

- Paediatrics - the study about doctoring of child (pais - boy, child and of iatria - doctoring) - the first half of the XIX century
- S.F.Khotovitskiy - the first Russian management on the children's diseases "Of paediatrics" (1847) - child - the not reduced copy of adult, but special in each development stage system
- **XX century** – the study of the special features of the development of healthy child
- **XXI century** – high technologies in the pediatrics

PATRONAGE OF HEALTHY CHILD (1)

- During the first 3 days after extraction from house
- On the 1st month of life every week
- On the 2nd month of the life of 1 times in 2 weeks
- From the 3rd through 12 mo. of life monthly
- In 1, 3 mnth. and 1 year - neuropathologist, orthopaedist, oculist
- in 3 mo. - analysis of the blood and urine (before the vaccination)

PATRONAGE OF HEALTHY CHILD (2)

- On the 2nd year- the quarterly inspections
- On the 3rd year - 1 times in half a year
- From the 4th year and further - the yearly professional examinations
- Before entering into the school- complete inspection by all specialists
- further - observation by the school doctor

PERIODS OF THE CHILDHOOD

- 1) *prenatal development* - 10 lunar months
- 2) *neonatal* – 4 weeks;
- 3) *breastfeed* – up to 1 year;
- 4) *crib* or *nursery* – from 1 year to the 3rd years;
- 5) *pre-school* - from 3 to 7 years;
- 6) *school* - from 7 to 18 years (periods of the young and elder school age).

NEONATAL PERIOD

- 28 days or 4 weeks
- Process of adaptation to the new conditions of environment (early adaptive - to 10 days of life)
- Transitory (boundary) states
- Reflexes of the newborns

NEWLY BORN CHILD (1)

■ Mature infant (38-42 weeks. Gestation)

- ❑ Weight - 3300 g (virgins.), 3500 g (boys)
- ❑ Length of 50-51 cm
- ❑ It is minimal - 2900 g/of 49 cm
- ❑ Dist. of head -35 cm, breast -33 cm
- ❑ Loud emotional cry
- ❑ Living reflexes (sucking and swallowing)
- ❑ Steady and correct rhythm of respiration and palpitation

NEWLY BORN CHILD (2)

PREMATURE (less than 38 weeks. gest).

Morphological signs

- Weight of < 2500
- Length of < 45 cm
- Lanugos throughout entire body
- Cerebral part of skull > facial
- Exophthalmoses
- Lateral fontanel
- Nails do not reach tips of it is finger
- the low arrangement of umbilical ring
- cryptorchism, the hiatus of the sexual

Functional signs

- Weak cry or its absence
- Sluggish physiological reflexes (sucking and swallowing) or their absence
- arrhythmic respiration with the protracted is apnoea
- Expressed thermo labile



Недоношенный ребенок



Недоношенный ребенок с массой тела 1300 гр, срок гестации – 26 недель (слева), доношенный новорожденный с массой тела 3500 г, срок гестации – 39 недель

Care of the premature child

- **M<2000 g – кюбез (incubator)**
- **T air**
 - **< 1000 g -34,5 – 35 degree C**
 - **1500-1700 g- 33 – 34 degree C**
 - **Further to descend by 1 deg in 7-10 days**
 - **Humidity of air**
 - **1-3 days – 80-90%**
 - **4-7 days – 70-80%**
 - **2-nd week of life- 60%**
 - **3-4 - week – 50%**
- **O₂ – 25-30%, flow 2-3 l/min (to 40% with the flow 4 l/min)**







Nourishment of the premature child

- the 1st feeding of [ch]/[z] of 4-6 hours (> 12 hours
- introduction to 5% of glucose of 5[ml]/3 of hour
per os or [v]/[v] 10% glucose of 3-5 [ml]/3 of the
hour
- Multiplicity of feedings - 7-8 times (3 h interval)
Severe premature babies- 10 times (2 h interval)
- Mt. with [rozhd]. < 1500 g (there is no reflex) - the
probe feeding
- Mt. of > 2000 g of 1-2 breast feedings, rest - from
the nipples

Nourishment of the premature child (2)

Age	Protein g/kg	Fats g/kg	Carbohydr -ates g/kg	Calories Kcal/kg
1 day	2-2,5	6,5-7	12-14	30
1 week	2-2,5	6,5-7	12-14	80-90
1 month	2-2,5	6,5-7	12-14	130-140
6 month - 1 year	2,5-2,9	5,5-6	12-14	From 3 rd month ↓ 5 Kcal/kg/month

Кормление недоношенного ребенка через зонд



NEW BORN CHILD (3)

- **IMMATURE** (morphologically and functionally not corresponding to the period of gestation) - as the consequence [V]/[U] of infection, unfavorable flow of the pregnancy
- **V/U HYPOTROPHY-** reduction in the mass- growth indices with the generation is less than 60

NEW BORN CHILD (4)

- **POST MATURED** (> 42 weeks. gestation.)
- Trophic disturbances (flabbiness and thinning [PZHK], dryness and the exfoliation of the skin - especially - palms and feet)
- Absence of lubricant
- Dense bones of the skull
- Closed cranial seams
- Small sizes of the fontanel
- Sometimes - jaundice with the greenish tint

BORDER LINE CONDITIONS

- Loss of initial mass (3-5-10%)
- Transit. the disturbance of heat balance (hypo- in first 30 min. hyperthermy on 3-5 day)
- Changes in the skin (childbirth tumor, the physiological or toxic erythema of the skin, the peeling)
- Hyper-bilirubinemia (Hb-100-140 of Mkmol/L on 3-4 days of life)
- Hormonal crisis
- Transit. the special feature of the functions of kidneys (oliguria, proteinuria, urate infarction)
- Transitory dysbacteriosis and the physiological dyspepsia
- Transitory hyperventilation



REFLEXES OF THE NEWBORNS

- persistent lifelong automatisms
- transitory rudimentary reflexes
- reflexes or the automatisms, which only appear and therefore not always revealed immediately after the next generation.
- corneal, conjunctival, throaty, swallowing, the tendinous reflexes of the extremities
- oral segmental automatisms (sucking, search, yoke, volar-oral), spinal segmental automatisms (seizing, reflex OF MOORES, support, automatic
- gait, creeping, myelo-encephalic postural reflexes (labyrinth, asymmetric and symmetrical neck tonic reflexes).
- mesencephalic adjusting automatisms (labyrinth reflexes, simple and chain neck and body reflexes)

BREAST FEEDING AGE

- 1st year of life
- The explosion of child (weight in 1 year of ~10 kg , increase in height ~75 cm)
- The intensive formation of the psycho-motor habits (up to 1 year he walks and he speaks)
- Predominantly milk food with the gradual introduction of the lures
- Maximum immunization

CRIB AND PRE-SCHOOL AGE

- Height up to 4 years on 8 cm yearly, further on 6 cm
- Intensive functional development of cerebral cortex
- Knowledge of the surrounding place
- Increase in the frequency of the traumatism

SCHOOL AGE

YOUNGER

- Increase growth and development of musculature
- Social adaptation
- Physical and psycho-emotional overload in the school

ELDER

- Maturity and beginning of the function of sexual glands
- Girls~12 years old
- Boys~13-15years old
- Overestimation of the values

SKIN

- ❑ Thin epidermis (2-3 layers)
- ❑ Basal layer is developed well (rapid regeneration of the skin)
- ❑ Basal membrane is friable and tender(epidermolysis during pemphigus of newborn)
- ❑ Richly vascularized,insufficient sweat
- ❑ Incomplete/imperfect thermoregulation
- ❑ Sebaceous gland is functioning well
- ❑ Newborn's lanugo(пущок),eyebrows and eyelashes develop badly(grow till 3-5years)

SUBCUTANEOUS FAT

- ❑ Accumulated in the duration of 1.5-2 last months of the prenatal development
- ❑ Intensively increases for the 1st half year of the life
- ❑ Contains lot of fatty tissues(fat denser and higher than melting temperature)
- ❑ Disappears more rapidly on the stomach, then extremities, later on entire face and then cheeks
- ❑ During puberty, girls apparently bigger than boys.

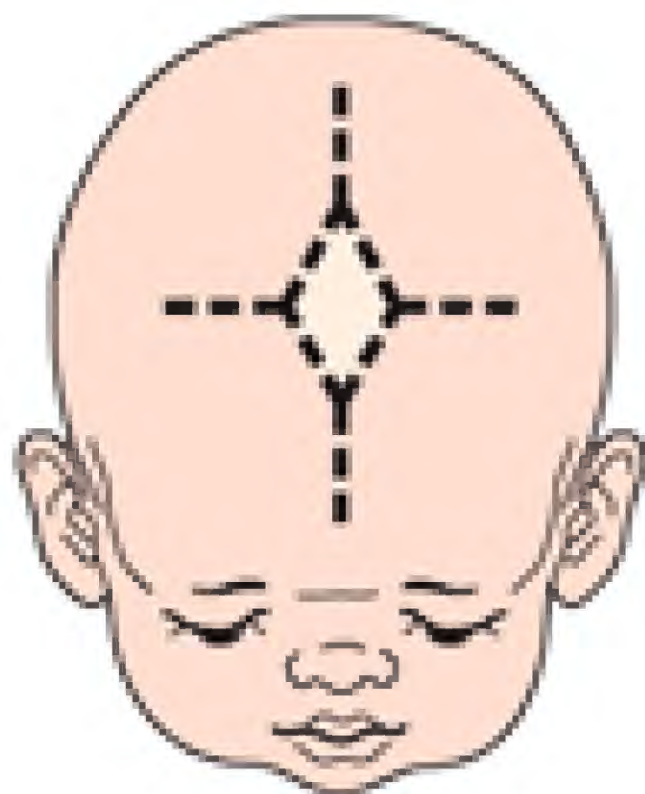
LYMPHATIC SYSTEM

- Small connective tissue and imperfection of cellular structure in newborn's lymph nodes.
- Palpate 3-4 groups of lymph node
- Insufficiency of barrier function (generalized infections)
- Mature cells, stroma and septa to age of 7-8
- Complete haemopoietic and barrier function

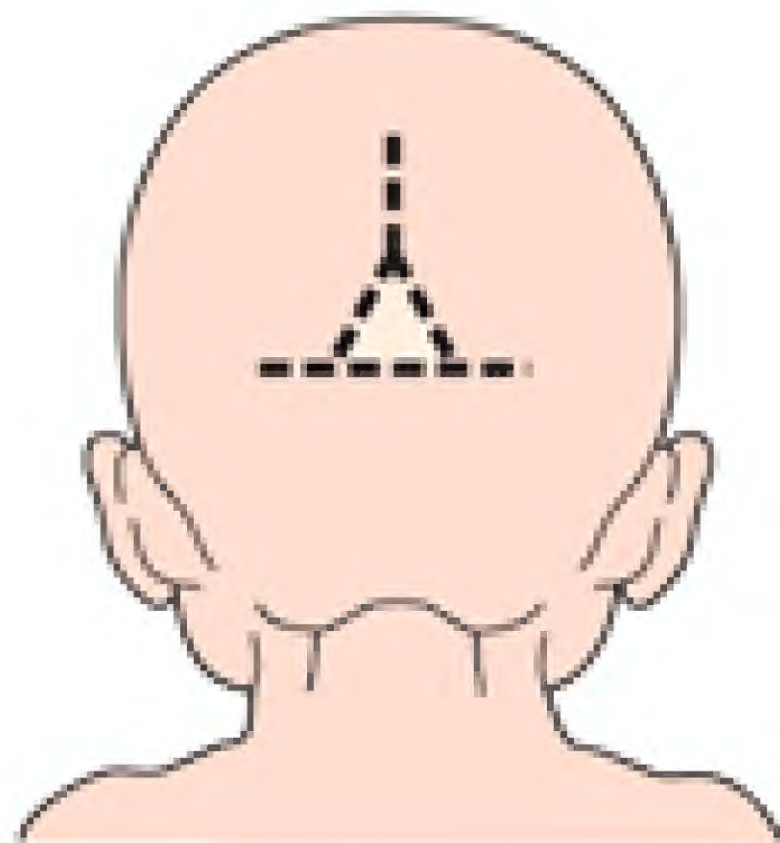
BONE SYSTEM

- Bone tissue - lots of water, organic compounds, fibrous, rich in vessels (less fragility). Periosteum elastic (periosteum fractures)
- Head – smaller frontal part, sutures and fontanelles (large to 12-18 months, small-25% of newborns-1st 3 months), proportional 4/1 (adults 8/1)
- Teeth - с 6-ти мес. ($k - \text{во зубов} = n - 4$), где n - возраст в мес. (в год - 8 зубов). К 2м годам - 20 шт.
- Spine – curvature are formed till 1.5-2 years
- Chest – conic(al), horizontal arrangement of ribs (малая экскурсия)
- Extremities – shorter, newborns physiological curvature of the shins

Череп новорожденного. Роднички



Большой родничок

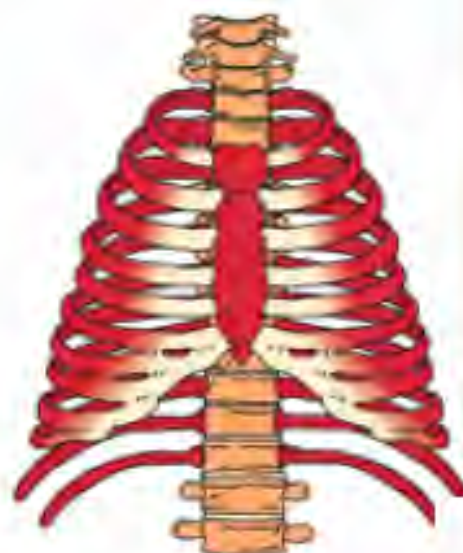


Малый родничок

Строение грудной клетки

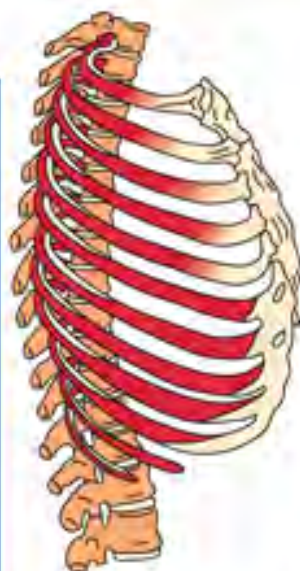


У взрослого человека

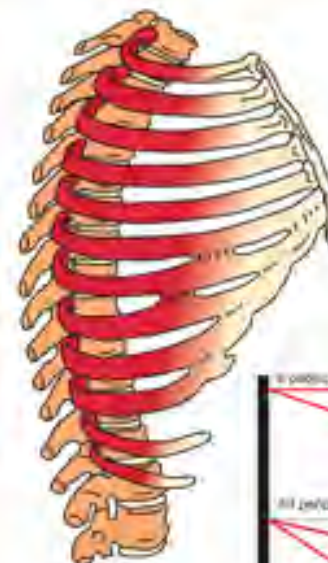


У грудного ребенка

Расположение ребер по отношению к позвоночнику



У взрослого человека



У грудного ребенка



MUSCULAR SYSTEM

- ❑ 23.8% of the weight (adults 42-43%)
- ❑ In the 1st 3 months – physiological hypertone (especially flexors)
- ❑ Histologically: increase thickness and number of muscular fibers, decrease quantity of interstitial tissues
- ❑ Most intensive development of school age (top to bottom - from neck to the extremities)

RESPIRATORY ORGAN (1)

- ❑ Narrow upper respiratory tract
- ❑ Nasal concha – to 3 years
- ❑ Mucous is rich of blood and lymph vessels
- ❑ Sinuses – maxillary(Haymory) grow from age of 2
frontal formed till age of 12-15
- ❑ Larynx, trachea and bronchi-narrow, plethoric/full-blooded
croup, obstructive bronchitis
- ❑ Lung volume of newborn 20 times < adult
- ❑ Anatamo-functional unit of lung is sack
- ❑ Undeveloped elastic tissues-emphysema

RESPIRATORY ORGAN (2)

- Type of respiration – up to age of 3 is abdominal
after age of 3 is chest
- Character of respiration – puerile
from age of 5-7 is vesicular
- Percussion – vesiculotympanic resonance
- Respiratory rate : newborn – 40 per min
age of 1 - 30 per min
age of 5 – 25 per min
age of 10 – 20 per min

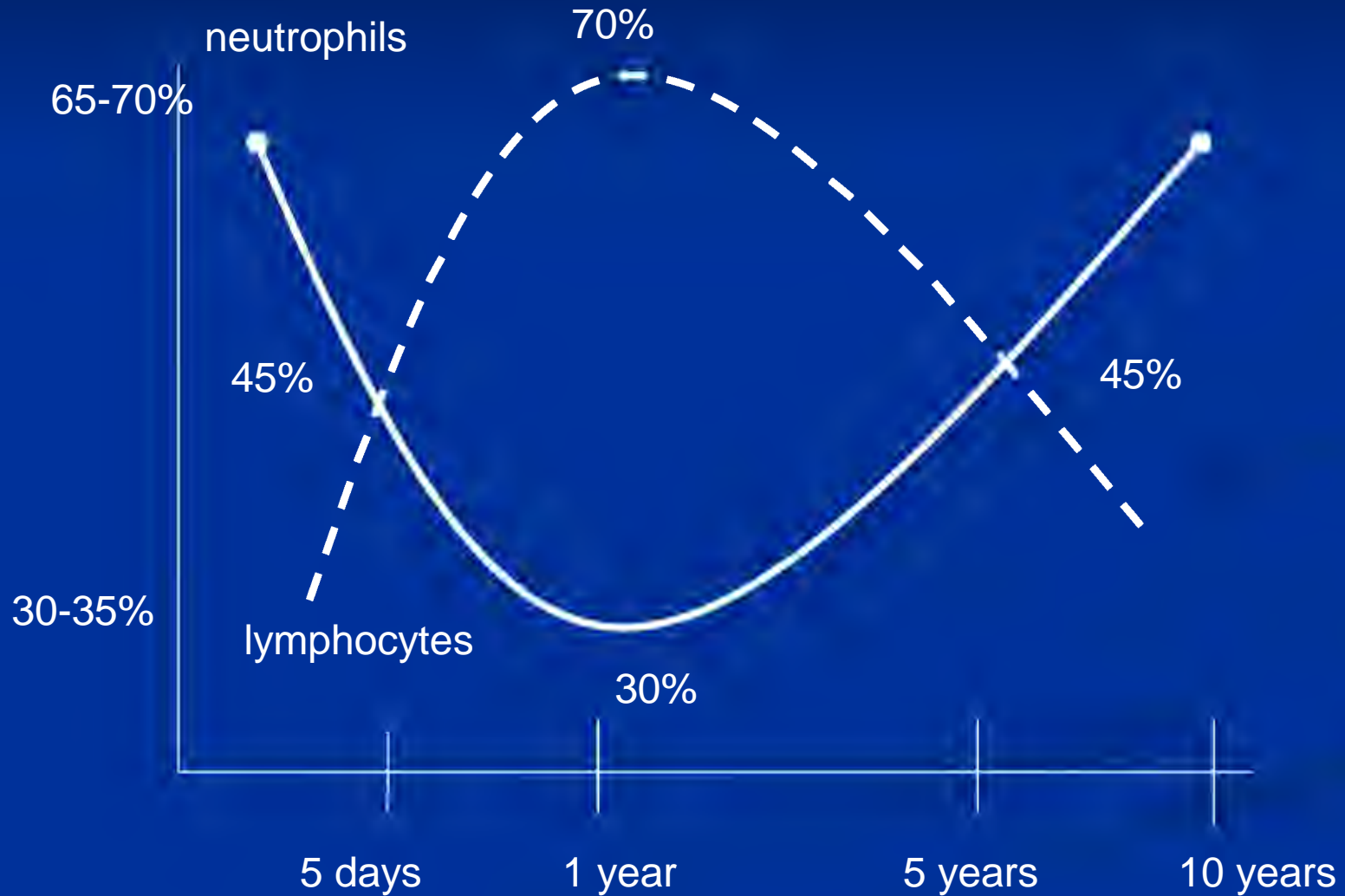
CARDIOVASCULAR ORGANS

- **Reconstruction of blood circulation** (*Артериальный и Венозный* ducts, fenestra vestibuli stop organisation.)
- **Children's heart - 0,7% of body mass,**
Adult's heart - 0,5%
- **Borders :** left is 1-1,5 cm to outwards from left medial clavicular line, right- along right parasternal line
- **Heart rate-** new born-140 bpm, 1 year old- 120 bpm,
5 years old- 100 bpm, 10 years old- 80 bpm.
- **Arterial pressure of infants-80/50,**
- **Arterial pressure of elder age = $80 + 2n$,** where n – children's age.
- **ECG of infants -right-, schooling children- normal,**
adolescents- left cardiogram

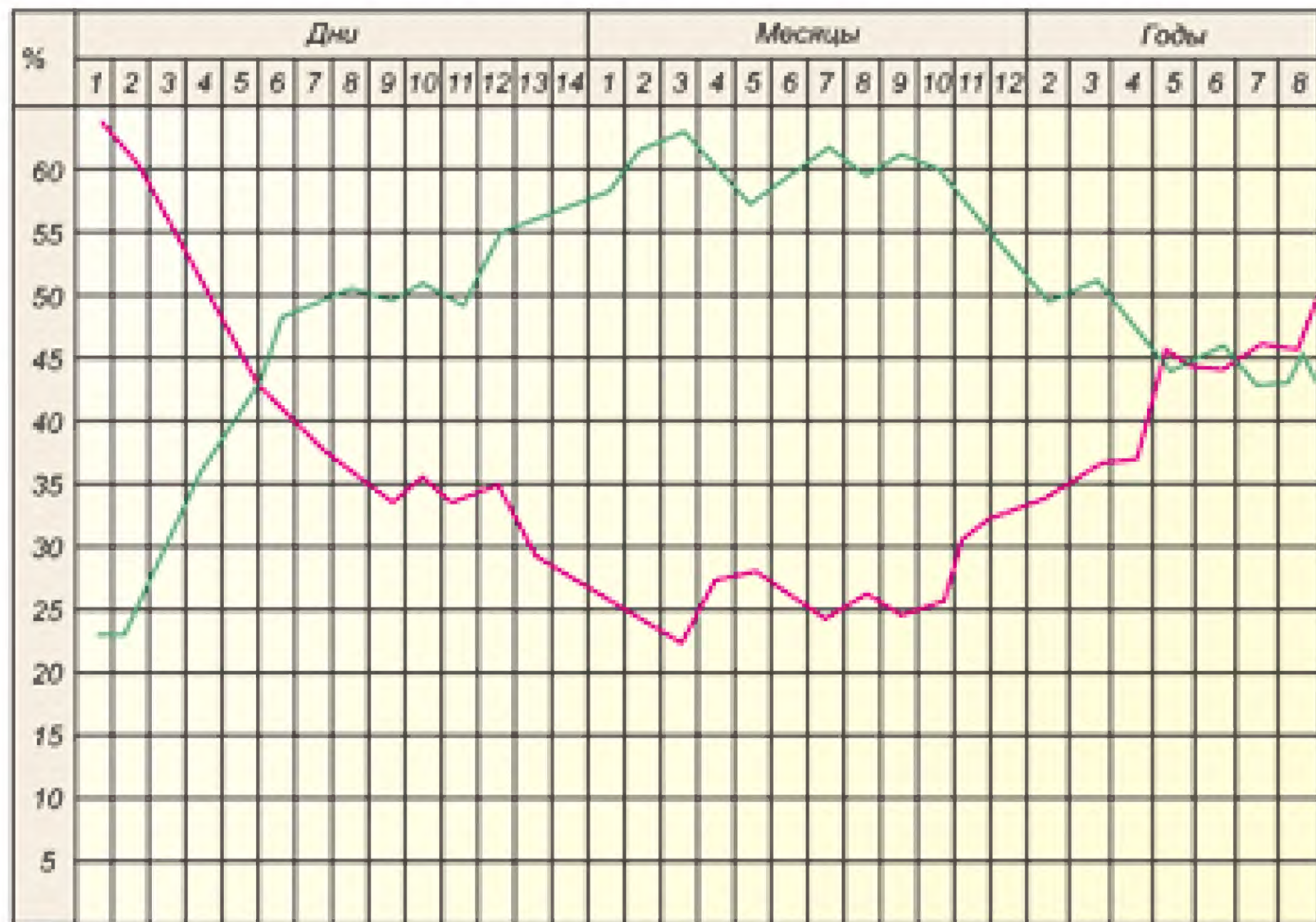
BLOOD

Indexes	New Borns	Infants	Schooling Children
Hb(g/l)	160 -180	120 - 140	120-130
Erythro- cytes (million)	5,5 – 6,0	4,0 – 5,0	3,5 – 4,5
Leuco- cytes (thousand)	Up to 30	Up to 12	Up to 7

PECULIARITIES OF WHITE BLOOD



Первый и второй перекрест нейтрофилов и лимфоцитов



DIGESTIVE SYSTEM (1)

- **Weakening of protective function of mucous membrane**
- **Decrease of secretory functional glands**
- **Hyposalivation up to 3-4 months (no amilase and decrease of ptyalin)**
- **V of stomach – on 2nd day – 10 – 20 ml
till 10th days – 80 ml
till 3rd month. – 120 ml
till 6th months. – 200-250 ml**
- **Content of digastric juice = similar to adults'**
- **Decrease activity of pepsin (in 10-15 times)**
- **Less lipase (difficulties in fat digestion)**

DIGESTIVE SYSTEM (2)

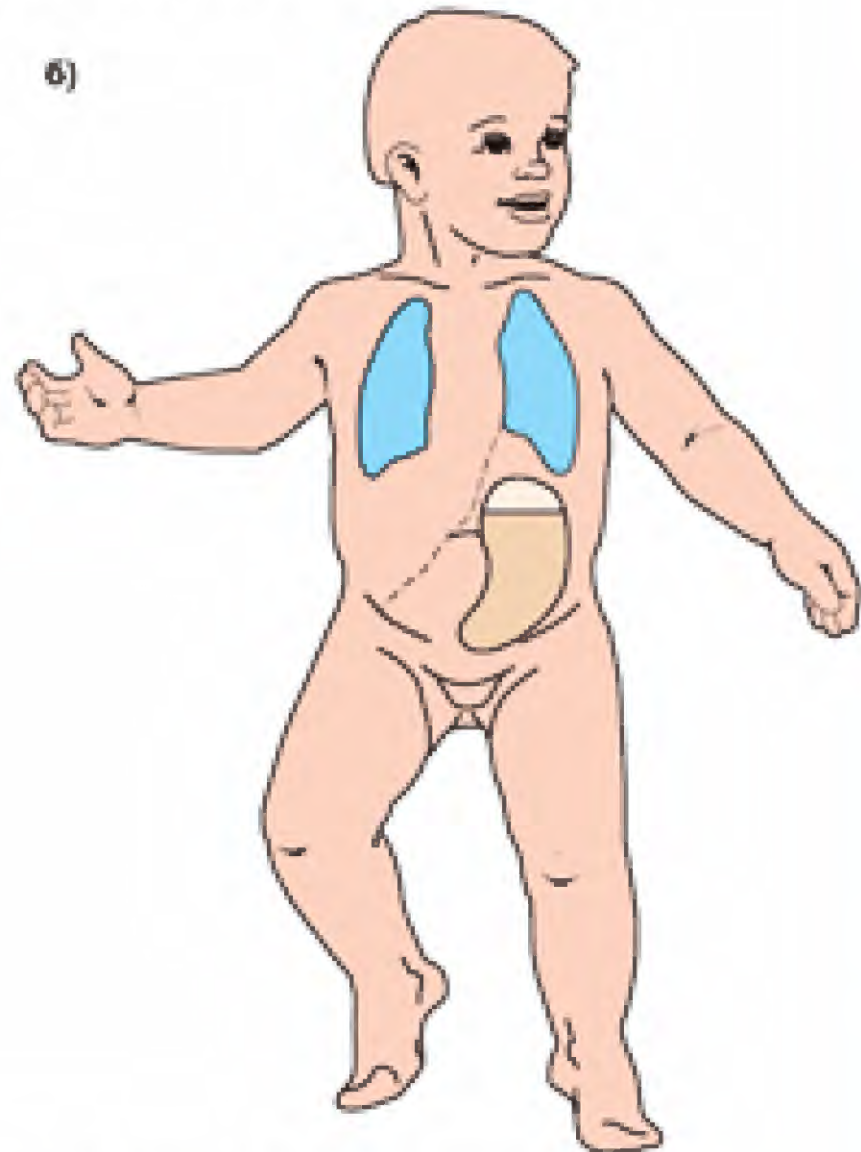
- **Total acidity *KC*** – new born- 3-6 ml 0,1N KOH, 1 year old- 15-20 ml, 12-15 years old- 40-60 ml
- **Pancreas** – low activity of enzymes
- **Intestines** – active contamination during and after birth (cocci, E.coli, acido. bac.)
- Natural feeding- bifido-bacteria
Artificial feeding- enterocooci, E.coli
- Stool- aft 30-40 hrs. after birth– meconium
first half year – 5-7 times
to end of 1st year – 1-2 times
elder than 1 year old – 1 time

Форма желудка

а)



б)



Форма и положение желудка: а) у новорожденного и ребенка до года; б) у ребенка после года

URINARY SYSTEM (1)

- Embryonic structure of kidneys (up to 5-6 years old)
- Filtration and concentration abilities of kidneys decrease
- Volume of urine relatively higher than adult's (intensive exchange process)
- Number of urination 10 day – 20-25
 - till 1 yr old – 15
 - till 2-3 yrs old- 10
 - elder than 3 yrs old – 6-7 times per day

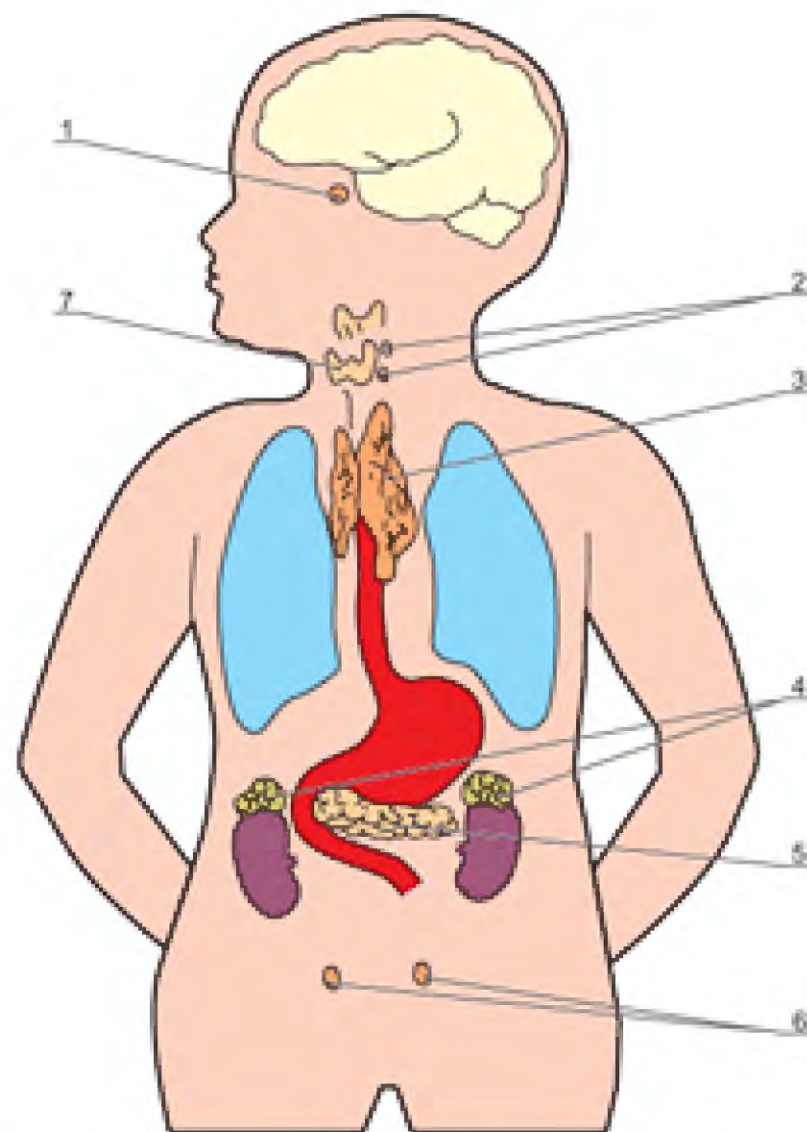
URINARY SYSTEM (2)

- **Density of urine – new born-1002-1004**
10 yrs old - 1020
- **Daily volume of urine –**
new born - 350ml
1 yr old - 600 ml
elder than 1 yr old:
 $600\text{ml} + 100 \times n$ (n - age)

ENDOCRINAL SYSTEM

- Prenatal and after birth- influence of mothers' hormones
- Thyroid gland- during birth relatively larger (congenital hypothyroidism)
- Hypophysis – satisfactory growth
- Thymus- too big, regress till 4-5 yrs of age (thymomegaly combine with hyperplasia of lymph nodes)
- Suprarenal glands- differentiate till end of 1st yr
- Sexual glands are formed till birth. Girls reach puberty earlier than boys

Железы внутренней секреции



1 – гипоталамус; 2 – гипофиз; 3 – щитовидная железа; 4 – надпочечники; 5 – поджелудочная железа; 6 – половые железы; 7 – тимус.

NERVOUS SYSTEM

- Morphological and functional immaturity (dynamical perfection)
- Reflexes of new born (change on deliberate days)
- Convolutions of brain of new born less apparent
- Cerebrum new born – $\frac{1}{8}$ of body mass
adult– $\frac{1}{40}$ of body mass
- By 9-10 yrs old weight of brain ~ 1300 g
increase of weight ends when reaches 18 yrs