

GENERAL OSTEOLOGY DEVELOPMENT AND GROWTH OF BONES



Olga R. Shangina, professor

Locomotion apparatus

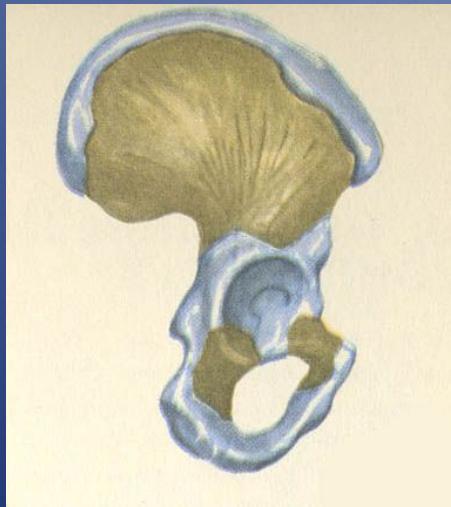
Passive component
(bones)

Active component
(muscles)

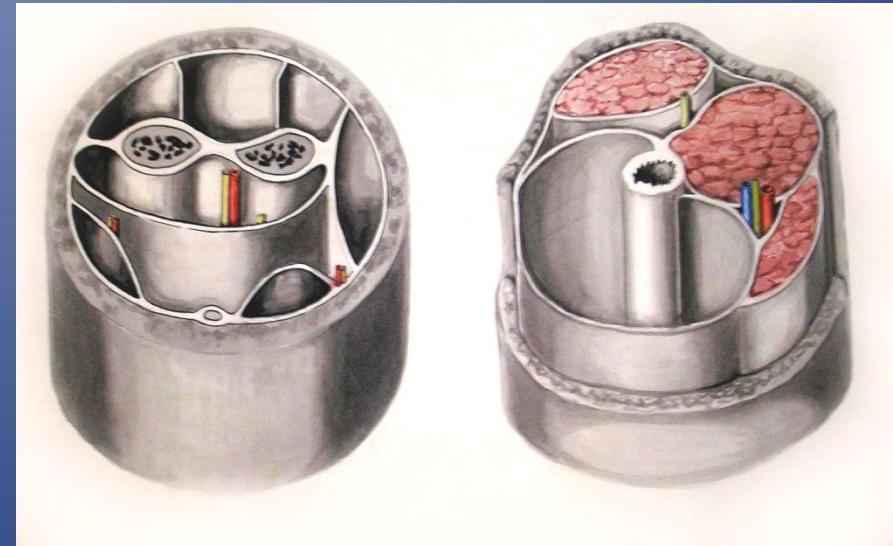


SKELETON

hard skeleton
bones, cartilages

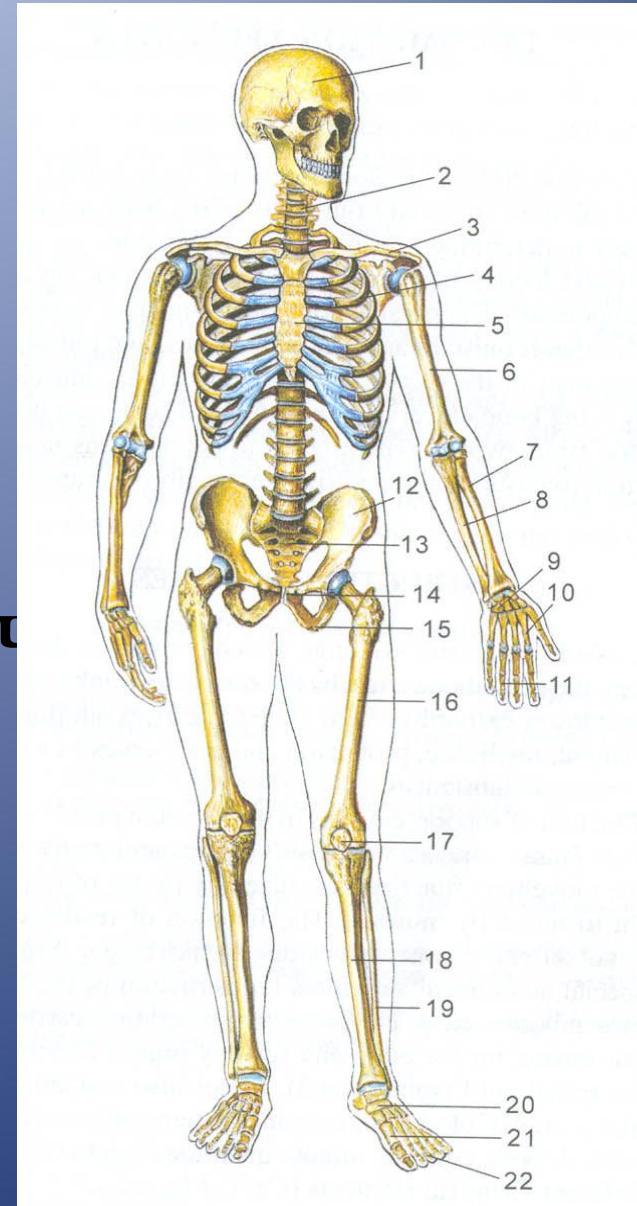


soft skeleton
muscles, fascies, ligaments



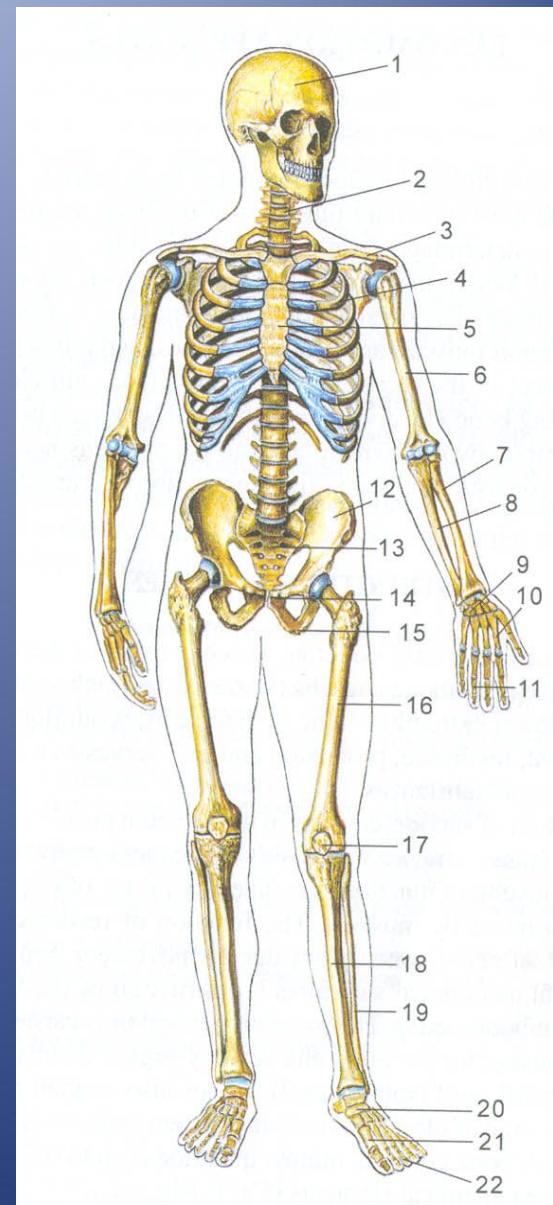
THE MECHANICAL FUNCTIONS OF BONES

- support
 - movement
 - protection
- общая



THE SKELETON CONTAINS 206 BONES

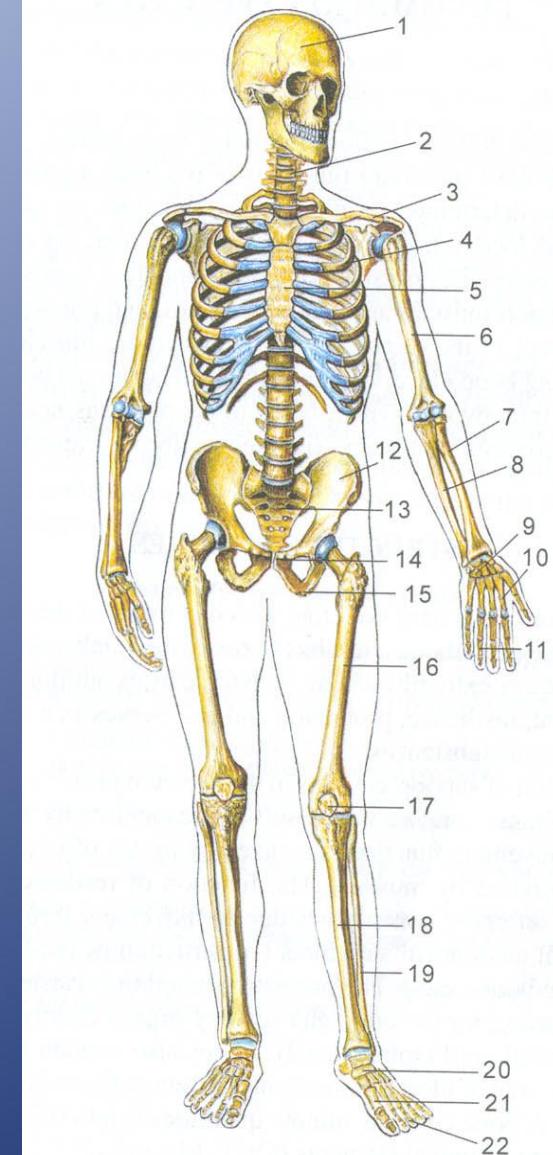
- 36 unpaired bones
- 85 paired bones



THE BIOLOGIC FUNCTIONS

Функции скелета

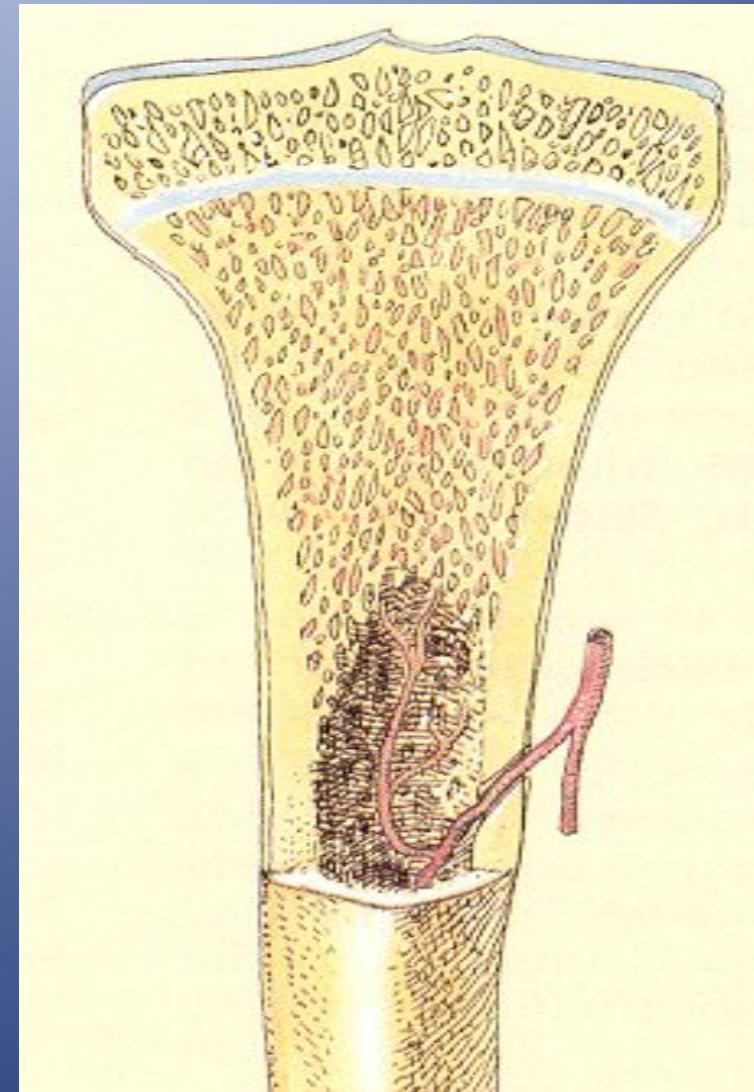
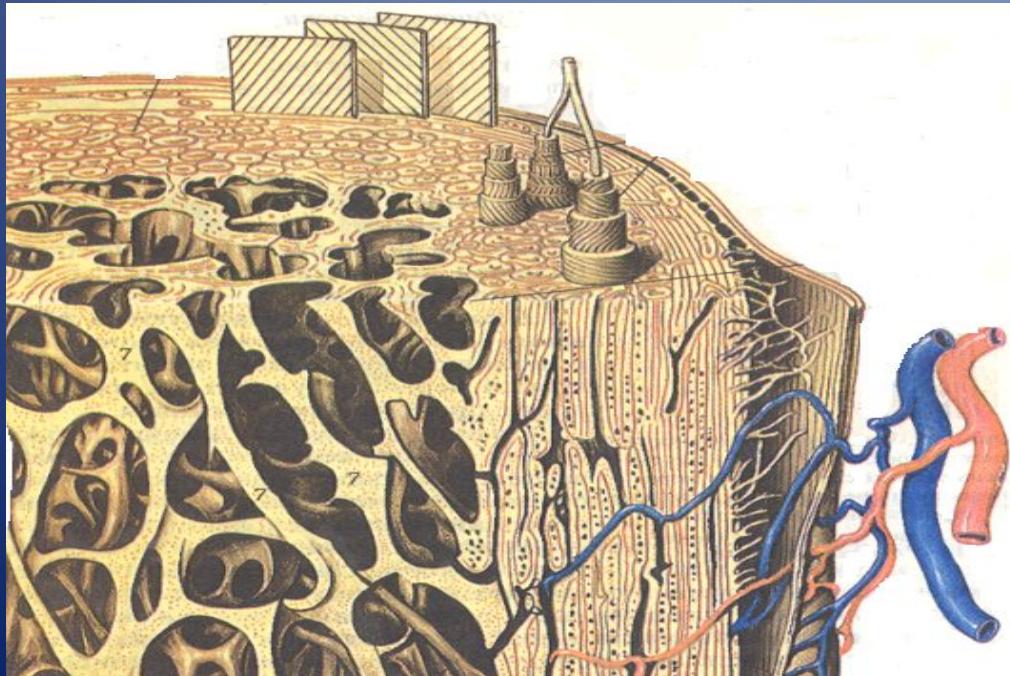
- bones contain bone marrow
- bones are a depot for mineral salts



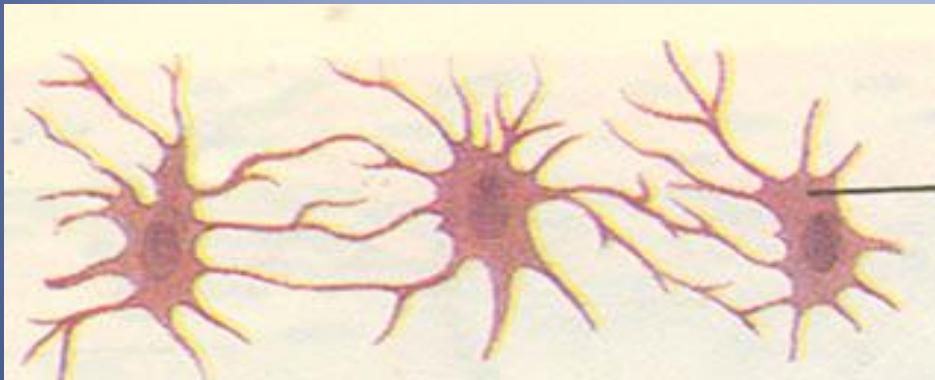
BONES CONSIST OF DIFFERENT KINDS OF TISSUES:

- osteal tissue
- periosteum
- bone marrow
- blood and lymphatic vessels
- nerves

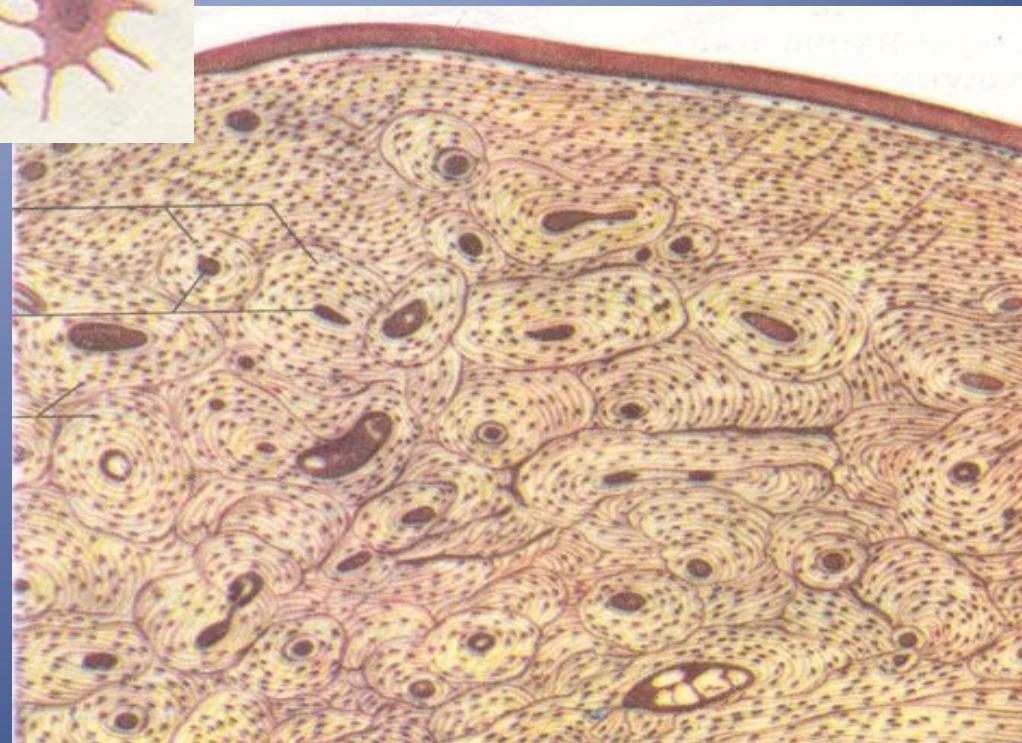
Ткани образующие кость:
костная
хрящевая
кровь и лимфа
жировая ткань
гладкая мышечная ткань
нервная ткань



THE BONE CELLS



osteoblasts
osteocytes
osteoclasts

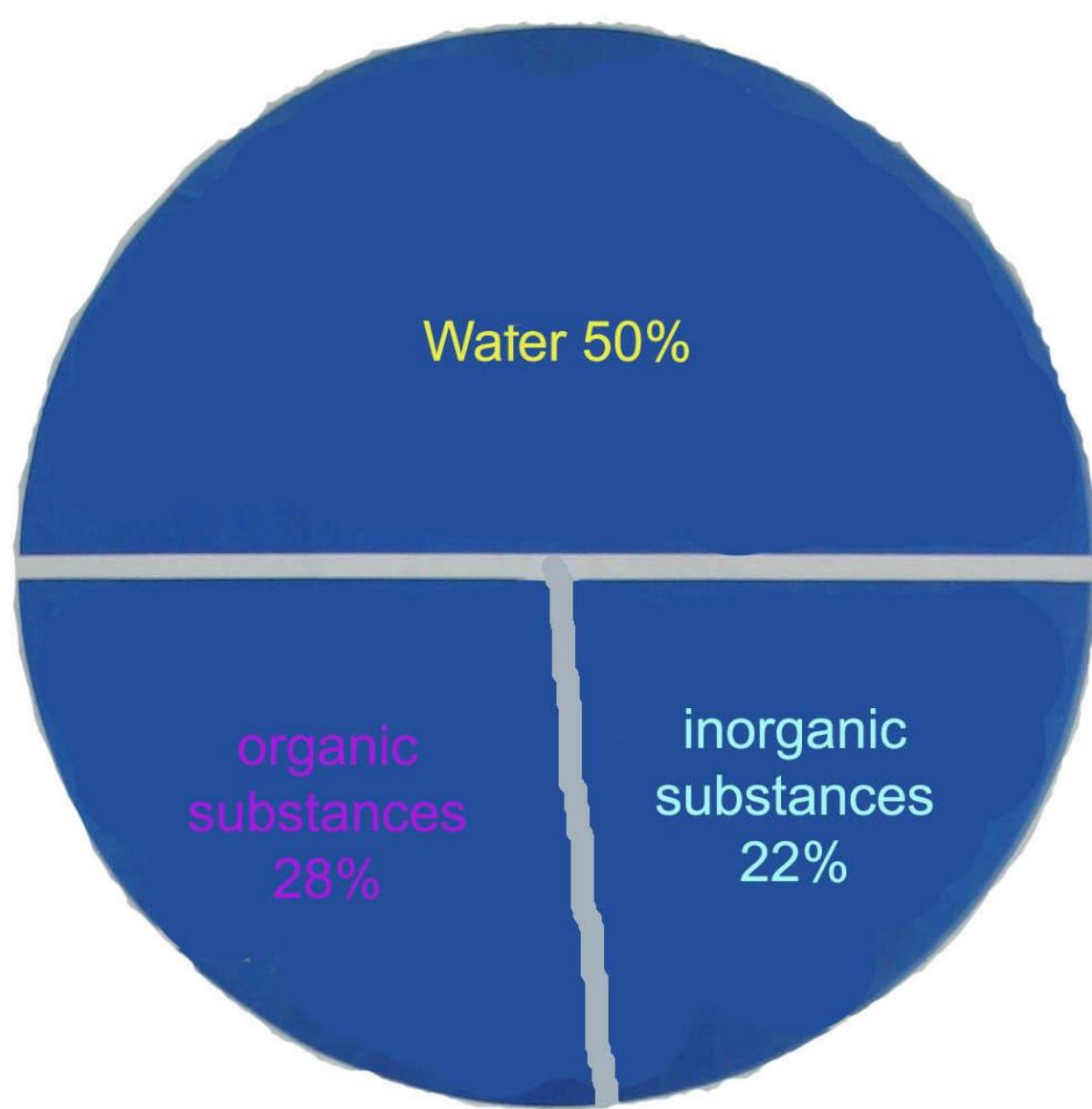


THE INORGANIC SUBSTANCES

- calcium
- magnesium
- phosphorus
- other elements

THE ORGANIC SUBSTANCES one called «ossein»

CHEMICAL COMPOSITION OF BONES

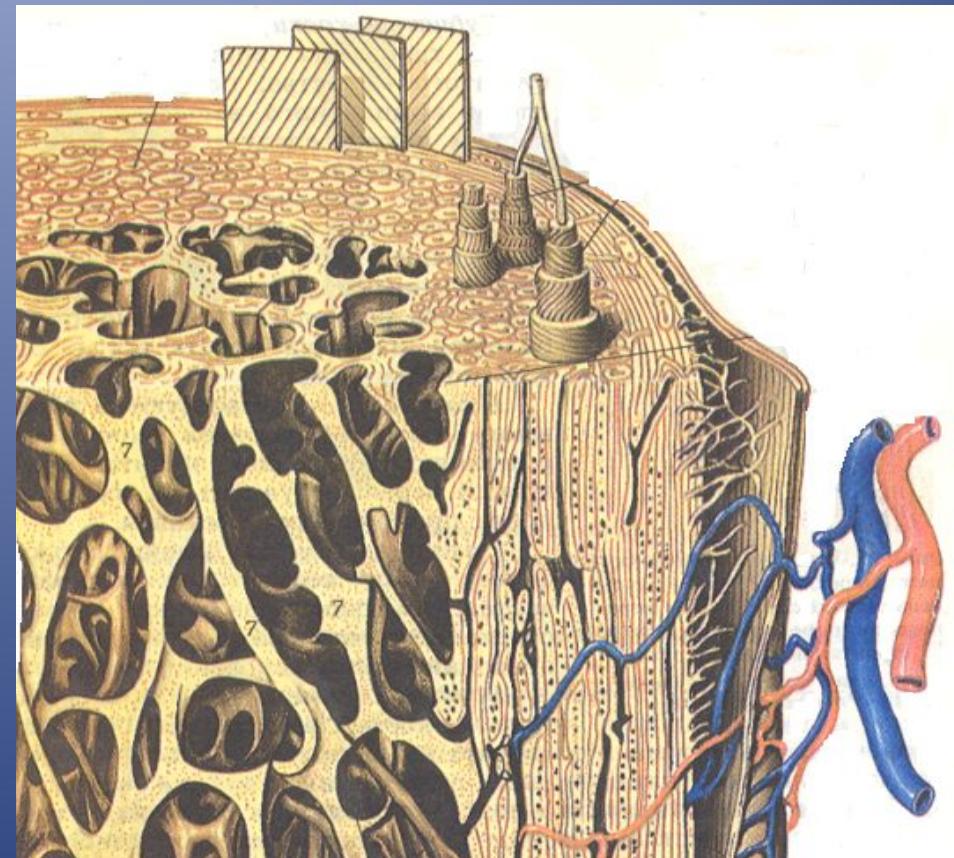


PROPERTIES OF BONE

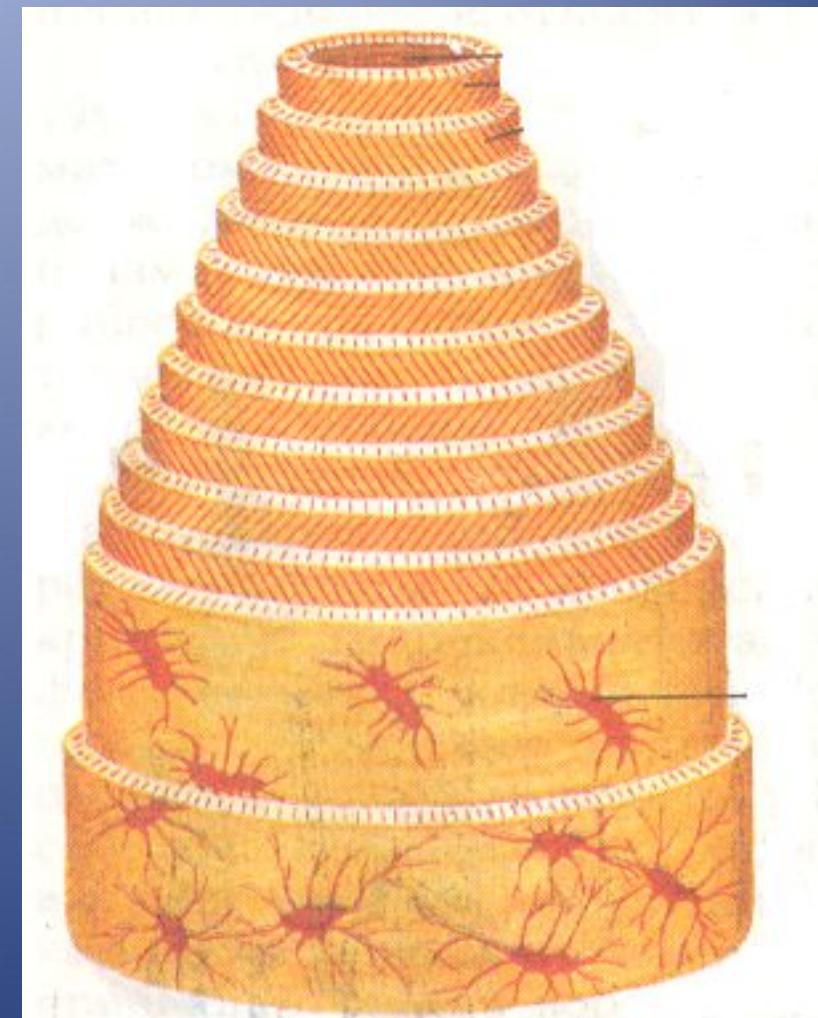
- resilience
- strength
- Электропроводимость
- Звукопроводимость
- Прочие

ВИДЫ КОСТНЫХ ПЛАСТИНОК

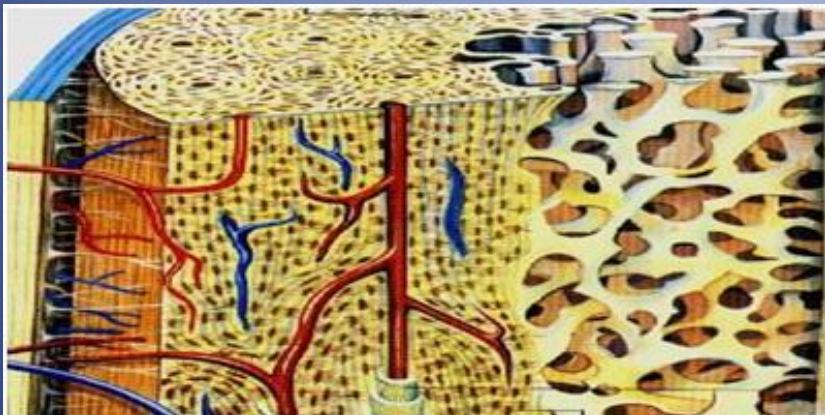
- ЦИЛИНДРИЧЕСКИЕ
- ВСТАВОЧНЫЕ
- ГЕНЕРАЛЬНЫЕ



OSTEON



BONE TISSUE



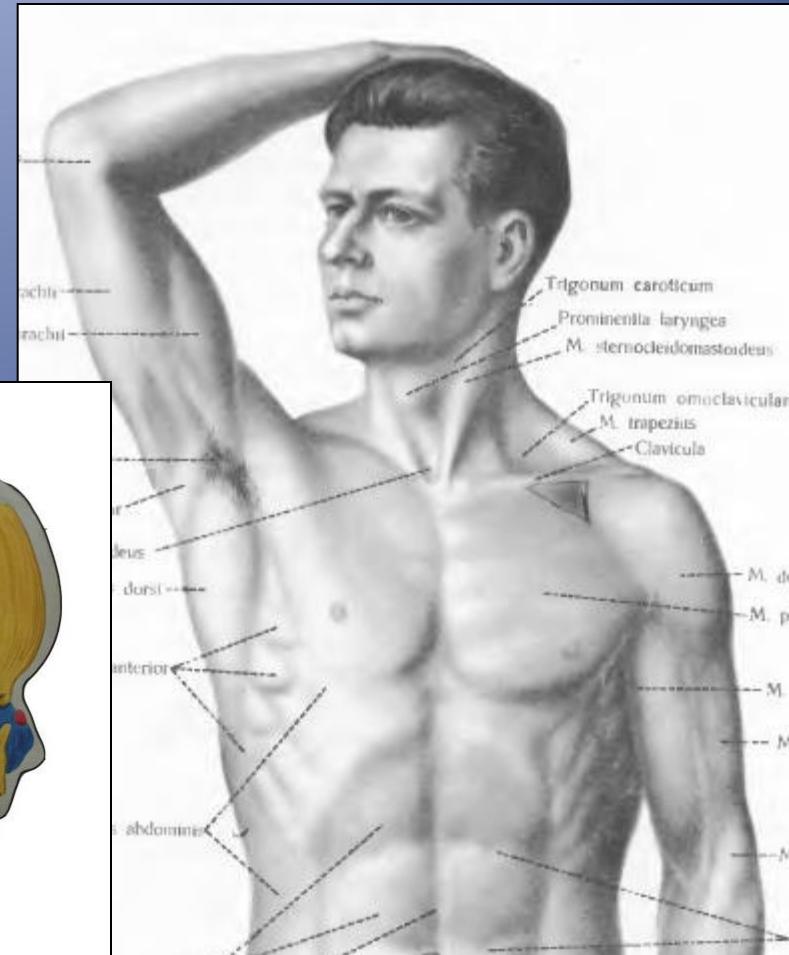
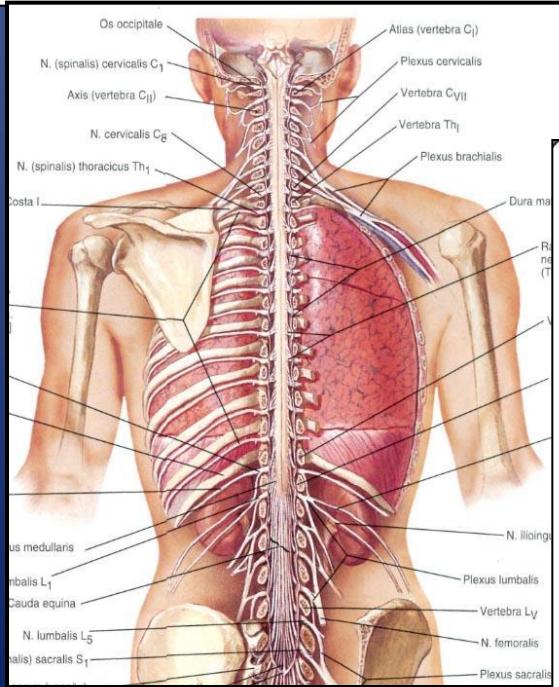
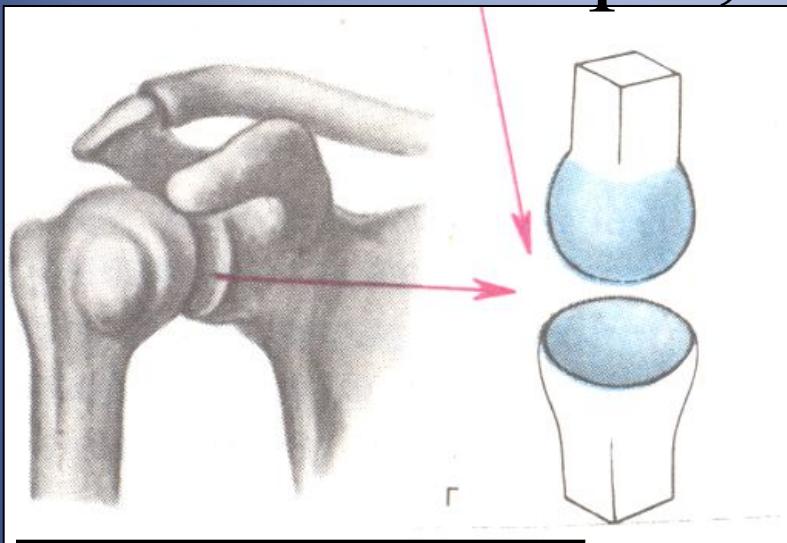
compact



spongy



Факторы, влияющие на внешнюю структуру костей

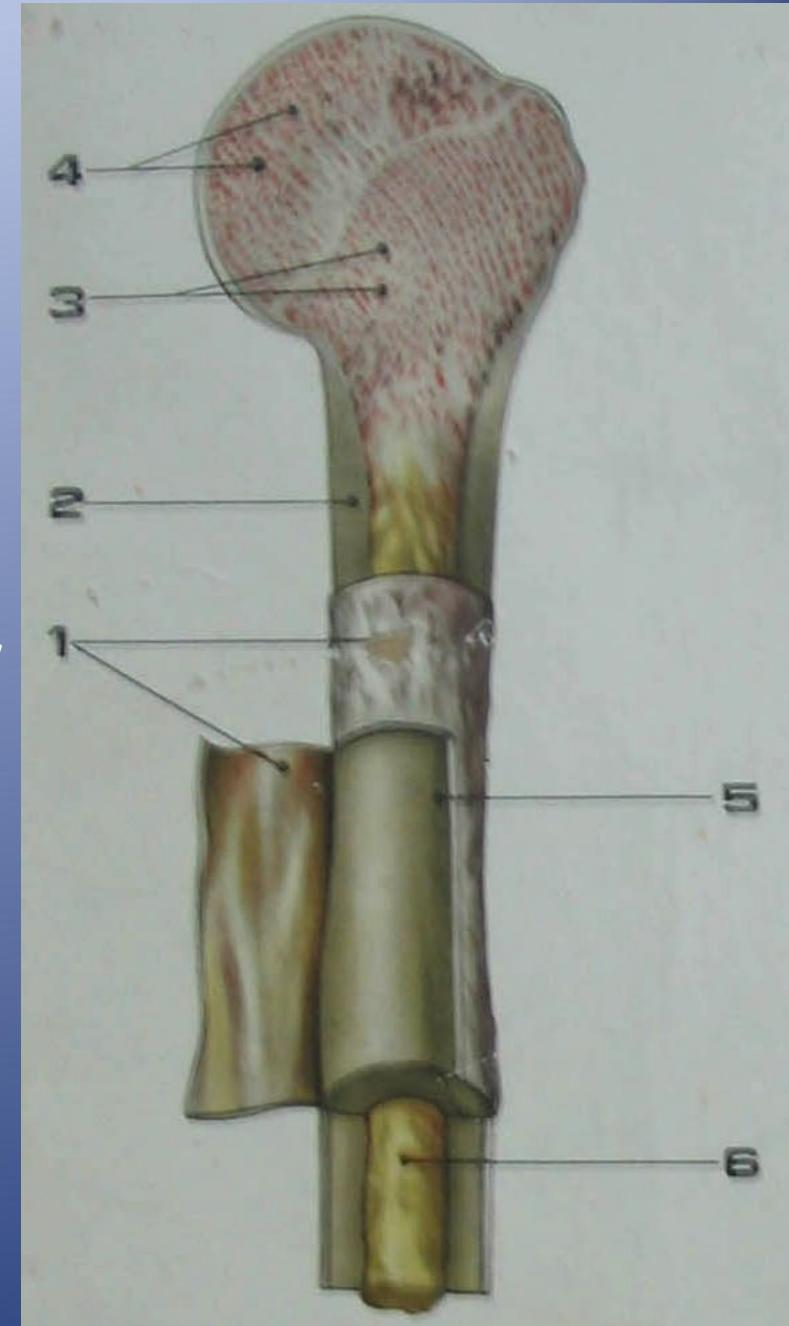


Факторы, влияющие на внутреннюю структуру костей

- возраст
- пол
- питание
- образ жизни (спорт, вредные привычки и др.)
- профессия
- и другие причины

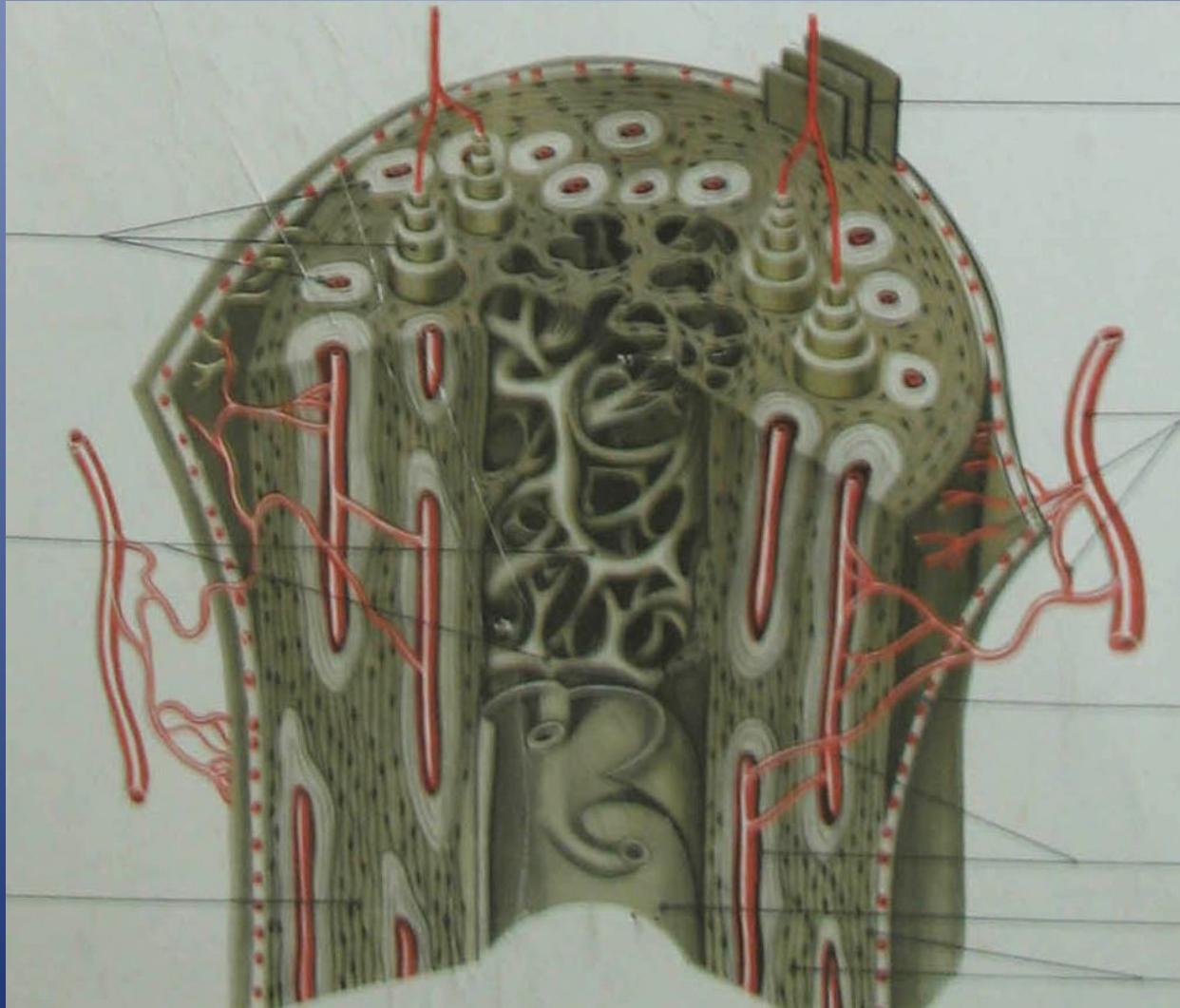
THE BONE MARROW

- red bone marrow
- yellow bone marrow



Периост

Эндост



THE PRINCIPLES OF CLASSIFICATION OF BONES

- the shape
- the structure
- the development
- the function

BONES ARE DIVIDED INTO:

- tubular (*long, short*)
- spongy (*long, short*)
- flat
- mixed
- pneumatic

CLASSIFICATION OF BONES BY THE STRUCTURE

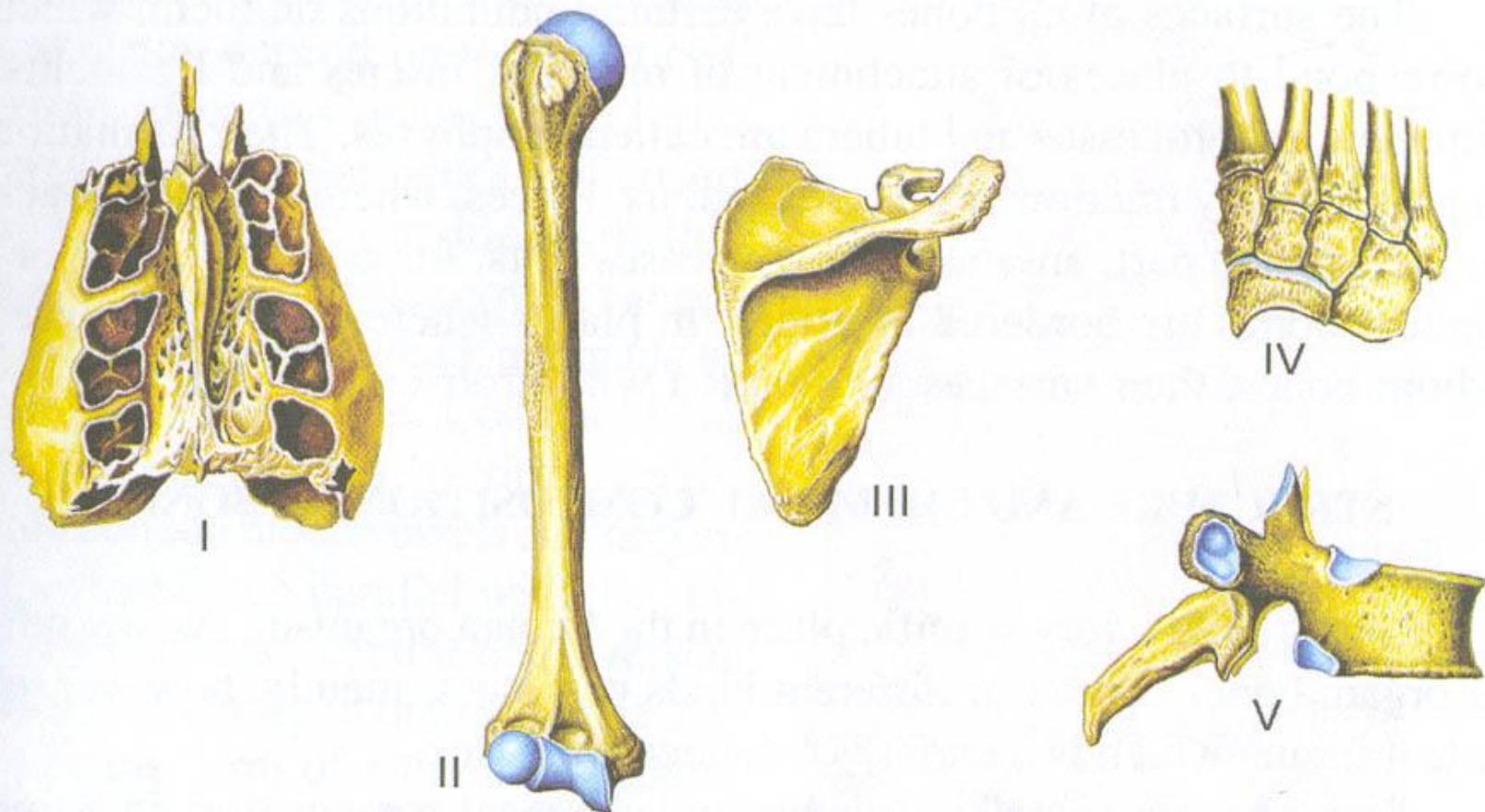
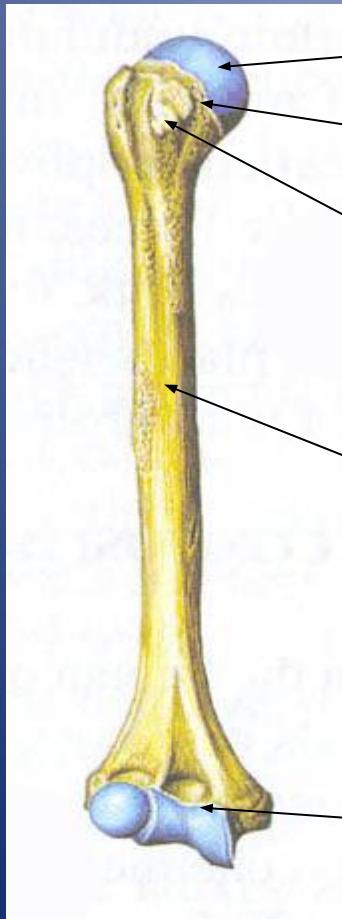


Fig. 34. Types of bones.

I - pneumatized bone (ethmoidal bone); II — long bone; III — flat bone; IV — short (spongy) bones;
V — irregular bone.

THE PARTS OF THE TUBULAR BONES:

LONG

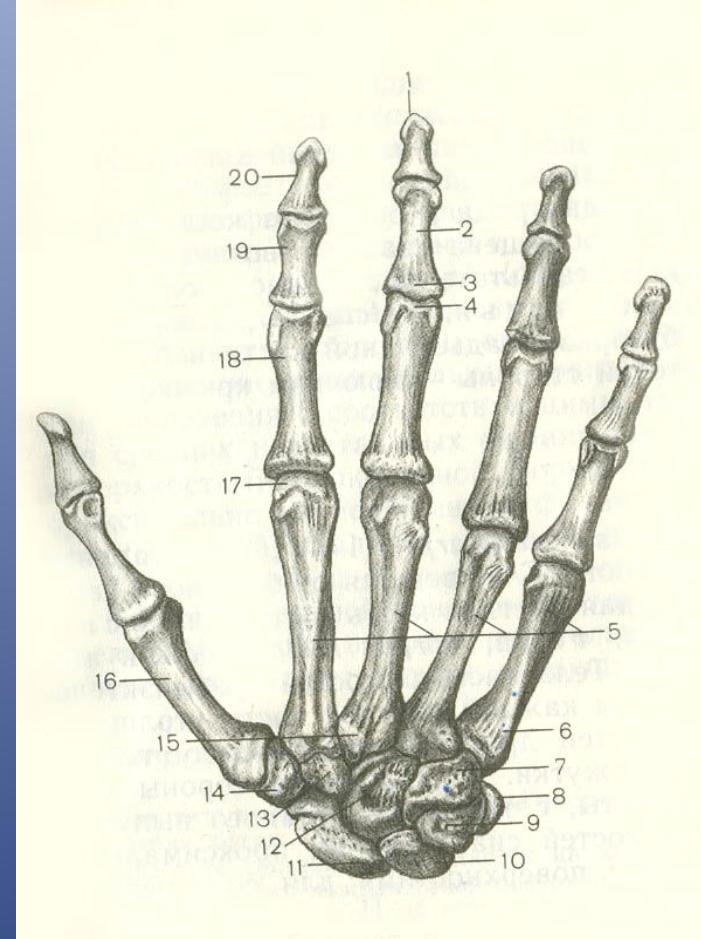


epiphysis
the proximal
metaphysis
apophyses

diaphysis

epiphysis
the distal

SHO T



TWO KINDS OF CELLS TAKE PART IN FORMING OF BONES

- OSTEOBLASTES
- OSTECLASTES

THESE CELLS ARE CONTAINED IN
THE DEEP LAYER OF:

- THE PERIOSTEUM
- THE PERICHONDRIUM

THERE ARE 4 WAYS OF OSSIFICATION

- INTRAMEMBANOUS
- PERICHONDRAL
- ENDOCHONDRAL
- PERIOSTEAL

THE STAGES OF DEVELOPMENT OF BONES

1. *CONNECTIVE TISSUE*
2. *CARTILAGE TISSUE*
3. *OSTEAL TISSUE*

SECONDARY BONES PASS 3 STAGES

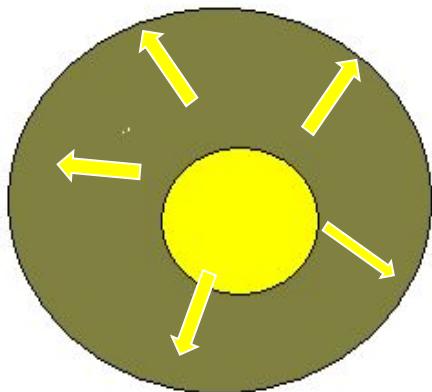
PRIMARY BONES PASS 2 STAGES
(CONNECTIVE TISSUE AND OSTEAL TISSUE)

TYPES OF OSSIFICATION

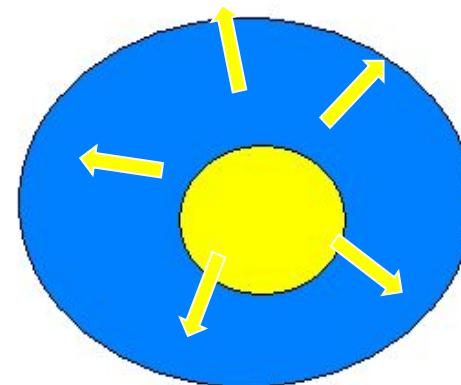
CONNECTIVE TISSUE

CARTILAGE TISSUE

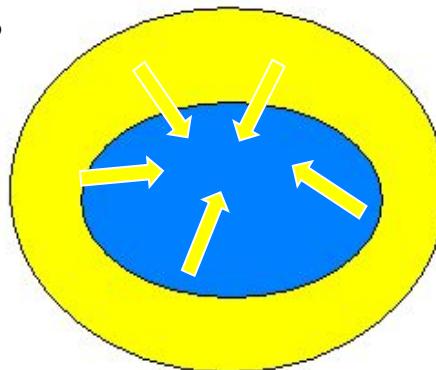
OSTEAL TISSUE



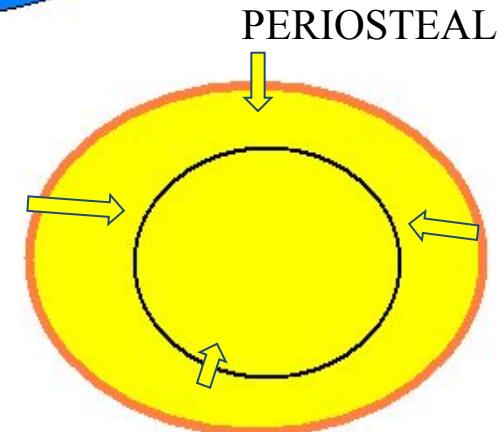
INTRAMEMBANOUS



ENDOCHONDRAL



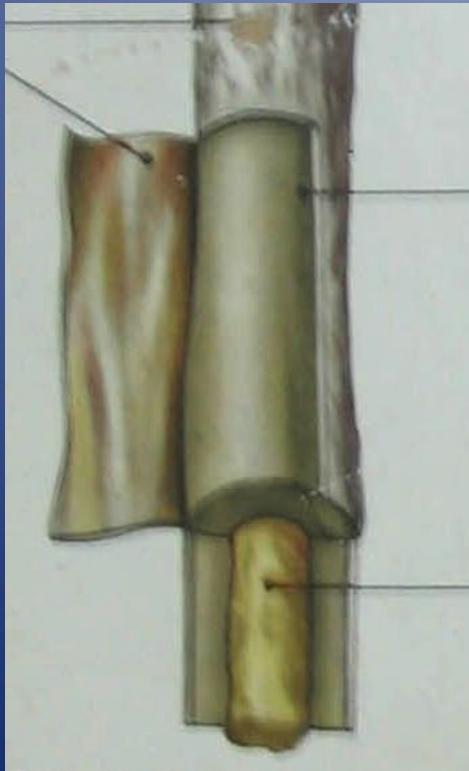
PERICHONDRAL



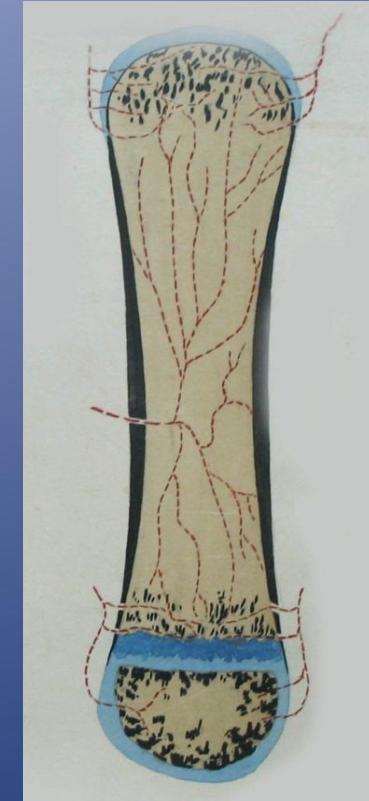
PERIOSTEAL

GROWTH OF BONE

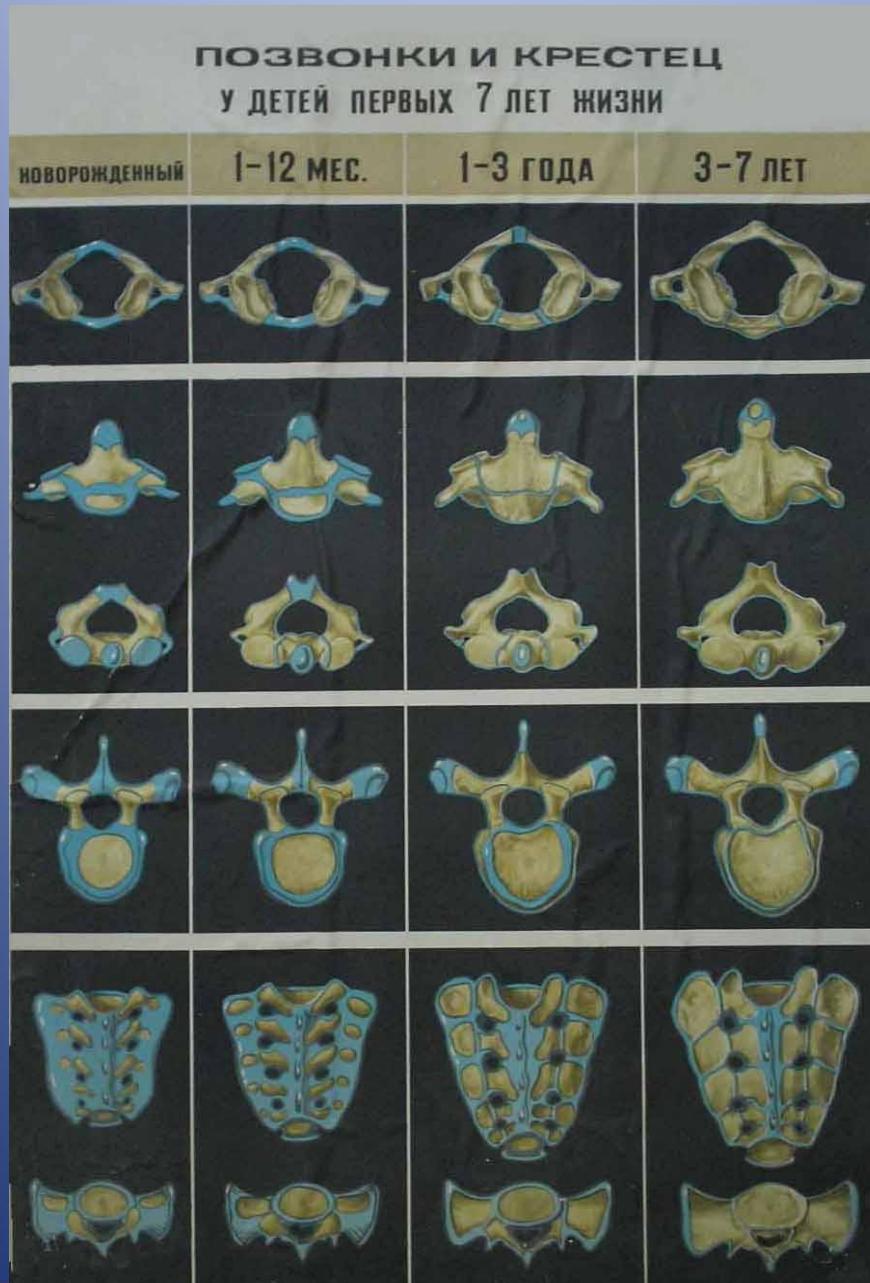
in width is provided by the periosteum



in length is provided by the metaphysial cartilage



DEVELOPMENT OF THE BONES OF THE TRUNK



VARIANTS AND ANOMALIES in development

VERTEBRAE

- SPINA BIFIDA LATERALIS
- SPINA BIFIDA POSTERIOR
- SACRALIZATION
- LUMBARIZATION



VARIANTS AND ANOMALIES IN DEVELOPMENT

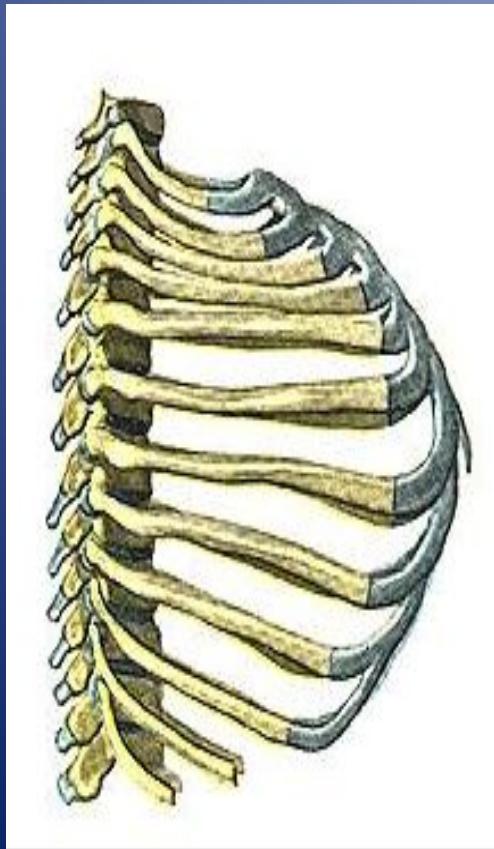
RIBS

CERVICAL RIBS

LUMBAR RIBS

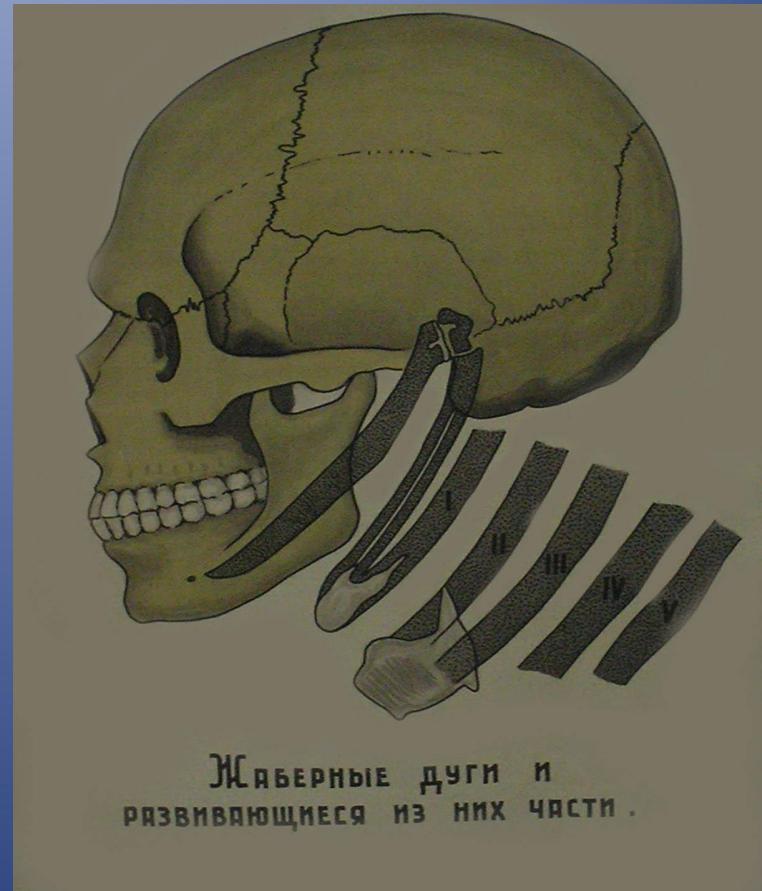
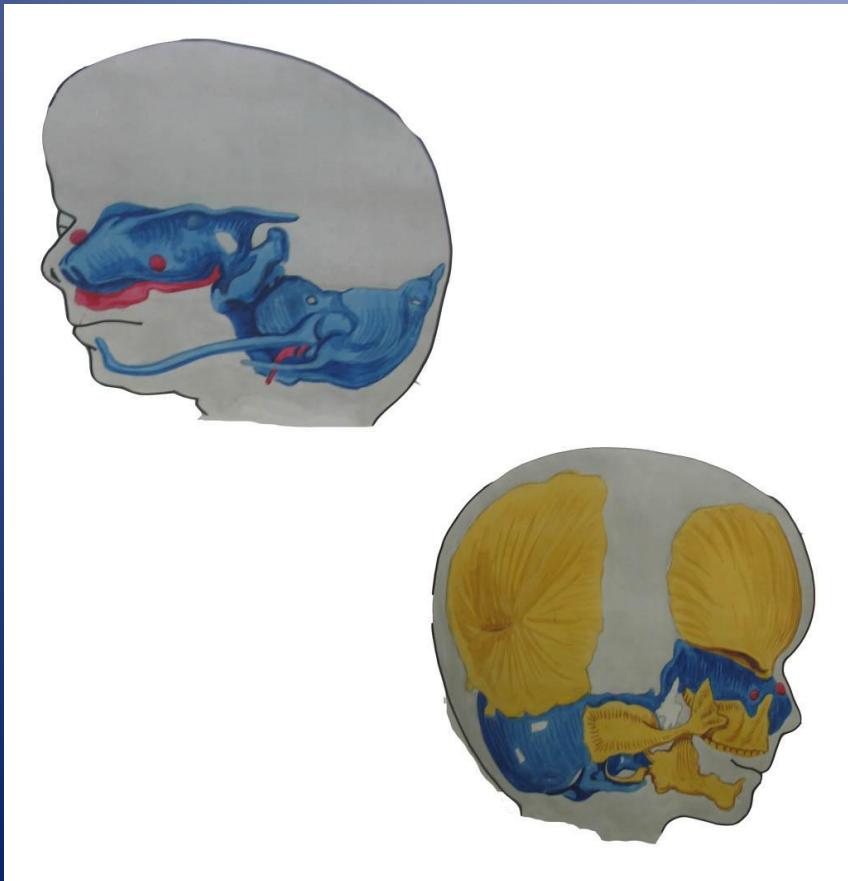
MERGIG NEIGHBOUR RIBS

SPLITTING RIBS



DEVELOPMENT OF THE BONES OF SKULL

- THE PRIMARY BONES – DEVELOP INTROMEMBRANOUS WAY
- THE SECONDARY BONES – DEVELOP ENDOCHONDRAL WAY
- BONES DEVELOPING FROM THE VISCERAL ARCHES



SKULL OF NEWBORN

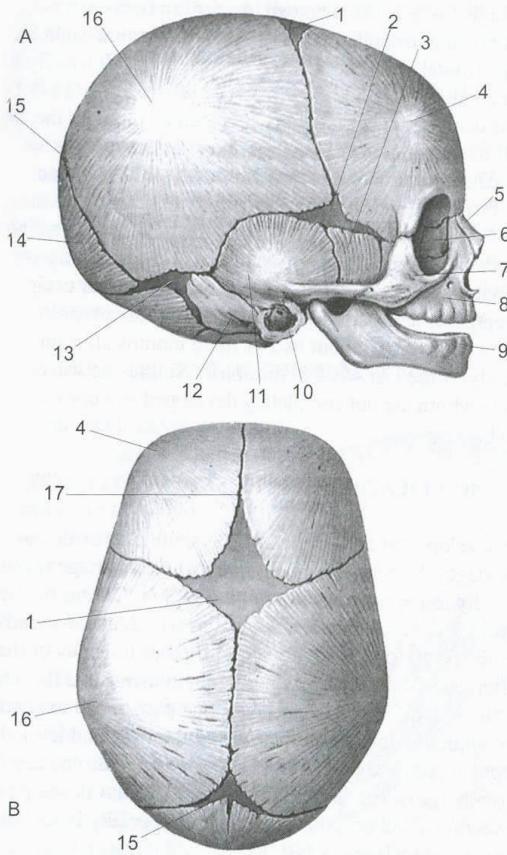
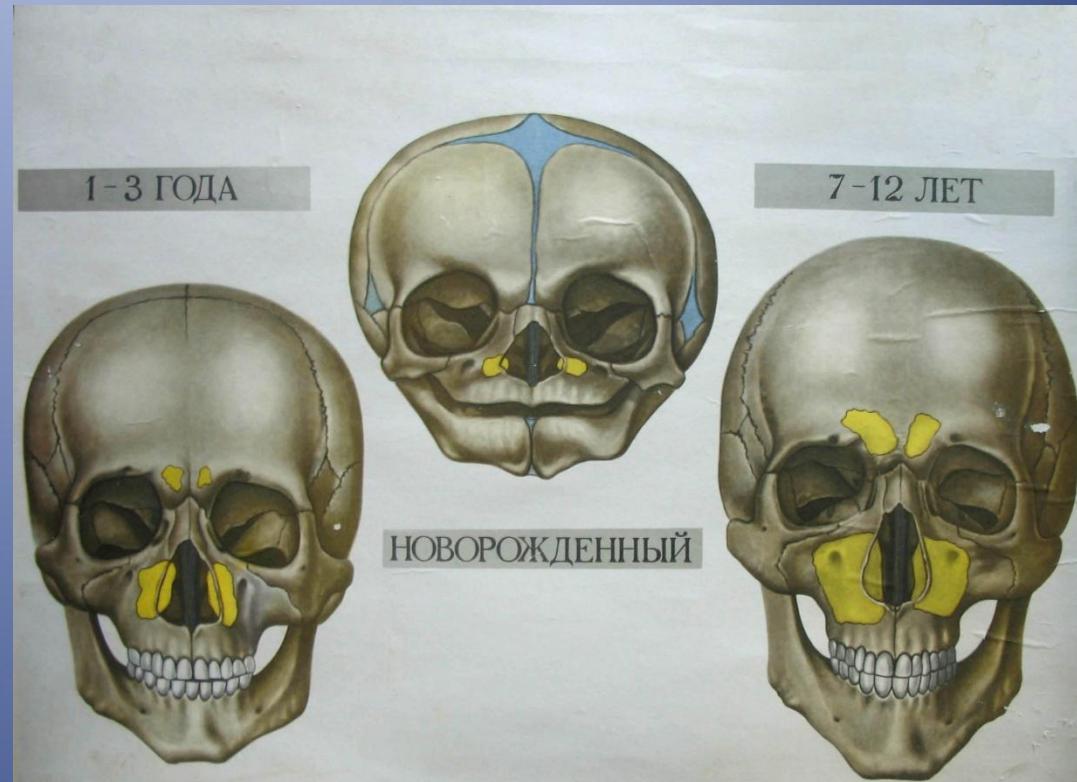


Fig. 58. Cranium of newborn. Lateral aspect (A) and superior aspect (B).

1 — anterior fontanelle; 2 — sphenoidal fontanelle; 3 — greater wing of sphenoidal bone; 4 — frontal tuber; 5 — nasal bone; 6 — lacrimal bone; 7 — zygomatic bone; 8 — maxilla; 9 — mandible; 10 — tympanic ring of temporal bone; 11 — squamous part of temporal bone; 12 — lateral part of occipital bone; 13 — mastoid fontanelle; 14 — squamous part of occipital bone; 15 — posterior fontanelle; 16 — parietal tuber; 17 — frontal suture.



ANOMALIES OF THE SKULL

- **ABSENCE OF THE VAULT OF THE SKULL**
- **ABSENCE OF THE FACIAL SKULL**
- **ABSENCE OR UNDERDEVELOPED OF MANDIBULE**
- **CLEFT PALATE (PALATINUM FISSUM)**
- **TOWER SKULL**

