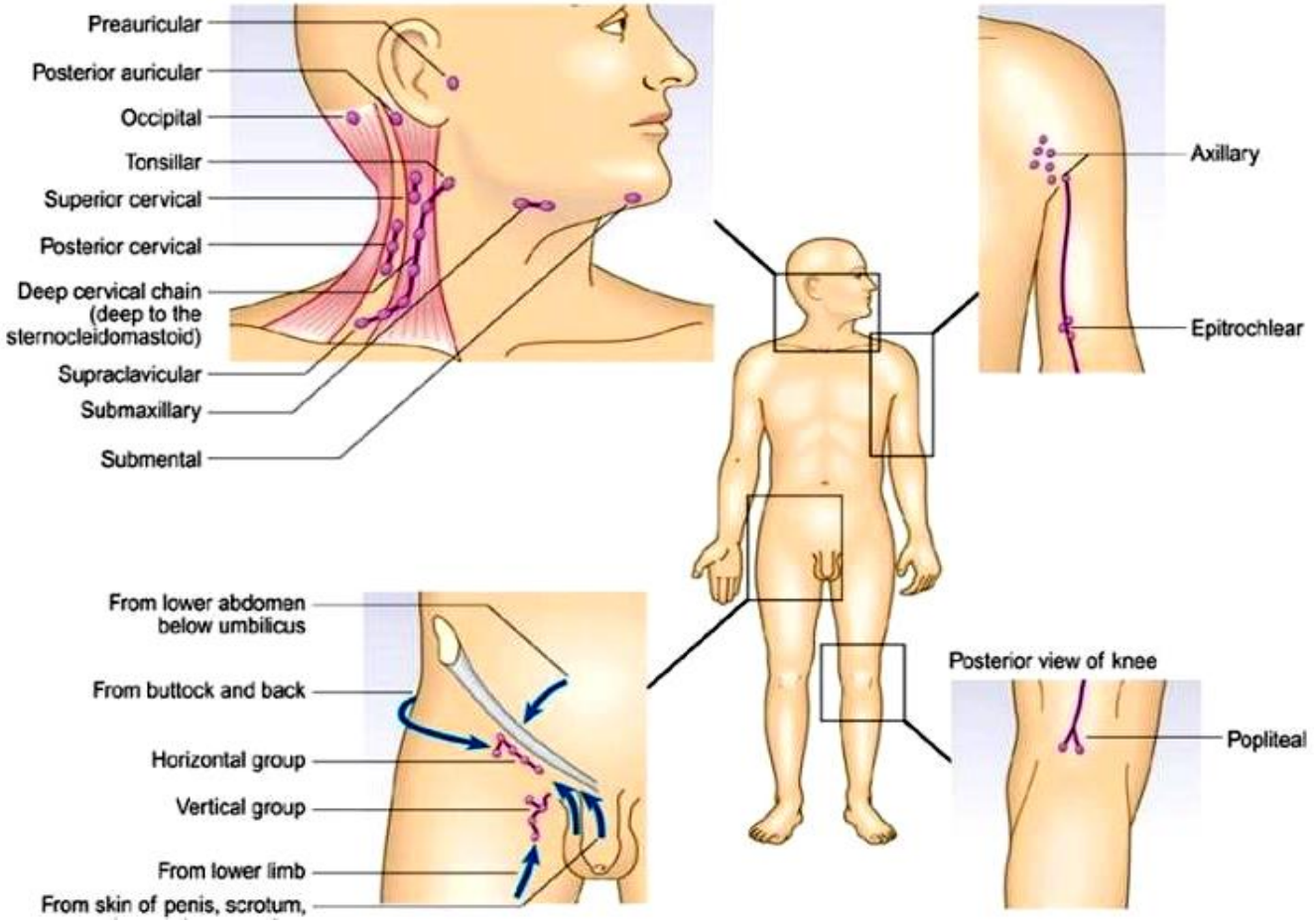
Describe the main signs of the disease

Laboratory tests to confirm the diagnosis

Patient's Name	
Age	
Sex	
Date	
Hemoglobin (Hb) (120–180 g/L)	
Hematocrit (Hct) (40–54 %)	
Mean Cell Vol(MCV) (78–98 fl)	
RBC ($3.5–5.5 \times 10^{12}$/l)	
Platelet Count ($150–400 \times 10^{9}$/l)	
Total WBC ($4–11 \times 10^{9}$/l)	
Differential WBC (%)	
Neutrophils: Bands	
Segs	
Lymphocytes	
Monocytes	
Eosinophils	
Basophils	
Myelocytes	
Promyelocytes	
Blast Cells	
E.S.R. (1×10 mm/hr)	
Reticulocytes ($10–100 \times 10^{9}$/l or 0.1–1 %)	
Blood film comment/Results:	

Conclusion:

Describe the palpation of the lymph nodes (localization and their size in cm, their consistence, tenderness, mobility, connection with underlying tissues and skin)



Theme: Morphological and functional features of the immune system in children. Semiotics of immunodeficiencies

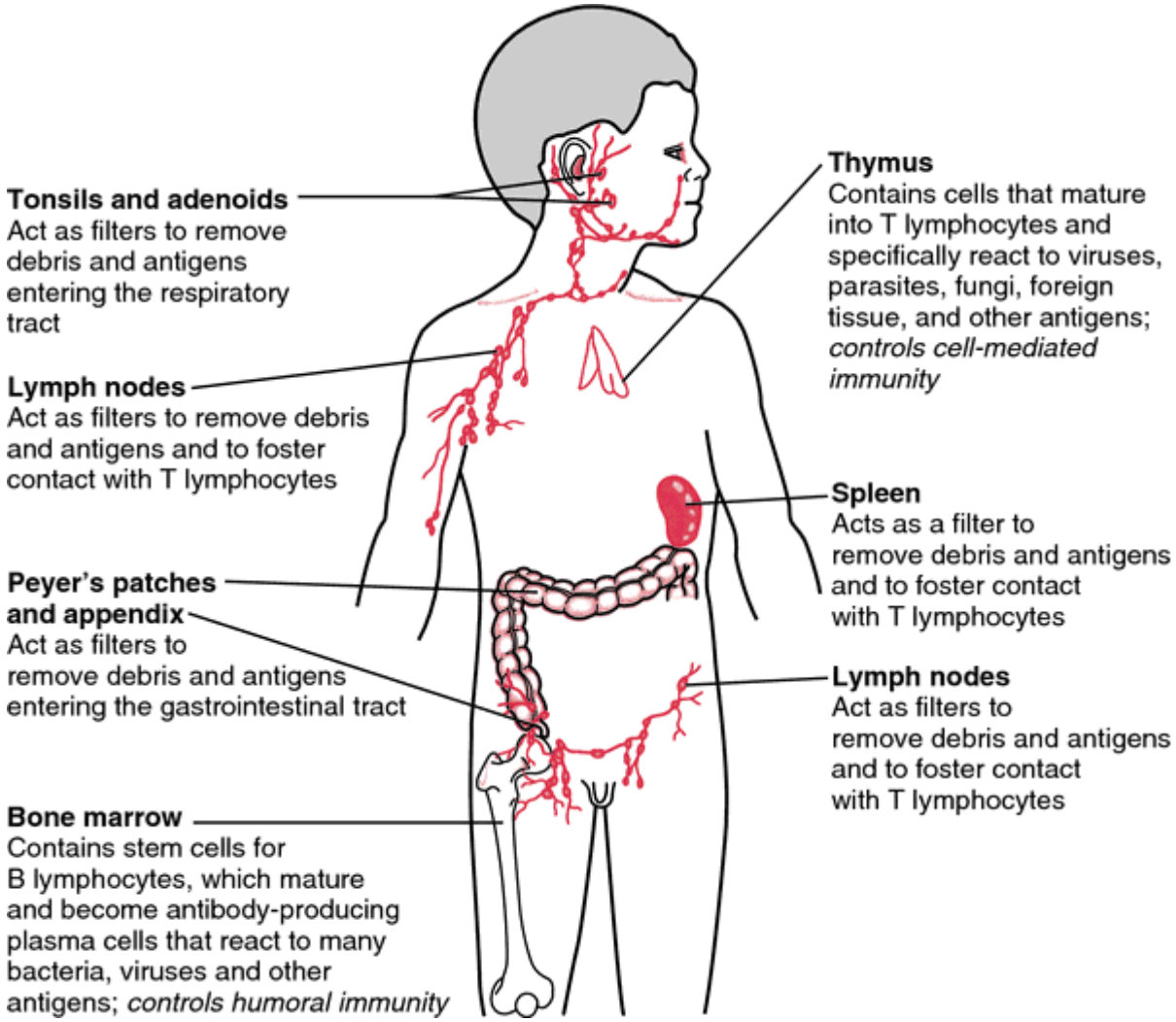
1. What is function of the immune system?
2. What organs of immune system do you know?
3. Cells of immune system.
4. Immune system features in children.
5. Characteristics of the types of immunity.
6. Methods of examination of the immune system (clinical and paraclinical).
7. Laboratory evaluation of the immunity.
2. The basic group of diseases with pathology of immune system and their characteristics.

Practical part:

1. Gather complaints, and appropriate health history information for a patient with disorders of the immune system.
2. Perform physical examination of the skin, lymph nodes, spleen and liver.
3. Describe representative laboratory studies used to assess the immune system and interpret it.

Recommended literature:

1. Lecture
2. T. Kapitan. Propaedeutics of children's diseases and nursing of the child: Textbook for students of higher medical educational institution. – Vinnitsa.-2010. P.247-307.
3. Patients examination and semiotics of pediatric diseases (modul 2): Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination : навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics: підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.
7. National Institute of Allergy and Infectious Diseases ,National Cancer Institute, NIH Publication No. 03-5423 September 2003 www.niaid.nih.gov www.nci.nih.gov



Central organs of immune system are

1._____

2._____

Peripheral organs of immune system are

1._____

2._____

3._____

4._____

The main function of immune system is_____

_____

_____

_____

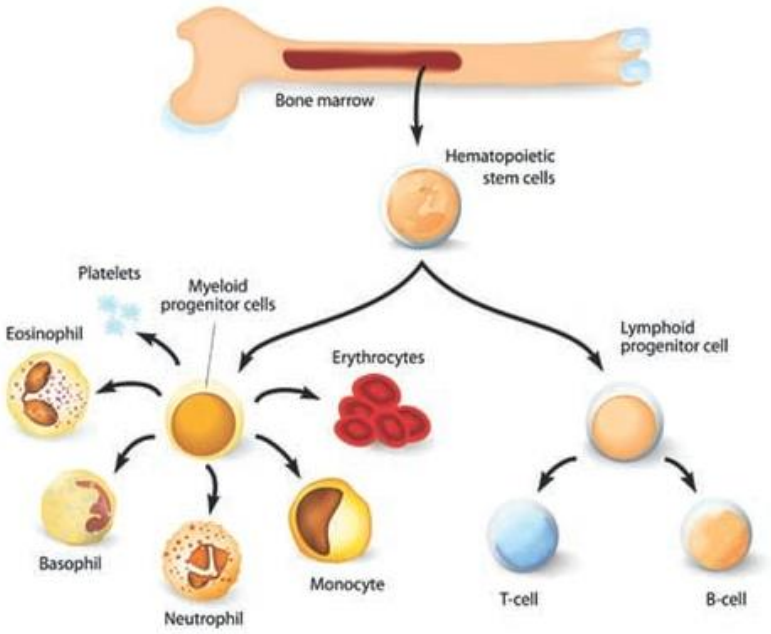
Bone marrow, the soft tissue in the hollow center of bones, is the ultimate source of all blood cells, including white blood cells destined to become immune cells.

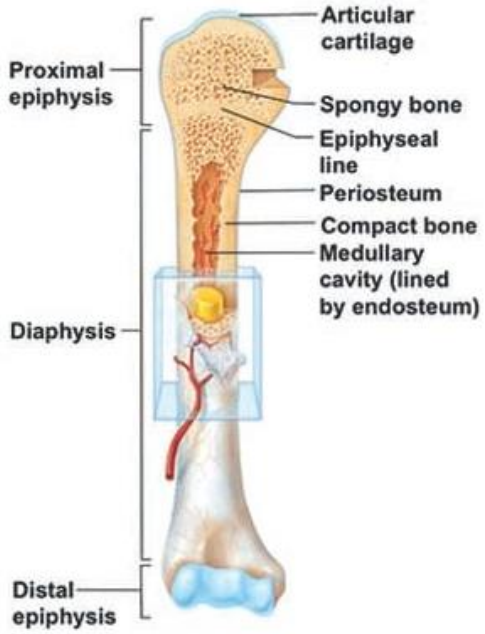
Red bone marrow

- Produces RBC, WBC, platelets = _____
- Consist of blood cells, adipocytes, fibroblasts, macrophages
- Developing boned of fetus : pelvis, ribs, sternum, vertebrae, skull, ends of some long bones

Yellow bone marrow

- _____storage in fat cells
- Few blood cells
- With high age much red turns to yellow
-

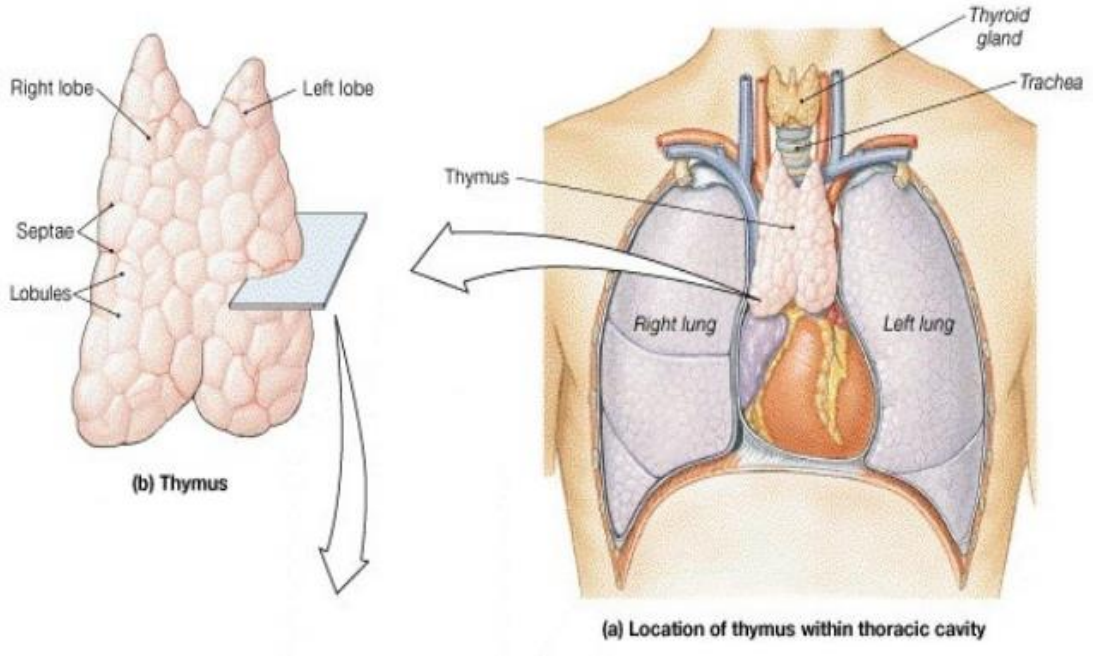




The thymus is an organ that lies behind the breastbone; lymphocytes known as T lymphocytes, or just "T cells," mature in the thymus.

Peculiarities of thymus function depends on age

- Thymus is pawned on gestation term near _____ week
- Lymphocytes appear in thymus from _____weeks. They are the first from a liver and after – from a _____
- Thymus is rather mature organ after birth
- Maturation continues till _____ years
- After 15 years function of thymus decreases – it's called _____.

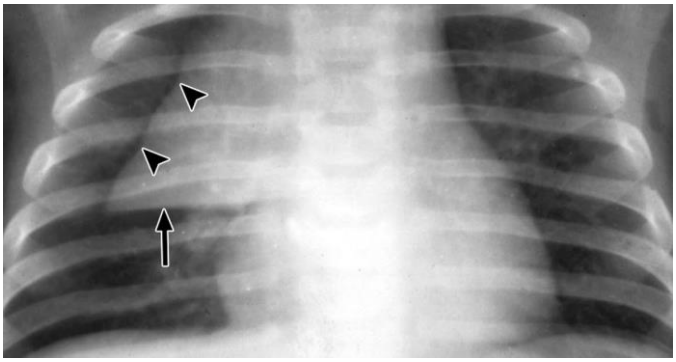


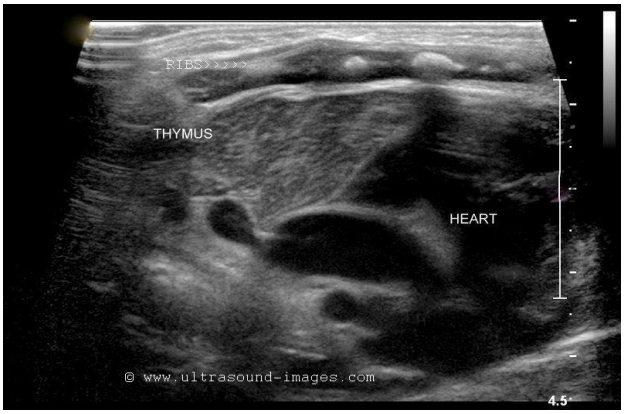
- **Thymomegalia is**_____

If involution takes place early due to action of pathological factors _____ _____ (give examples of factors) it's called accidental (convertible) involution.

Name methods of visualization of the thymus:

The thymus

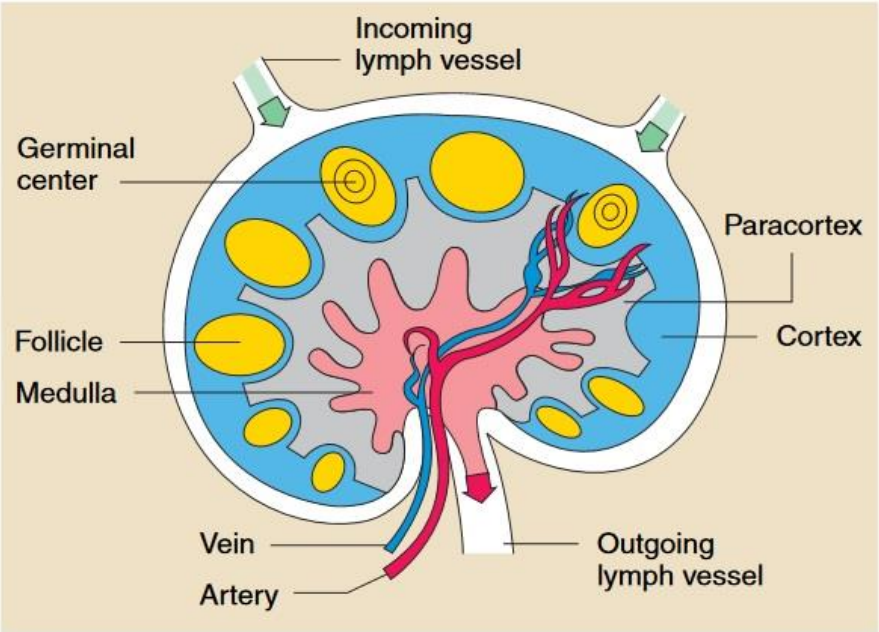




_____ _____

Thymomegalia and earlier involution both are dangerous due to formation_____

Small, bean-shaped **lymph nodes** are laced along the lymphatic vessels, with clusters in the neck, armpits, abdomen, and groin. Each lymph node contains specialized compartments where immune cells congregate, and where they can encounter antigens.



The lymph node contains numerous specialized structures. T cells concentrate in the paracortex, B cells in and around the germinal centers, and plasma cells in the medulla.

Immune cells and foreign particles enter the lymph nodes via incoming lymphatic vessels or the lymph nodes' tiny blood vessels. All lymphocytes exit lymph nodes through outgoing lymphatic vessels. Once in the bloodstream, they are transported to tissues throughout the body. They patrol everywhere for foreign antigens, then gradually drift back into the lymphatic system, to begin the cycle all over again.

Lymph nodes are formed from 12 weeks of gestation, but lymphoid elements appear after 16 weeks .

Functions

- _____
- _____
- _____

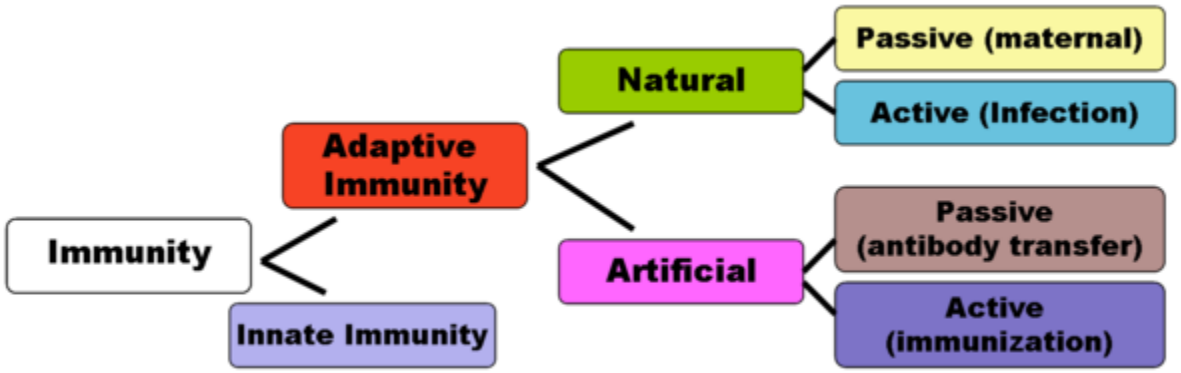
The spleen is a flattened organ at the upper left of the abdomen. Like the lymph nodes, the spleen contains specialized compartments where immune cells gather and work, and serves as a meeting ground where immune defenses confront antigens.

A spleen is formed on 5th week of intrauterus development, but finished maturation in some years after birth.

The function of spleen in immunity likes lymph node:

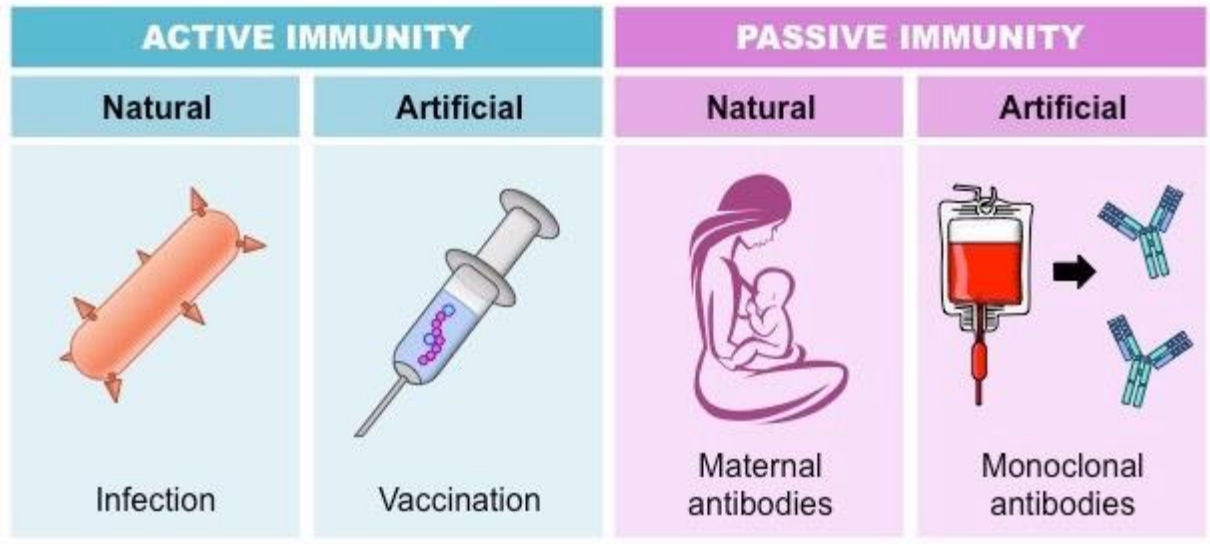
- _____
- _____
- _____

Clumps of lymphoid tissue are found in many parts of the body, especially in the linings of the digestive tract and the airways and lungs—territories that serve as gateways to the body. These tissues include the ***tonsils, adenoids,*** and ***appendix***.



The innate immunity formed earlier in ontogenesis and provides the function of protection before final maturing more perfect mechanisms, that is why it has great value for _____and children of _____ age.

The adaptive (acquired, specific) immunity characterized by _____ responses to a foreign antigen or pathogen.



Physical and Chemical Barriers

Before any immune factors are triggered, the skin functions as a continuous, impassable barrier to potentially infectious pathogens. Pathogens are killed or inactivated on the skin by desiccation (drying out) and by the skin's acidity. In addition, beneficial microorganisms that coexist on the skin compete with invading pathogens, preventing infection. Regions of the body that are not protected by

skin (such as the eyes and mucus membranes) have alternative methods of defense, such as tears and mucus secretions that trap and rinse away pathogens, and cilia in the nasal passages and respiratory tract that push the mucus with the pathogens out of the body. Throughout the body are other defenses, such as the low pH of the stomach (which inhibits the growth of pathogens), blood proteins that bind and disrupt bacterial cell membranes, and the process of urination (which flushes pathogens from the urinary tract).

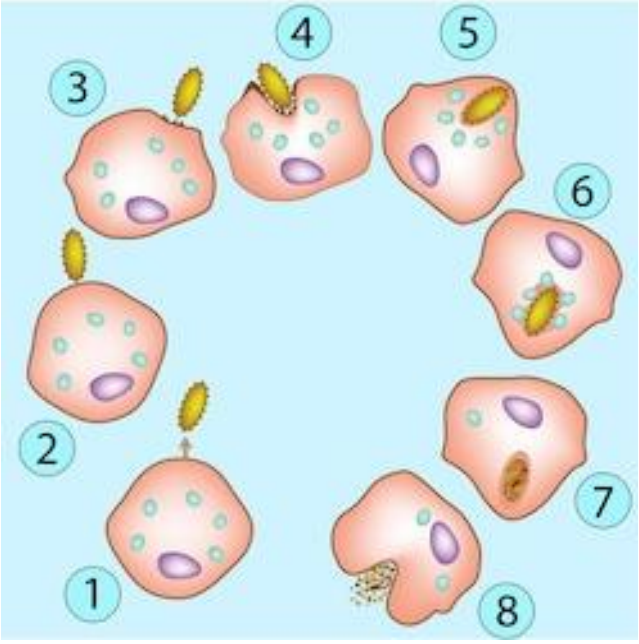
Despite these barriers, pathogens may enter the body through skin abrasions or punctures, or by collecting on mucosal surfaces in large numbers that overcome the mucus or cilia. Some pathogens have evolved specific mechanisms that allow them to overcome physical and chemical barriers. When pathogens do enter the body, the innate immune system responds with inflammation, pathogen engulfment, and secretion of immune factors and proteins.

Phagocytes and Their Relatives

Phagocytes are large white cells that can swallow and digest microbes and other foreign particles. ***Monocytes*** are phagocytes that circulate in the blood. When monocytes migrate into tissues, they develop into ***macrophages***. Specialized types of macrophages can be found in many organs, including lungs, kidneys, brain, and liver. All phagocytes may be divided into two groups: macrophages (monocytes, NK) and microghages (neutrophils).

Macrophages play many roles. As scavengers, they rid the body of worn-out cells and other debris. They display bits of foreign antigen in a way that draws the attention of matching lymphocytes. And they churn out an amazing variety of powerful chemical signals, known as *monokines*, which are vital to the immune responses.

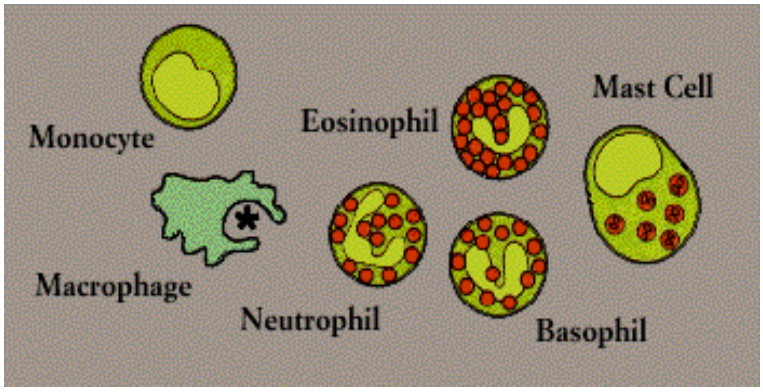
Name stages of phagocytosis and note their features (development) in children



1_____
_____
2_____
_____
3_____
_____
4_____
_____
5_____
_____
6_____
_____
7_____
_____
8_____
_____

Granulocytes are another kind of immune cell. They contain granules filled with potent chemicals, which allow the granulocytes to destroy *microorganisms*. Some of these chemicals, such as histamine, also contribute to inflammation and allergy.

The ***mast cell*** is a twin of the basophil, except that it is not a blood cell. Rather, it is found in the lungs, skin, tongue, and linings of the nose and intestinal tract, where it is responsible for the symptoms of allergy.



One type of granulocyte, the *neutrophil*, is also a phagocyte; it uses its prepackaged chemicals to break down the microbes it ingests.

Eosinophils and ***basophils*** are granulocytes that "degranulate," spraying their chemicals onto harmful cells or microbes nearby.

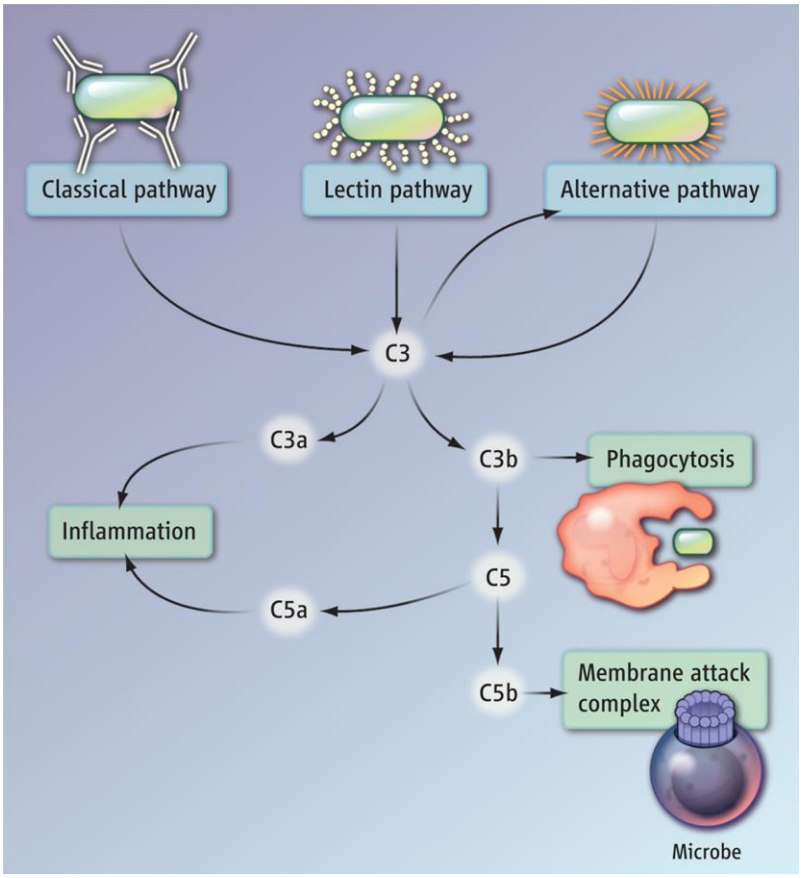
A related structure, the blood *platelet*, is a cell fragment. Platelets, too, contain granules. In addition to promoting blood clotting and wound repair, platelets activate some of the immune defenses.

Complement

The *complement* system is made up of about 25 proteins that work together to "complement" the action of antibodies in destroying bacteria. Complement also helps to rid the body of antibody-coated antigens (antigen-antibody complexes). Complement proteins, which cause blood vessels to become dilated and then leaky, contribute to the redness, warmth, swelling, pain, and loss of function that characterize an *inflammatory response*.

Complement proteins circulate in the blood in an inactive form. When the first protein in the complement series is activated— typically by antibody that has locked onto an antigen—it sets in motion a domino effect. Each component takes its turn in a precise chain of steps known as the *complement cascade*. The end product is a cylinder inserted into—and puncturing a hole in—the cell's wall. With fluids and molecules flowing in and out, the cell swells and bursts. Other components of the complement system make bacteria more susceptible to *phagocytosis* or beckon other cells to the area.

Complement system activation



Complement system functions

- ❖ cell lysis
- ❖ mastcells degranulation
- ❖ chemoattractant for neutrophils and monocytes-macro phages

The complement system peculiarities in children

The activity of this system is _____ in newborn, but_____ _____.

The level of **properdini** (a protein for activation of alternative way of complement system) is _____ at once after birth, but it _____ very fast during the first week and its level is _____ during all periods of childhood.

Lysozyme - enzyme (is presented in blood serum, mucous secretion, leucocytes) possessing function of lysis (first of all Gram-positive microflora). Its amount is _____ in newborn.

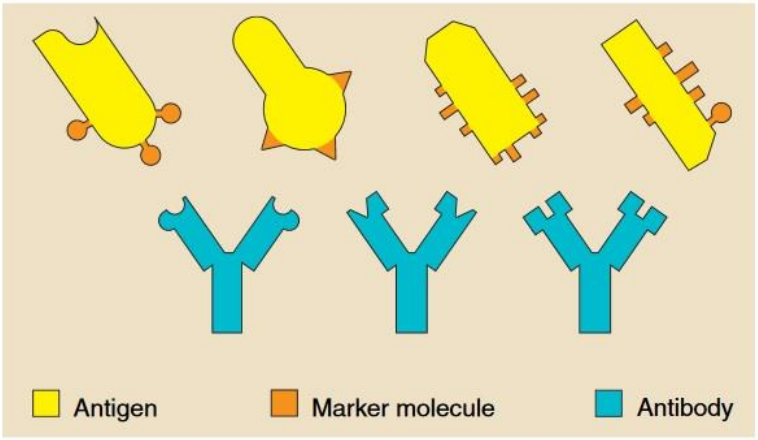
An interferon (IFN) is produced in response to _____ infections.

IFN in turn activates NK cells to kill _____(a kind of infection) infected cells and activates monocytes-macrophages to recruit antigen-specific T and B cells to respond.

Peculiarities of INF in children (True – False, correct if false):

1. High ability to synthesize INF in newborns_____
2. This ability is increasing till 1 year _____
3. After 1 year it is decreasing and reaches a maximum level till 12–18 year _____ _____
4. IFN is produced in response to viral infections _____
5. In response to INF some cells produce large amount of an enzyme known as protein kinase _____

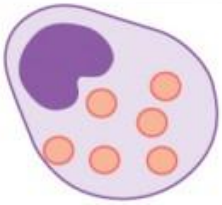
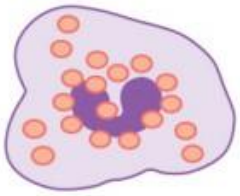
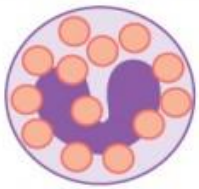
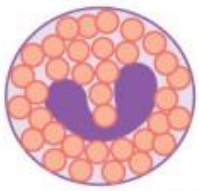
The key to a healthy immune system is its remarkable ability to distinguish between the body's own cells—self—and foreign cells—nonself. The body's immune defenses normally coexist peacefully with cells that carry distinctive "self" marker molecules. But when immune defenders encounter cells or organisms carrying anything that can trigger this immune response is called an antigen. An antigen can be a _____.



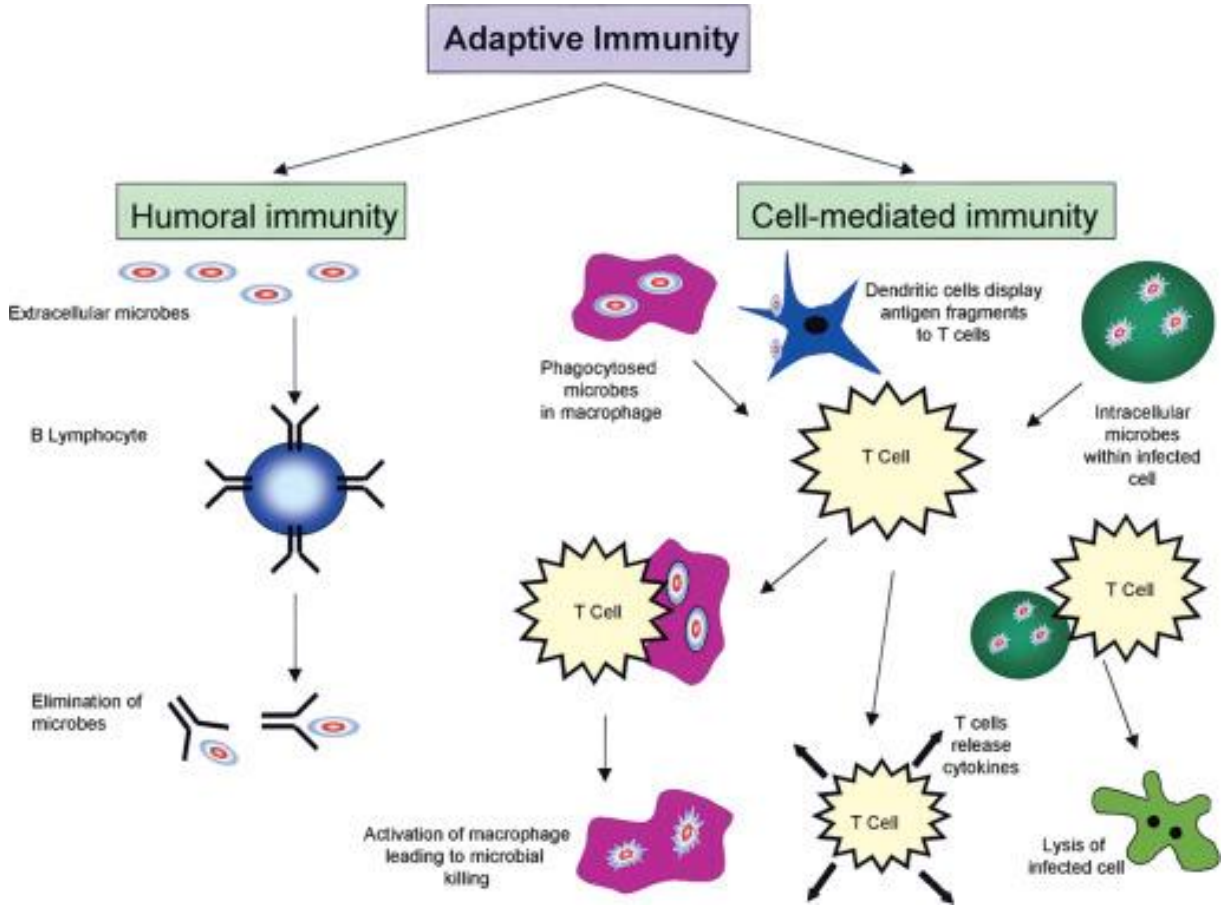
Antigens carry marker molecules that identify them as foreign.

In abnormal situations, the immune system can mistake self for nonself and launch an attack against the body's **own cells or tissues**. The result is called an _____disease. Some forms of _____diseases (give examples). In other cases, the immune system responds to a seemingly harmless foreign substance such as ragweed pollen. The result is_____, and this kind of antigen is called an_____.

Complete the table

Cell type	Characteristics	Location	Image
Mast cell	Dilates blood vessels and induces inflammation through release of histamines and heparin. Recruits macrophages and neutrophils. Involved in wound healing and defense against pathogens but can also be responsible for allergic reactions.	Connective tissues, mucous membranes	
Macrophage			
Natural killer cell	Kills tumor cells and virus-infected cells.	Circulates in blood and migrates into tissues.	
Dendritic cell	Presents antigens on its surface, thereby triggering adaptive immunity.	Present in epithelial tissue, including skin, lung and tissues of the digestive tract. Migrates to lymph nodes upon activation.	
Monocyte			
Neutrophil			
Basophil			
Eosinophil			

All immune cells begin as immature *stem cells* in the _____. They respond to different *cytokines* and other signals to grow into specific immune cell types, such as **T cells**, ***B cells***, or **phagocytes**.



The adaptive immune system characterized by antigen-specific responses to an antigen, generally takes several days or longer to materialize, compared to innate immunity which occurs immediately

A key feature of adaptive immunity is memory for the antigen such that subsequent antigen exposures lead to more rapid and often more vigorous immune responses.

T Cells

The pool of effector T cells is established in the thymus early in life and is maintained throughout life both by new T cell production in the thymus and by antigen-driven expansion of virgin peripheral T cells into "memory" T cells that reside in peripheral lymphoid organs.Unlike B cells, T cells do not recognize free-floating antigens. Rather, their surfaces contain specialized antibody-like receptors that see fragments of antigens on the surfaces of infected or cancerous cells. T cells contribute to immune defenses in two major ways: some direct and regulate immune responses; others directly attack infected or cancerous cells.

Mature T lymphocytes constitute 70 to 80% of normal peripheral blood lymphocytes.

Helper T cells, or *Th cells*, coordinate immune responses by communicating with other cells. Some stimulate nearby B cells to produce antibody, others call in microbe-gobbling cells called phagocytes, still others activate other T cells.

Killer T cells — also called _____ *T lymphocytes* or *CTLs* — perform a different function. These cells directly attack other cells carrying certain foreign or abnormal molecules on their surfaces. CTLs are especially useful for attacking viruses because viruses often hide from other parts of the immune system while they grow inside infected cells. CTLs recognize small fragments of these viruses peeking out from the cell membrane and launch an attack to kill the cell.

In most cases, T cells only recognize an antigen if it is carried on the surface of a cell by one of the body's own *MHC*, or *major histocompatibility complex*, molecules. MHC molecules are proteins recognized by T cells when distinguishing between self and nonself. A self MHC molecule provides a recognizable scaffolding to present a foreign antigen to the T cell.

Natural killer (NK) cells are another kind of lethal white cell, or lymphocyte. Like killer T cells, NK cells are armed with *granules* filled with potent chemicals. But while killer T cells look for antigen fragments bound to self-MHC molecules, NK cells recognize cells lacking self-MHC molecules. Thus NK cells have the potential to attack many types of foreign cells.

Cytokines

Components of the immune system communicate with one another by exchanging chemical messengers called cytokines. These proteins are secreted by cells and act on other cells to coordinate an appropriate immune response. Cytokines include a diverse assortment of ***interleukins, interferons***, and ***growth factors***. Some cytokines are chemical switches that turn certain immune cell types on and off.

One cytokine, **interleukin** _____ (IL-_____), triggers the immune system to produce T cells.

Other cytokines chemically attract specific cell types. These so-called ***chemokines*** are released by cells at a site of injury or infection and call other immune cells to the region to help repair the damage or fight off the invader. Chemokines often play a key role in inflammation.

Note other interleukins and their role in the immune response:

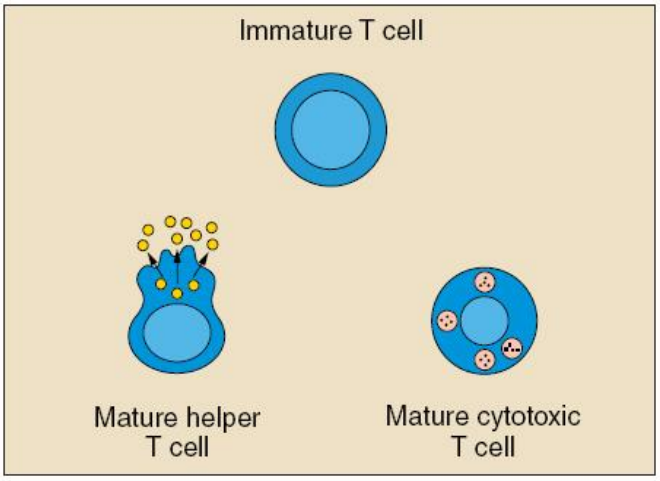
_____

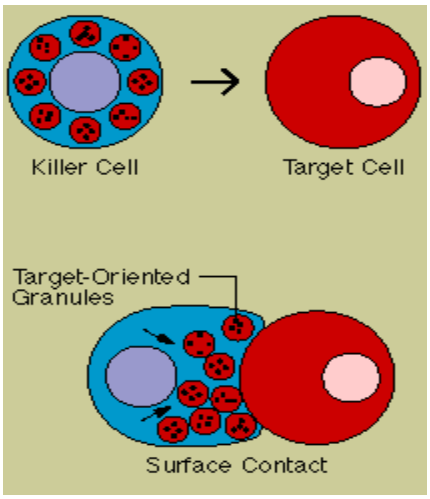
_____

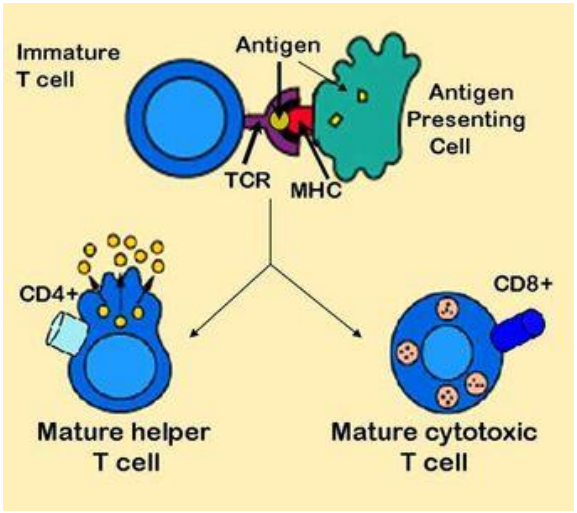
_____

_____

_____







Surface markers of T cells are

_____

_____

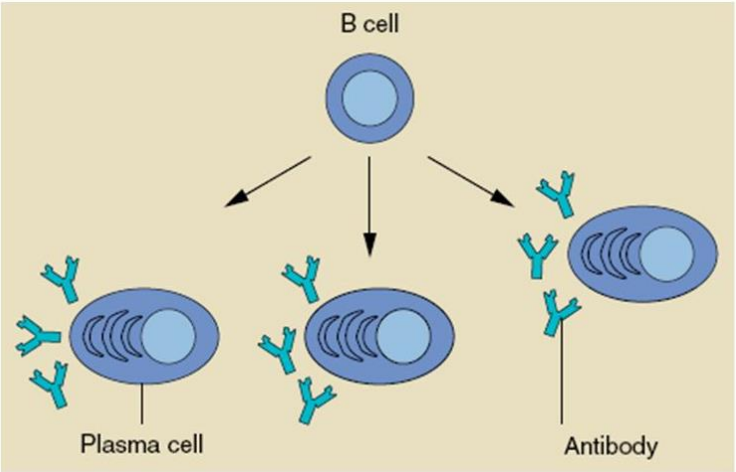
_____

B Lymphocytes

Mature B cells comprise 10 to 15 % of human peripheral blood lymphocytes.

B cells work chiefly by secreting substances called _____ into the body's fluids.

B cells mature into plasma cells that produce antibodies.



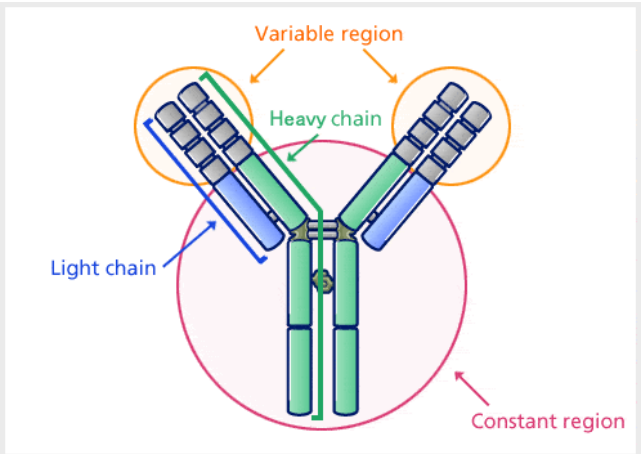
Antibodies ambush antigens circulating the bloodstream. They are powerless, however, to penetrate cells. The job of attacking target cells—either cells that have been infected by viruses or cells that have been distorted by cancer—is left to T cells or other immune cells

Each B cell is programmed to make one specific antibody. For example, one B cell will make an antibody that blocks a virus that causes the common cold, while another produces an antibody that attacks a bacterium that causes pneumonia. When a B cell encounters its triggering antigen, it gives rise to many large cells known as ***plasma cells***. Every plasma cell is essentially a factory for producing an antibody. Each of the plasma cells descended from a given B cell manufactures millions of identical antibody molecules and pours them into the bloodstream.

An antigen matches an antibody much as a key matches a lock. Some match exactly; others fit more like a skeleton key. But whenever antigen and antibody interlock, the antibody marks the antigen for destruction.

Markers B cells - CD19, CD20, CD21, activation markers B cells – CD80.

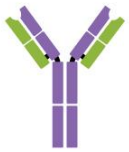
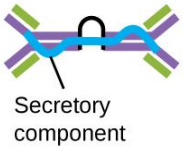
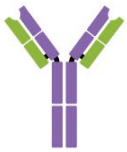
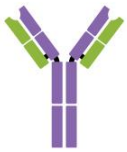
Antibodies belong to a family of large molecules known as ***immunoglobulins*.** Different types play different roles in the immune defense strategy.

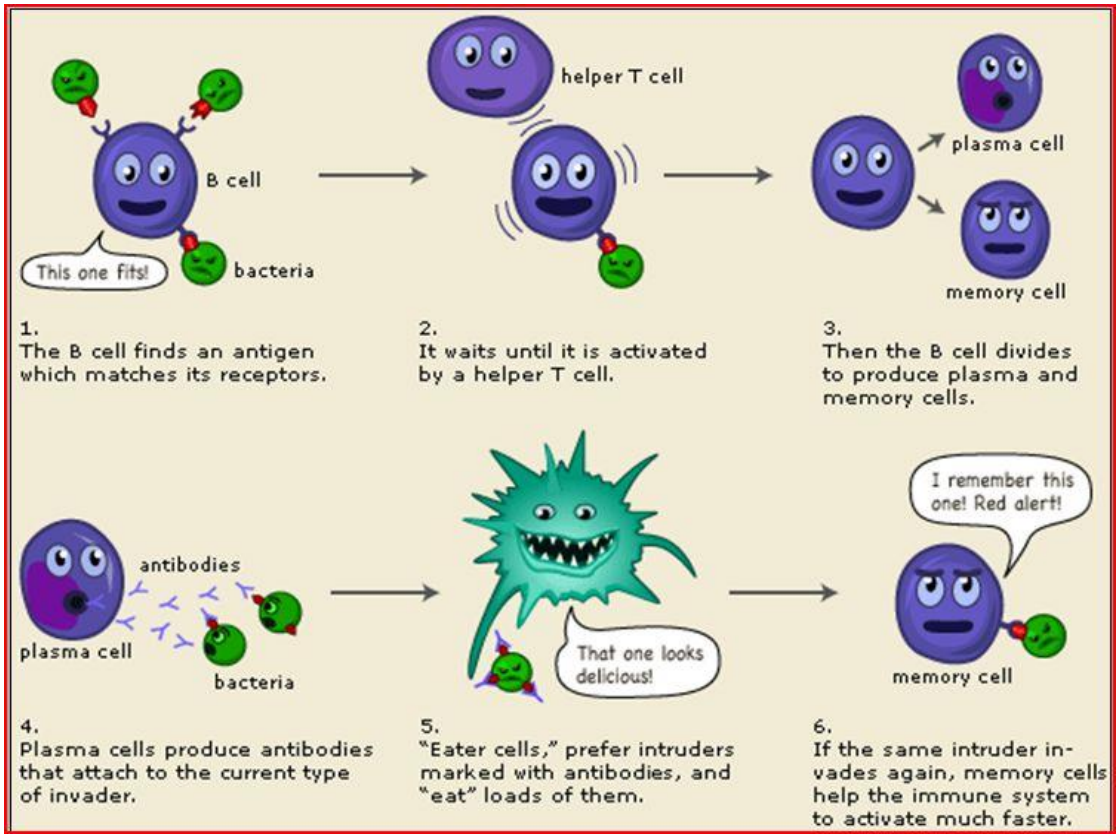


All immunoglobulins have the basic structure of two heavy and two light chains.

Immunoglobulin isotype (i.e., G, M, A, D, E) is determined by the type of Ig heavy chain present.

Identify IgA, IgD, IgE, IgG, IgM

The Five Immunoglobulin (Ig) Classes					
Structure					
Heavy chains	γ	μ	α	δ	ε
Number of antigen-binding sites	2	10	4	2	2
Molecular weight (Daltons)	150,000	900,000	385,000	180,000	200,000
Percentage of total antibody in serum	80%	6%	13% (monomer)	<1%	<1%
Crosses placenta	yes	no	no	no	no
Fixes complement	yes	yes	no	no	no
Fc binds to	phagocytes				mast cells and basophils
Function	Neutralization, agglutination, complement activation, opsonization, and antibody-dependent cell-mediated cyotoxicity.	Neutralization, agglutination, and complement activation. The monomer form serves as the B-cell receptor.	Neutralization and trapping of pathogens in mucus.	B-cell receptor.	Activation of basophils and mast cells against parasites and allergens.



Clinical methods examination of immune system

Fill the table

Method	What data can be received
Interrogation	
Observation	
Palpation	
Percussion	
Auscultation	

Paraclinical methods examination of immune system

Laboratory	Instrumental

Disorders of the Immune System

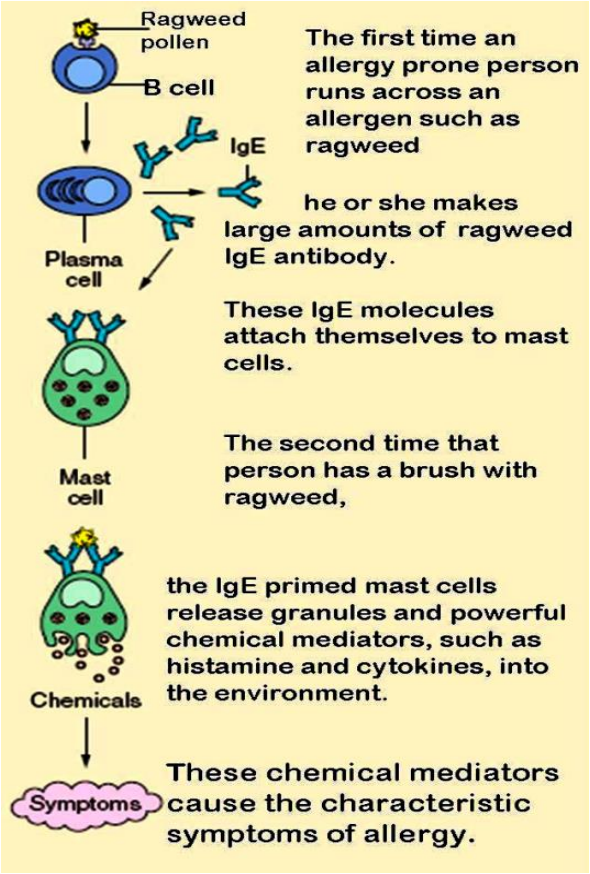
The basic group of diseases with pathology of immune system

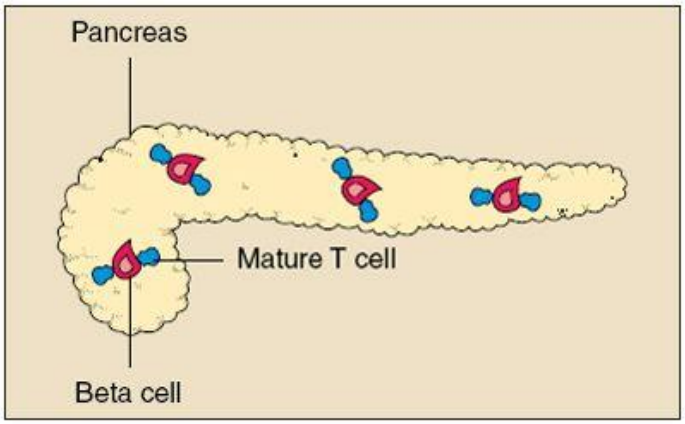
- Primary and Secondary Immunodeficiency
- Infection of the immune system (infection mononucleosis, AIDS)
- Malignant diseases of immune system (lymphosacroma, lyphogranulomatosis, lymphoma)
- Disease with autoimmune genesis, allergic diseases

Allergic Diseases

The most common types of allergic diseases occur when the immune system responds to a false alarm. In an allergic person, a normally harmless material such as grass pollen or house dust is mistaken for a threat and attacked.

Allergies are related to the antibody known as IgE. Like other antibodies, each IgE antibody is specific against specific allergen.





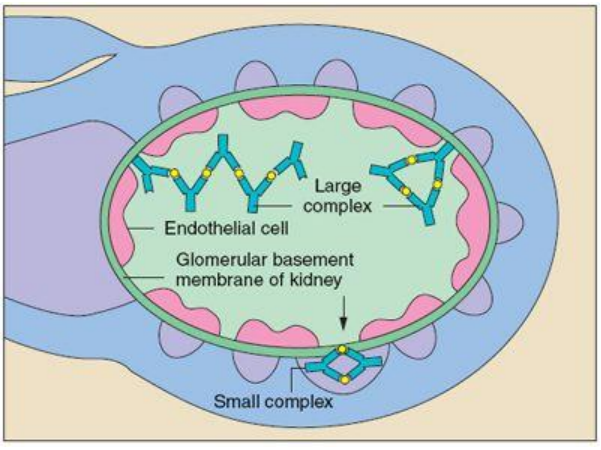
Autoimmune Diseases

Sometimes the immune system's recognition apparatus breaks down, and the body begins to manufacture T cells and antibodies directed against its own cells and organs. Misguided T cells and *autoantibodies*, as they are known, contribute to many diseases. For instance, T cells that attack pancreas cells contribute to diabetes, while an autoantibody known as rheumatoid factor is common in people with rheumatoid arthritis.

Immune Complex Diseases

Immune complexes are clusters of interlocking antigens and antibodies. Normally, immune complexes are rapidly removed from the bloodstream. Sometimes, however, they continue to circulate, and eventually become trapped in the tissues of the kidneys, the lungs, skin, joints, or blood vessels. There they set off reactions with complement that lead to inflammation and tissue damage.

Immune complexes work their mischief in many diseases. These include malaria and viral hepatitis, as well as many autoimmune diseases.



When the immune system is missing one or more of its components, the result is an immunodeficiency disorder. Immunodeficiency disorders can be **inherited**, **acquired** through infection, or produced unintentionally by drugs such as those used to treat people with cancer or those who have received transplants.

Temporary immune deficiencies can develop in the wake of common virus infections, including influenza, infectious mononucleosis, and measles. Immune responses can also be depressed by _____

_____.

Some children are born with poorly functioning immune systems. Some have flaws in the B cell system and cannot produce antibodies. Others, whose thymus is either missing or small and abnormal, lack T cells. Very rarely, infants are born lacking all of the major immune defenses. This condition is known as combined immunodeficiency disease or SCID.

Primary immunodeficiency

Immunodeficiency	
B-Cell Deficiencies	**T-Cell Deficiencies**
Recurrent bacterial infections Bruton's agammaglobulinemia—defect in B-cell development Common variable–hypogammaglobulinemia—defect in plasma cell differentiation Hyper-IgM syndrome—defect in class switching	*Severe viral, fungal, and protozoal infections* Bare lymphocyte syndrome—lack of class II MHC Omenn's syndrome—defect in TCR gene rearrangement DiGeorge syndrome—thymic aplasia
B and T-cell deficiencies Severe combined immunodeficiency	
Phagocytic Cell Deficiencies	**Complement Deficiencies**
Recurrent bacterial infections Chronic granulomatous disease—lack of respiratory burst Leukocyte adhesion deficiency—lack of PMN extravasation into tissue Chediak-Higashi syndrome—defect in neutrophil microtubule function and related phagosome/lysosome fusion	*Recurrent bacterial infections* *Defects in immunocomplex clearance* C1, C2, or C4 deficiency—defects in clearing immunocomplexes C3 or C5 deficiency—block in alternative and classical pathways C6, C7, C8, or C9—defect in MAC assembly and function

Defects in cellular immunity

- Viral infections (predispose to disseminated infections, particularly with latent viruses such as herpes simplex, varicella zoster, cytomegalovirus)
- Mycobacterial infections
- Fungal infections
- Severe complication (systemic illness) following after vaccination by alive virus and BCG
- T cell deficiency is always accompanied by some abnormality of antibody responses, although this may not be reflected by hypogammaglobulinemia.

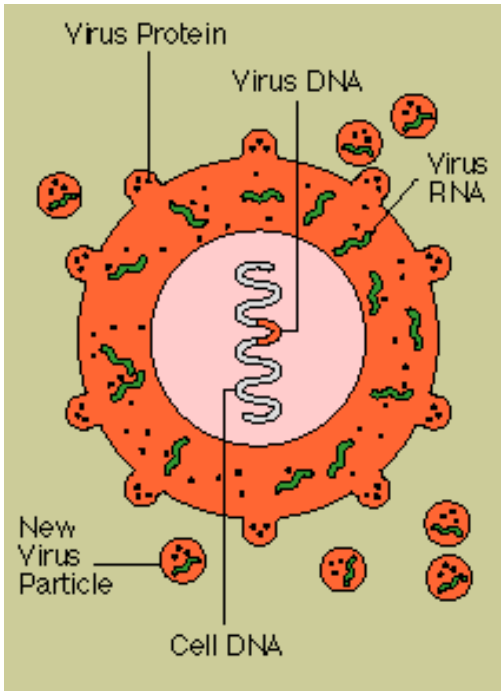
Review Questions

True—False

1. Viral infections (predispose to disseminated infections, particularly with latent viruses such as herpes simplex, varicella zoster, cytomegalovirus) _____

2. Recurrent or chronic bacterial infections (Sino-pulmonary infection, otitis, meningitis, and bacteremia), frequently with organisms such as Streptococci, Haemophilus influenzae, and Staphylococci _____
3. Mycobacterial infections _____
4. Fungal infections _____
5. Severe complication (systemic illness) following after vaccination by alive virus and BCG _____
6. Selective deficiency of immunoglobulin A is an example of T-cell immunity deficiency _____

AIDS is an immunodeficiency disorder caused by a _____ that infects immune cells. and destroy or disable vital T cells, paving the way for a variety of immunologic shortcomings. It also can hide out for long periods in immune cells. As the immune defenses falter, a person with AIDS falls prey to unusual, often life-threatening infections and rare cancers.



A contagious disease, AIDS is spread by _____

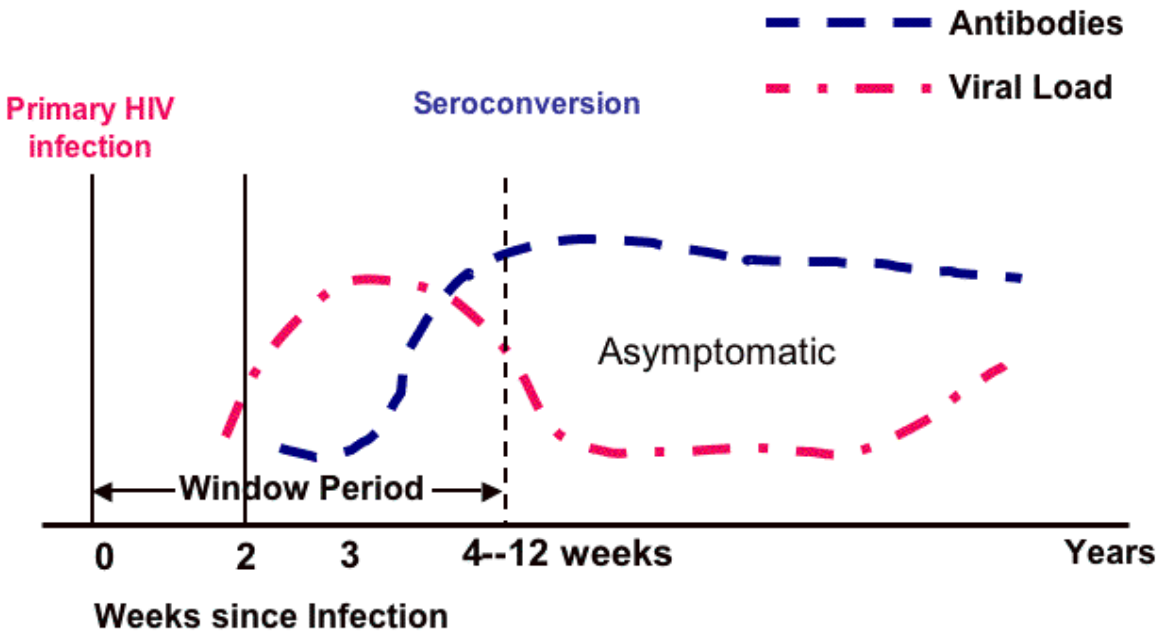
_____

_____

There is no cure for AIDS, but newly developed antiviral drugs can slow the advance of the disease, at least for a time.

Did you know? . . .
An AIDS diagnosis can only be made by a licensed healthcare provider and, once the diagnosis is made, the person is always considered to have AIDS.

Natural Course of Untreated HIV Infection



Asymptomatic HIV Infection (**Stage I**)

Following seroconversion, a person infected with HIV is **asymptomatic** (has no noticeable signs or symptoms). The person may look and feel healthy, but can still pass the virus to others. It is not unusual for an HIV-infected person to live 10 years or longer without any outward physical signs of progression to AIDS. Meanwhile, the person's blood and other systems are affected by HIV, which would be reflected in laboratory tests. Unless a person in this stage has been tested for HIV, they will probably not be aware they are infected.

Symptomatic HIV Infection

During the symptomatic stage of HIV infection, a person begins to have noticeable physical symptoms that are related to HIV infection. Anyone who has symptoms like these and has engaged in behaviors that transmit HIV should seek medical advice. The only way to know for sure if you are infected with HIV is to take an HIV antibody test.

Although no symptoms are specific only to **HIV infection**, some **common symptoms** are:

Stage II

1. _____
2. _____

Stage III

3. _____
4. _____
5. _____

Stage IV

6. _____
7. _____
8. _____

Apply Your Learning

Q: A 16 years old patient comes into your clinic complaining of a fever of 37,4 C for 3 weeks, weight loss of 2 kg in the past 2 months, and diarrhea for 6 weeks. He claims he has not changed his regular diet and is not trying to lose weight. He states he has had a lingering cold for weeks and just doesn't feel good or have energy. What additional history and physical factors would you need to assess?

A: These are classic symptoms of an HIV infection but could also be a gastrointestinal or respiratory virus. Sexual history, diet history, and family history of GI diseases would need to be assessed. A chest x-ray, CBC, basic metabolic panel, and thyroid levels should be ordered to rule out pneumonia, infections, thyroid health, and inflammatory conditions. It is said as high as 90% of a diagnosis can be determined by a thorough history alone.

Humoral Immunity Deficiency

Features: Increased susceptibility to bacteria, enterovirus intestinal parasites

Delayed in growth and development

Increased incidence of autoimmune disease, malignant tumor

Peripheral blood B cells absent or reduced

Levels of Ig absent or reduced

Pathogenesis: Block of the differentiation and development of B cells

Reduced function of Th cells

1 Bruton's syndrome : X-linked agammaglobulinaemia

2 Selectively IgA deficiency

3 Ig immunodeficiency with increased IgM

Characterize the most common **B-cell immunity deficiency**

Bruton agammaglobulinemia	
Selective deficiency of immunoglobulin A	
Selective deficiency of immunoglobulin M	

Combined immunodeficiency (T and B cell associated deficiency)

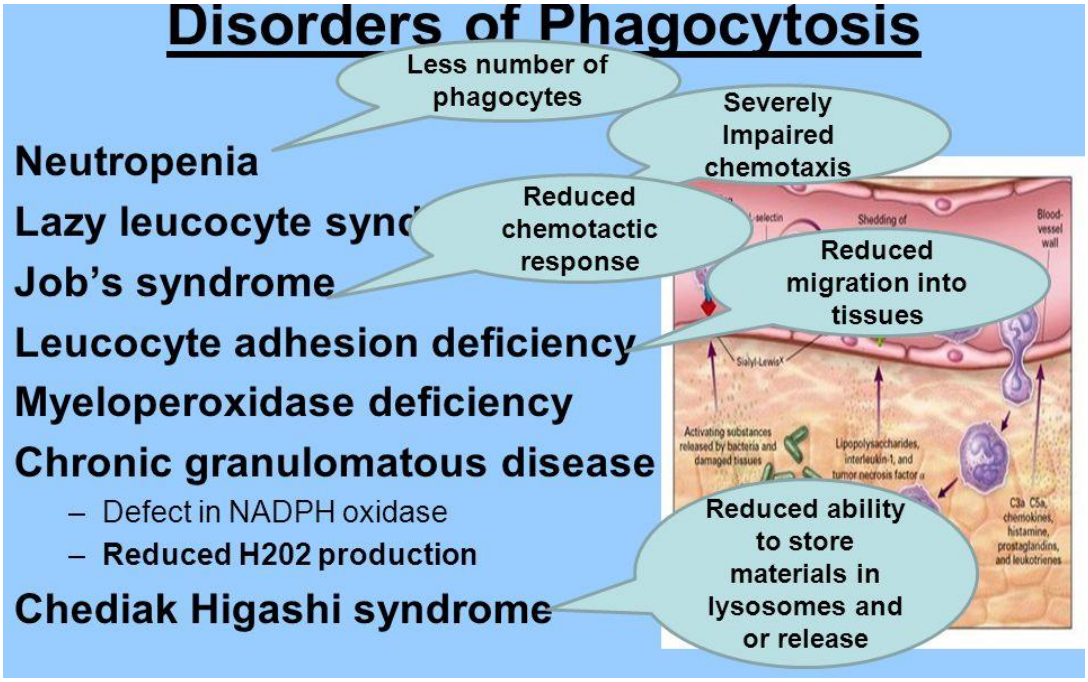
Is the most severe form of immune deficiency

Individuals with severe combined immunodeficiency are susceptible to the whole range of infectious agents including organisms not ordinarily considered pathogenic

Give examples of combined immunodeficiency and characterize them

Example	Characteristics

Disorders of phagocytosis



Review Questions

True—False

1. Viral infections (predispose to disseminated infections, particularly with latent viruses such as herpes simplex, varicella zoster, cytomegalovirus) _____
2. Recurrent skin infections, often due to Staphylococcus aureus, abscesses of subcutaneous tissue and lungs, purulent arthritis and osteomyelitis_____

3. Mycobacterial infections _____
4. Fungal infections _____
5. Chronic granulomatosis is an example of disorders of phagocytosis _____
6. Di-George syndrome is an example of phagocytosis disorders _____

Assess immunogramme below, note possible clinical manifestations

Immunogramme 1

Name: Andrew K. Age: 9 years

Index		Referent level according to the age
WBC, $\times 10^9$/L	6,5	1 m.o. – 12 m.o.: 6,4–11,0 1 y.o. – 3 y.o.: 6,8–10,7 4 y.o. – 6 y.o.: 6,0–9,2 7 y.o. – 18 y.o: 5,4–8,8
Neutrophils, %	58,8	1 m.o.– 12 m.o.: 31–48 1 y.o. – 3 y.o: 36–49 4 y.o. – 6 y.o: 52–56 7 y. o.– 18 y.o: 61–71
Lymphocytes, %	41,4	1 m.o.– 12 m.o.: 52–69 1 y.o. – 3 y.o: 51–64 4 y.o. – 6 y.o: 44–48 7 y.o. – 18 y.o: 29–39
CD 3, %	59,4	1 m.o.– 12 m.o.: 58–67 1 y.o. – 3 y.o: 62–69 4 y.o. – 6 y.o: 62– 9 7 y.o. – 18 y.o: 66–76
CD 4, %	39,9	1 m.o.– 12 m.o.: 38–50 1 y. o.– 3 y.: 30– 0 4 y.o – 6 y.o: 30–40 7 y.o. – 18 y.o: 33–41
CD 8, %	29,4	1 m.o.– 12 m.o.: 18–25 1 y.o. – 3 y.o: 25–32 4 y.o. – 6 y.o: 25–32 7 y.o. – 18 y.o: 27–35
CD 16, %	12,6	1 m.o.– 12 m.o.: 8–17 1 y.o. – 3 y.o: 8–15 4 y.o. – 6 y.o: 8–15 7 y.o. – 18 y.o: 9–16
CD 22, %	18,8	1 m.o.– 12 m.o.: 12–23 1 y.o. – 3 y.o: 13–22 4 y.o. – 6 y.o: 13–22 7 y. o.– 18 y.o: 11–20
CD 25, %	23,3	1 m.o.– 18 y.o: 10–18
Phagocytosis of latex, %	62,8	1 m.o.– 18 y.o: 45–65
Phagocytic number	3,3	1 m.o.– 18 y.o: > 1
Total complement	61,1	1 m.o.– 18 y.o: 40–80
Circulating immune complexes, units.	8,9	1 m.o.– 18 y.o: 10±2

Index		Referent level according to the age
Spontaneous nitroblue tetrazolium (NBT) tests, %	26,3	1 m.o.– 18 y.o: 9,34±0,4
Spontaneous index of activated neutrophils (IAN) test,, units	0,6	1 m.o.– 18 y.o: 0,13±0,006
Stimulated nitroblue tetrazolium (NBT) tests, %	61,4	1 m.o.– 18 y.o: 0,5–1,5
Lysosomal cationic proteins, units	1,7	1 m.o.– 18 y.o: 1,23±0,015
Ig A g/L	1,3	1 m.o.– 6 m.o.: 0,21±0,13 7 m.o.– 12 m.o.: 0,37±0,18 1 y.o – 2 y.o: 0,50±0,24 3 y.o – 5 y.o: 0,93±0,27 6 y.o – 11 y.o: 1,24±0,45 12 y.o – 18 y.o: 1,48±0,63
Ig M, g/L	0,9	1 m.o.– 6 m.o.: 0,30±0,11 7 m.o.– 12 m.o.: 0,54±0,23 1 y.o – 2 y.o: 0,58±0,23 3 y.o – 5 y.o: 0,56±0,18 6 y.o – 11 y.o: 0,65±0,25 12 y.o – 18 y.o: 0,59±0,20
Ig G, g/L	10,3	1 m.o.– 6 m.o.: 4,30±1,19 7 m.o.– 12 m.o.: 6,61±2,96 1 y.o – 2 y.o: 7,62±2,09 3 y.o – 5 y.o: 9,29±2,28 6 y.o – 11 y.o: 9,23±2,56 12 y.o – 18 y.o: 9,46±1,24

Comments and Conclusion: _____

Immunogramme 2

Name: Hanna T. Age: 1 year

Index		Referent level according to the age
WBC, $\times 10^9$/л	12,5	1 m.o. – 12 m.o.: 6,4–11,0 1 y.o. – 3 y.o.: 6,8–10,7 4 y.o. – 6 y.o.: 6,0–9,2 7 y.o. – 18 y.o: 5,4–8,8
Neutrophils, %	48,8	1 m.o.– 12 m.o.: 31–48 1 y.o. – 3 y.o: 36–49 4 y.o. – 6 y.o: 52–56 7 y. o.– 18 y.o: 61–71
Lymphocytes, %	55,4	1 m.o. – 12 m.o.: 52–69 1 y.o. – 3 y.o: 51–64 4 y.o. – 6 y.o: 44–48 7 y.o. – 18 y.o: 29–39

Index		Referent level according to the age
CD 3, %	56,4	1 m.o. – 12 m.o.: 58–67 1 y.o. – 3 y.o: 62–69 4 y.o. – 6 y.o: 62–69 7 y.o. – 18 y.o: 66–76
CD 4, %	39,9	1 m.o.– 12 m.o.: 38–50 1 y. o.– 3 y.: 30–40 4 y.o – 6 y.o: 30– 0 7 y.o. – 18 y.o: 33–41
CD 8, %	25,4	1 m.o.– 12 m.o.: 18–25 1 y.o. – 3 y.o: 25–32 4 y.o. – 6 y.o: 25–32 7 y.o. – 18 y.o: 27–35
CD 16, %	12,6	1 m.o.– 12 m.o.:8 – 17 1 y.o. – 3 y.o: 8 – 15 4 y.o. – 6 y.o: 8 – 15 7 y.o. – 18 y.o: 9 – 16
CD 22, %	18,8	1 m.o.– 12 m.o.: 12–23 1 y.o. – 3 y.o: 13–22 4 y.o. – 6 y.o: 13–22 7 y. o.– 18 y.o: 11–20
CD 25, %	16,3	1 m.o.– 18 y.o: 10–18
Phagocytosis of latex, %	62,8	1 m.o.– 18 y.o: 45–65
Phagocytic number	3,3	1 m.o.– 18 y.o: > 1
Total complement	61,1	1 m.o.– 18 y.o: 40–80
Circulating immune complexes, units.	8,9	1 m.o.– 18 y.o: 10±2
Spontaneous nitroblue tetrazolium (NBT) tests, %	26,3	1 m.o.– 18 y.o: 9,34±0,4
Spontaneous index of activated neutrophils (IAN) test,, units	0,6	1 m.o.– 18 y.o: 0,13±0,006
Stimulated nitroblue tetrazolium (NBT) tests, %	1,4	1 m.o.– 18 y.o: 0,5 – 1,5
Lysosomal cationic proteins, units	1,7	1 m.o.– 18 y.o: 1,23±0,015
Ig A g/L	1,1	1 m.o.– 6 m.o.: 0,21±0,13 7 m.o.– 12 m.o.: 0,37±0,18 1 y.o – 2 y.o: 0,50±0,24 3 y.o – 5 y.o: 0,93±0,27 6 y.o – 11 y.o: 1,24±0,45 12 y.o – 18 y.o: 1,48±0,63
Ig M, g/L	0,9	1 m.o.– 6 m.o.: 0,30±0,11 7 m.o.– 12 m.o.: 0,54±0,23 1 y.o – 2 y.o: 0,58±0,23 3 y.o – 5 y.o: 0,56±0,18 6 y.o – 11 y.o: 0,65±0,25 12 y.o – 18 y.o: 0,59±0,20
Ig G, g/L	1,1	1 m.o.– 6 m.o.: 4,30±1,19 7 m.o.– 12 m.o.: 6,61±2,96 1 y.o – 2 y.o: 7,62±2,09 3 y.o – 5 y.o: 9,29±2,28 6 y.o – 11 y.o: 9,23±2,56 12 y.o – 18 y.o: 9,46±1,24

Comments and Conclusion:_____

_____

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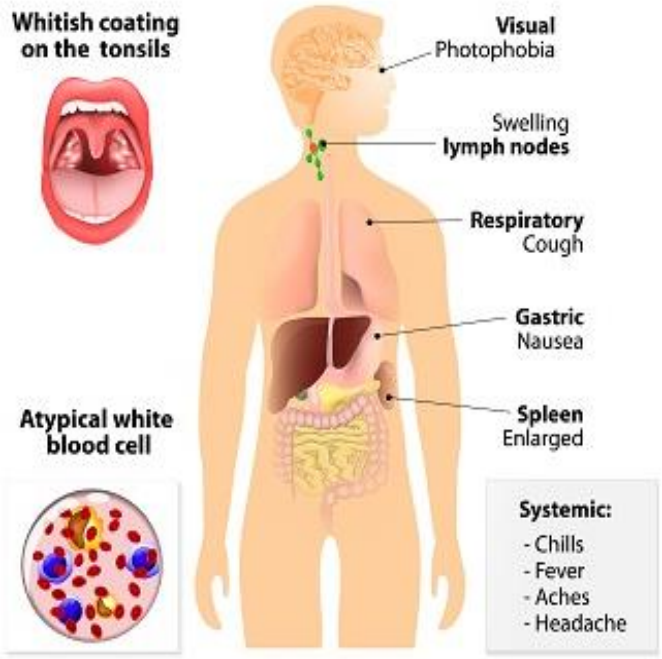

What is possible diagnosis?

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Theme: Anatomical and physiological peculiarities of endocrine system. Examination of endocrine system. Semiotics of endocrine system diseases.

1. What is function of the endocrine system?
2. What does the endocrine system consist of?
3. What is hormone?
4. What do you know about control of hormone secretion and neuroendocrine interrelationships?
5. What hormones are produced in various endocrine glands? What are their effects?
6. What are the age features of hormones biosynthesis and their influences on growth and development of the child?
7. What do you know about normal sexual development in embryo and fetus?
8. Hormonal changes of puberty. Sexual maturation and developmental stages of secondary sex characteristics in girls and boys.
9. What laboratory tests and radiologic procedures can help in diagnosis of endocrine diseases?
10. Disorders of the pituitary gland: clinical manifestation hypofunction and hyperfunction (gigantism, nanism, diabetes insipidus, Simonds disease).
11. Disorders of the thyroid gland (hypothyroidism, hyperthyroidism).
12. Disorders of the parathyroid glands.
13. Diabetes mellitus (signs of hyperglycemia and hypoglycemia).
14. Disorders of the adrenal gland (congenital adrenal hyperplasia, Cushing syndrom, acute adrenal insufficiency, Addison disease).
15. Disorders of the gonads (delayed puberty, precocious puberty).

Practical part:

1. Gather appropriate complaints and health history information for a child with endocrine disorders.
2. Clinical methods of examination in endocrinology
3. Interpret laboratory results and instrumental investigation methods used in children with endocrine disorders (serum level of glucose, cholesterol, calcium, potassium, sodium, chlorine; excretion of 17-hydroxycorticosteroid with urine). Determine bone age.

The recommended literature:

1. Lecture
2. Propaedeutics of children's diseases and nursing of the child.T.Kapitan,Vinnitsa:The State cartographicae Factory. 2012. P. 671–684.
3. Patients examination and semiotics of pediatric diseases (modul 2): Workbook for the third-year students of the medical university / comp. N. V. Kyzyma, A. S. Krut, E. A. Radutnaya. – Zaporozhye : ZSMU, 2016. 104 p.
4. Клінічне обстеження дитини = Pediatric Physical Examination: навч. посіб. для студ. ВНЗ / О. В. Катілов [и др.]. 2-е вид., перероб. Вінниця : Нова Книга, 2019. 498 с.
5. Лекції з пропедевтичної педіатрії = Manual of Propaedeutic Pediatrics: підруч. для студ. II–III к. / С. О. Нікітюк, Н. І. Балацька, Н. В. Галяш [та ін.]. 2-е вид., доп. Тернопіль : Укрмедкнига, 2017. 467 с.
6. Robert M. Kliegman, Joseph St. Geme Nelson Textbook of Pediatrics 21th Edition. 2019. Elsevier. 4112 p.

Definition:

Endocrine system:_____

By the endocrine glands of the body are_____

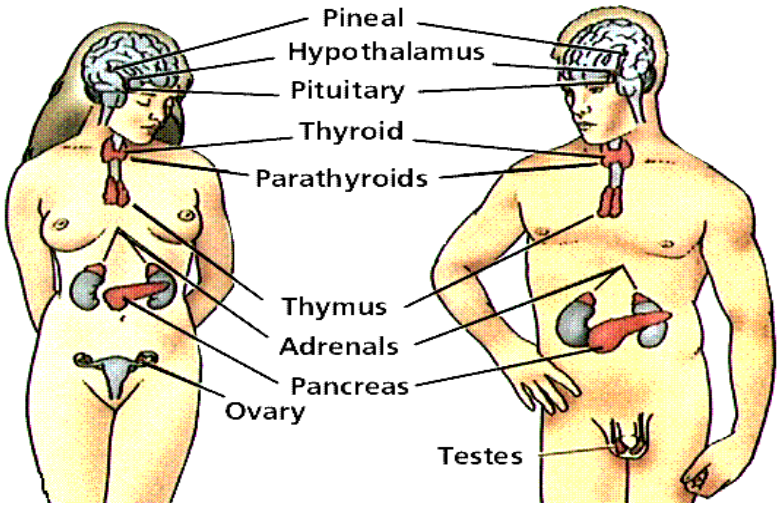
The functions of the endocrine system are:

1._____
2._____
3._____
4._____
5._____

The endocrine system consists of three components:

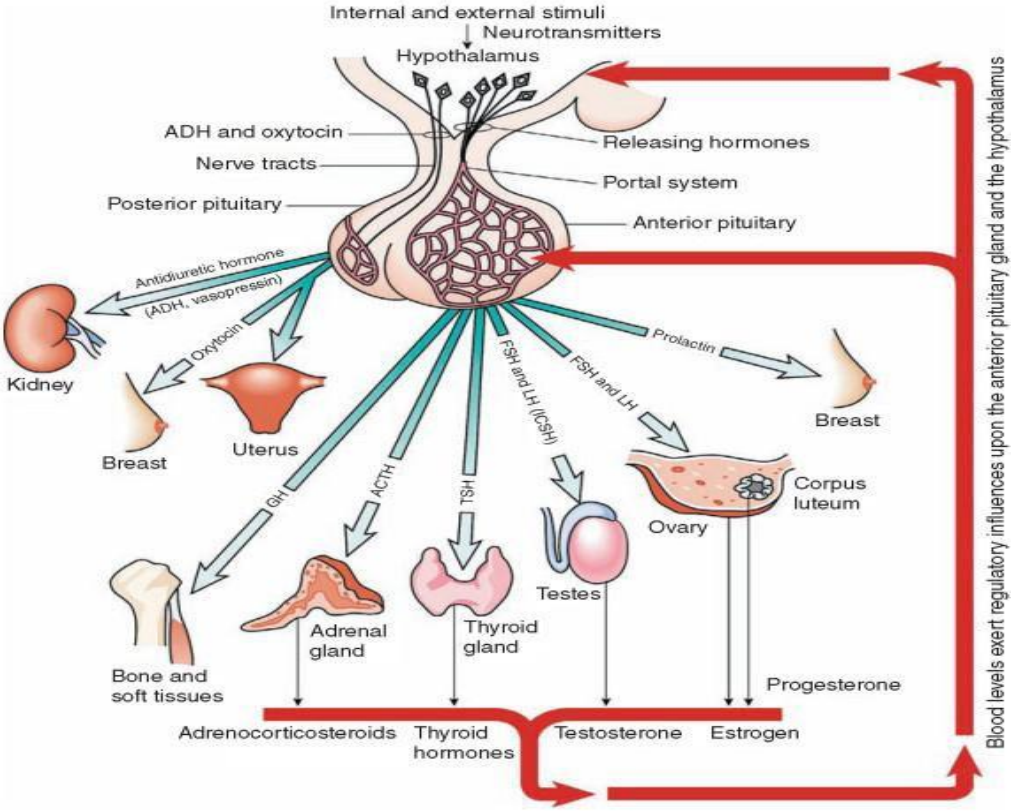
1._____
2._____
3._____

Endocrine glands



The most important properties of the hormone:

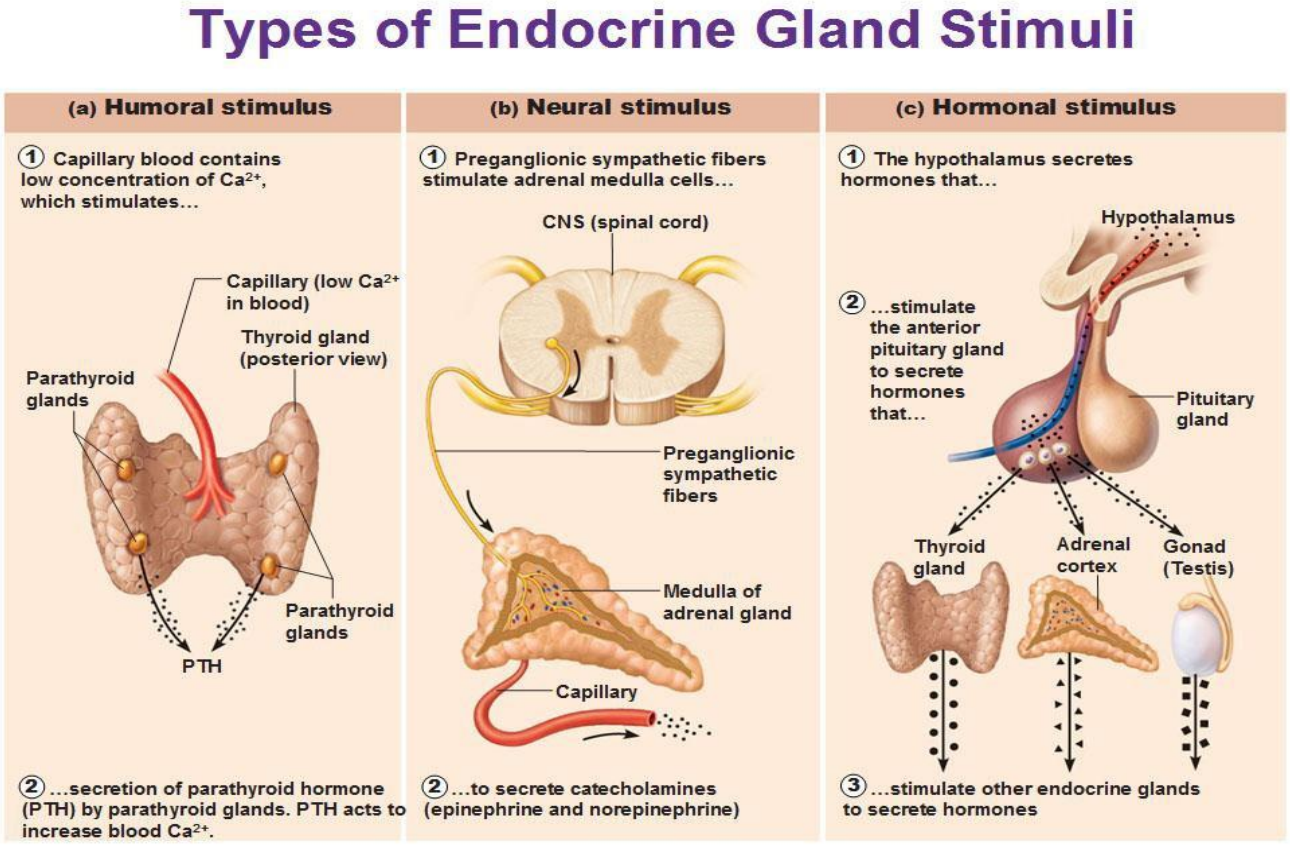
The main center, which regulates the production of hormones by endocrine glands and release them into the bloodstream, is the hypothalamus



Feedback mechanism regulation:

_____

_____



What endocrine glands are not under pituitary stimulation regulation?

What levels of Ca and glucose in blood are normal?

Fill the table *1:* **Endocrine glands and hormones**

Endocrine glands	Hormones	Effects
Hypothalamus		
Hypophysis		
Thyroid		
Parathyroid glands		
Pancreas (the islands of Langerhans)		
Adrenal glands		

Endocrine glands	Hormones	Effects
Reproductive glands		
Epiphysis		
Thymus		

Fill the table 2: **Dysfunction of some endocrine glands**

Hormones	Hypofunction	Hyperfunction
Hypophysis		
Epiphysis		
Thyroid gland		

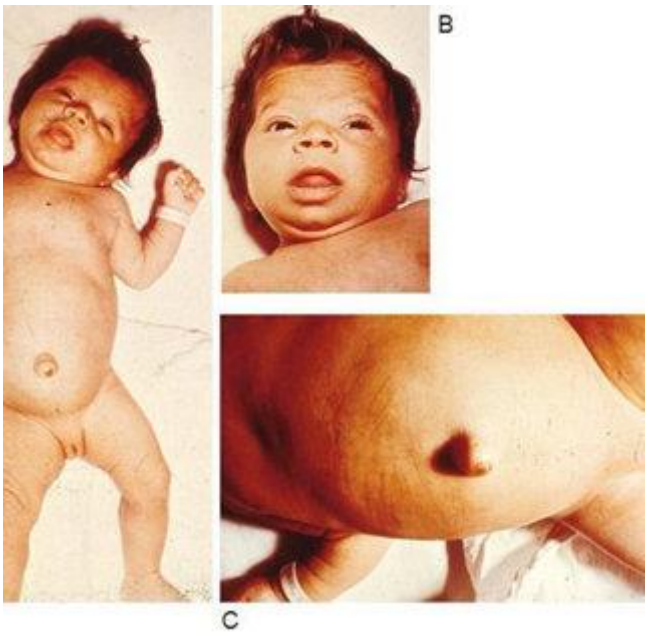
Hormones	Hypofunction	Hyperfunction
Parathyroid glands		
Thymus		
Pancreas (the islands of Langerhans)		
Adrenal glands		
Reproductive glands		

Definitions: **Match the definitions in *Column I* with correct words in *Column II***

Column I	Column II
1. High growth, pubertal age, pain in the joints, delayed sexual development, elevated GH	**A** Cushing's syndrom
2. Weakness, enlargement of the distal parts of the body, thickening of facial features, widening of the fingers, hypogonadism, narrower field of vision, increase of the level of somatotropin hormone in the plasma, excessive hairiness	**B** Congenital adrenal hyperplasia
3. Height below 3rd percentile, prepubertal growth velocity less than 4 cm per year, bone age below the chronological age, abnormal 24-hour GH secretory pattern	**C** Addison disease
4. Nervousness, irritability, emotional lability, tremor, excessive appetite, weight loss; smooth, moist, warm skin; increased perspiration, and heat intolerance. Goiter, exophthalmos, tachycardia, widened pulse pressure (systolic hypertension). Thyroid function studies elevated (eg, TT4, FT4, T3 RU). TSH concentration suppressed.	**D** Waterhouse – Friderichsen syndrome
5. Growth retardation, diminished physical activity, impaired tissue perfusion, constipation, thick tongue, poor muscle tone, hoarseness, anemia, and intellectual retardation. Thyroid hormone concentrations low, TSH levels are elevated in primary disease.	**E** Diabetes mellitus
6. Fatigue or muscle weakness, mood swings, nervousness or anxiety, depression, fragile bones that easily fracture (osteoporosis), kidney stones, excessive urination, abdominal pain, depression, bone and joint pain, nausea, vomiting or loss of appetite	**F** Hypoparathyroidism
7. Tingling or burning (paresthesias) in fingers, toes and lips, muscle aches or cramps, fatigue or weakness, dry skin, brittle nails, headaches, depression, mood swings, memory problems, hypocalcemia	**G** Hyperparathyroidism
8. Polyuria, polydipsia, polyphagia, weight loss, bedwetting, dry mucous membranes in the mouth, itching of the skin and mucous membranes, increased nervous irritability, headache; hyperglycemia, glycosuria	**H** Hypothyroidism
9. Fever, rigors, vomiting, headache, dyspnea, petechial, purpuric, low blood pressure, cyanosis, diarrhea. Peripheral blood: hypoglycemia, hyponatremia, hyperkalemia, leukocytosis	**I** Hyperthyroidism
10. Brown color of the skin, progressive fatigue, loss of weight, anorexia, loss of blood pressure, anemia	**J** Growth Hormone Deficiency
11. Ambiguous genitalia in girls, enlarged penis in boys, poor weight gain, weight loss, dehydration, vomiting. Laboratory findings: elevated blood content of testosterone and ACTH, a significant increase in urinary excretion of urinary 17-keto-steroids (17-KS), (daily urinary excretion of 17 hydroxy-corticosteroids (ACS) is normal or reduced).	**K** Acromegaly
12. Growth retardation, hypotonia, obesity, moon face, stretch marks on the skin, hirsutism, osteoporosis, permanent increase in blood pressure, depression	**L** Gigantism

1___2___3___4___5___6___7___8___9___10___11___12___

What a presumptive diagnosis? _____



Describe the main signs of the disease

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What a presumptive diagnosis? _____

Describe the main signs of the disease

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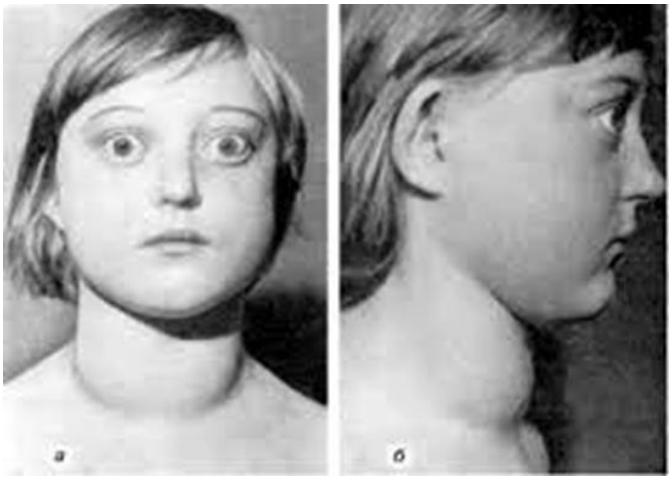

What a presumptive diagnosis? _____

Symptoms are _____

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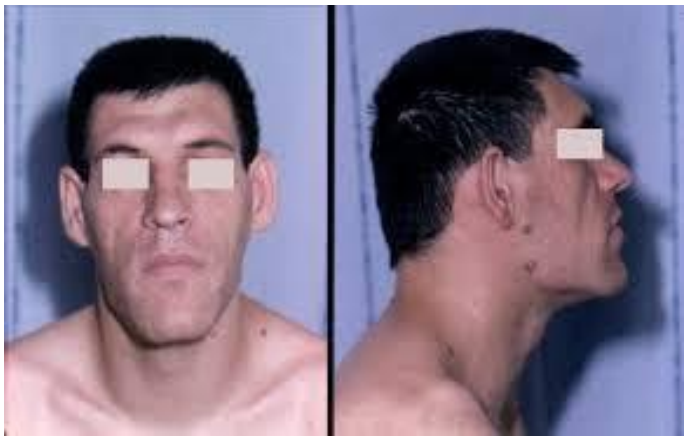
What a presumptive diagnosis? _____

Describe the main signs of the disease



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What a presumptive diagnosis? _____

Describe the main signs and cause of the disease

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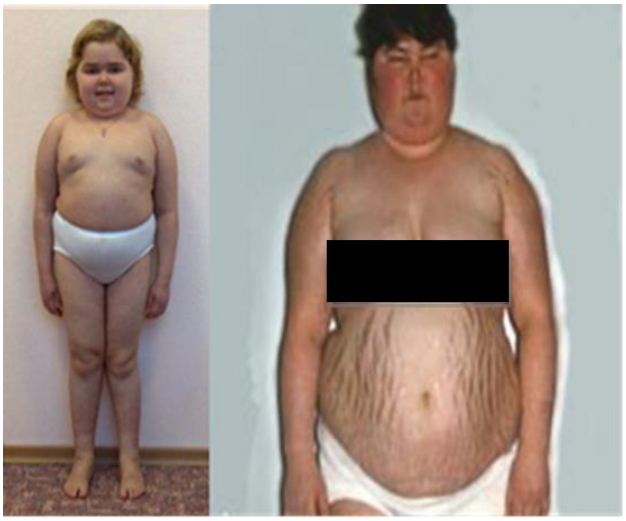
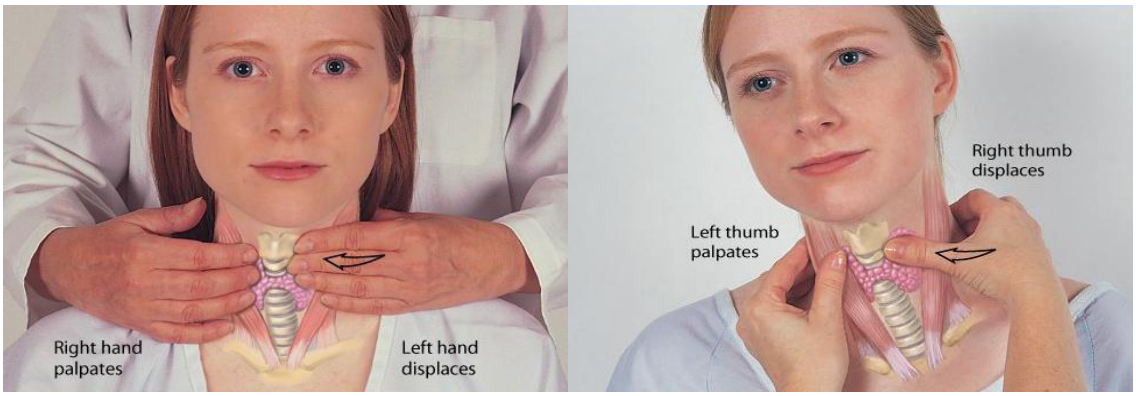


Define concepts, note their causes and main clinical manifestations:

Syndrome of premature sexual development	Syndrome of delayed sexual development

Practical skills

Thyroid gland palpation



Exam patients and describe Endocrine System:

Growth , body proportionality (gigantism, nanism)

Body weight (malnutrition, obesity)

Skin (color, dryness, other characteristics)

Allocation of subcutaneous adipose tissue

Condition of thyroid gland (lobular and isthmus size)

Observation of genitals (development of genitals correlate with the age, degree of development of secondary sexual characteristics).

Delay or precocious puberty

NOTES

Навчальне видання

Обстеження пацієнта та семіотика дитячих хвороб

Робочий зошит
для студентів 3-го курсу медичних університетів, що навчаються англійською мовою

Упорядник Карпушенко Юлія Валентинівна

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Комп’ютерна верстка О. Ю. Лавриненко

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