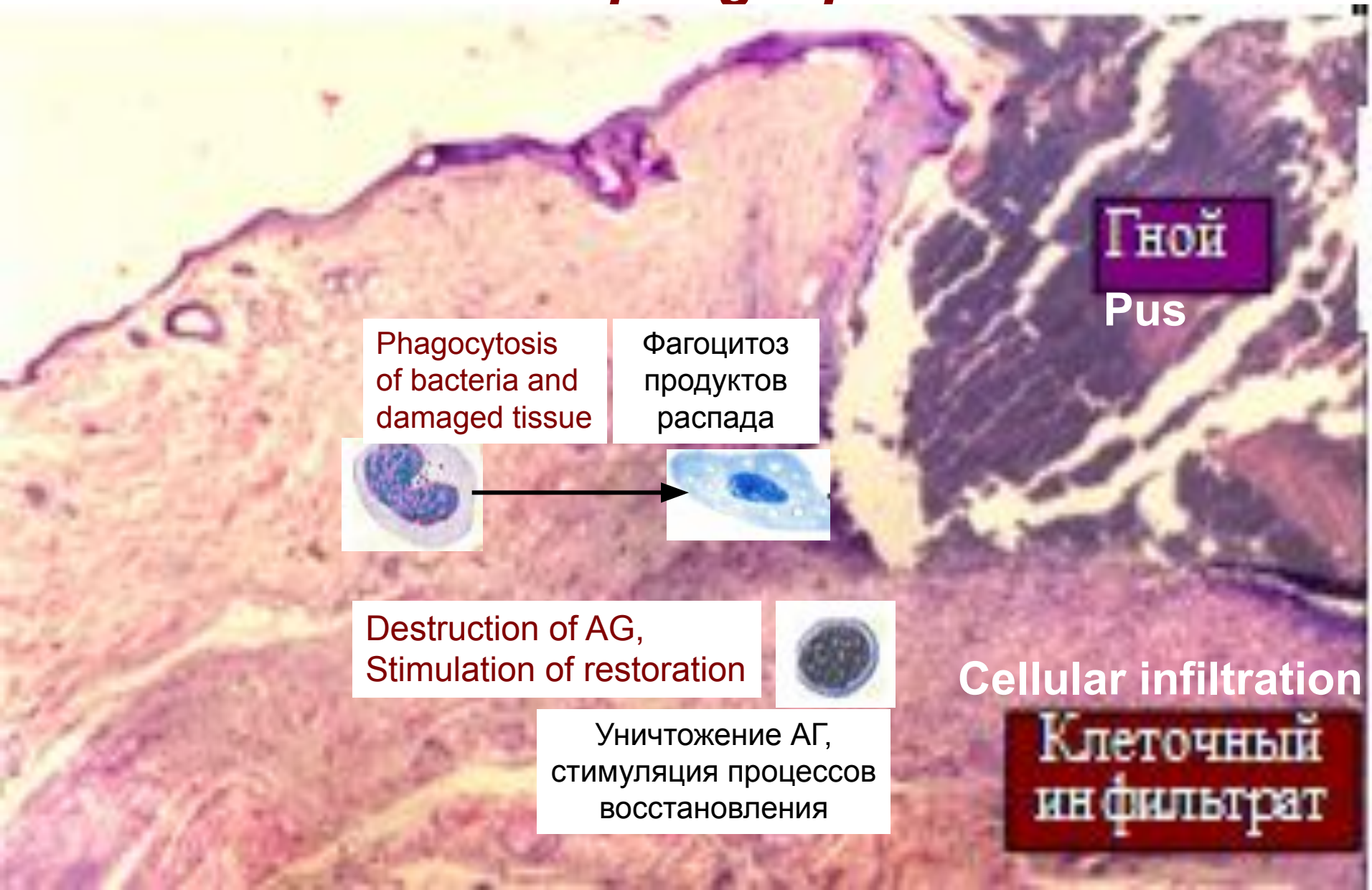
Inflammatory reaction of an organism

is carried out by a loose collagen tissue together with leukocytes of blood

- At damage of a tissue ***labrocytes*** react the first and throw out the granules in tissue, histamin increases permeability of capillaries for blood plasma and leukocytes. Plasma collects in a tissue and creates ***an inflammatory oedema*** which separates the inflammatory focus from healthy tissues and does not allow to extend to products of disintegration on an organism.
- ***Neutrophils*** come the first to the center of damage. They throw out in a tissue much oxygen superoxide, lysosomal enzyms and contents of specific granules, and then perish. Oxygen superoxide and lysocim destroy bacteria, cation-proteins increase an oedema, and lysosomal enzymes even more destroy the damaged tissue. This phase of an inflammation refers to ***leucocytic*** (or the ***sharp period***).
- Then ***the*** **macrophagic** ***phase*** develops. ***Macrophages*** come to the center of damage and phagocyte bacteria and products of disintegration of tissue, completely clearing from them the inflammatory focus.
- ***The fibroblastic (reparative) phase*** begins. ***Fibroblasts*** are actively made multiple copies, form around of the cleared site of damage a fibroblastic capsule and secrete of fundamantal substance and collagen of 1 type of which at once form thick fibres, filling with them defect of a tissue. Vessels grow into a capsule, the granulation tissue is formed of thick, rough collagenic fibres and vessels. Within the next 6 months rough scar is gradually reconstructed, thick fibres from collagen of 1 type are replaced with more thin fibres from collagen 3 types

Лейкоцитарная фаза воспаления (в коже)
Leucocytic phase of inflammation (in skin)

Макрофагическая фаза
Macrophagic phase



Фибробластическая (репаративная) фаза
Fibroblastic (reparative) phase

1. Образование капсулы из фибробластов.
   Formation of capsule from fibroblasts
2. Секреция основного вещества и волокон.
   Secretion of fundamantal substance and fibers

Формирование рубца
Formation of scar

1. Прорастание сосудов. Growth of vessels
2. Формирование рубца из грануляционной соединительной ткани (коллаген I типа)
Formation of scar from granulation connective Tissue (collagen 1 type)

Хрящевая ткань
Cartilage tissue

Клетки (cells):

Хондроциты ***Chondrocyte***

Хондробласты ***Chondroblast***

Межклеточное вещество
Intercellular substance:

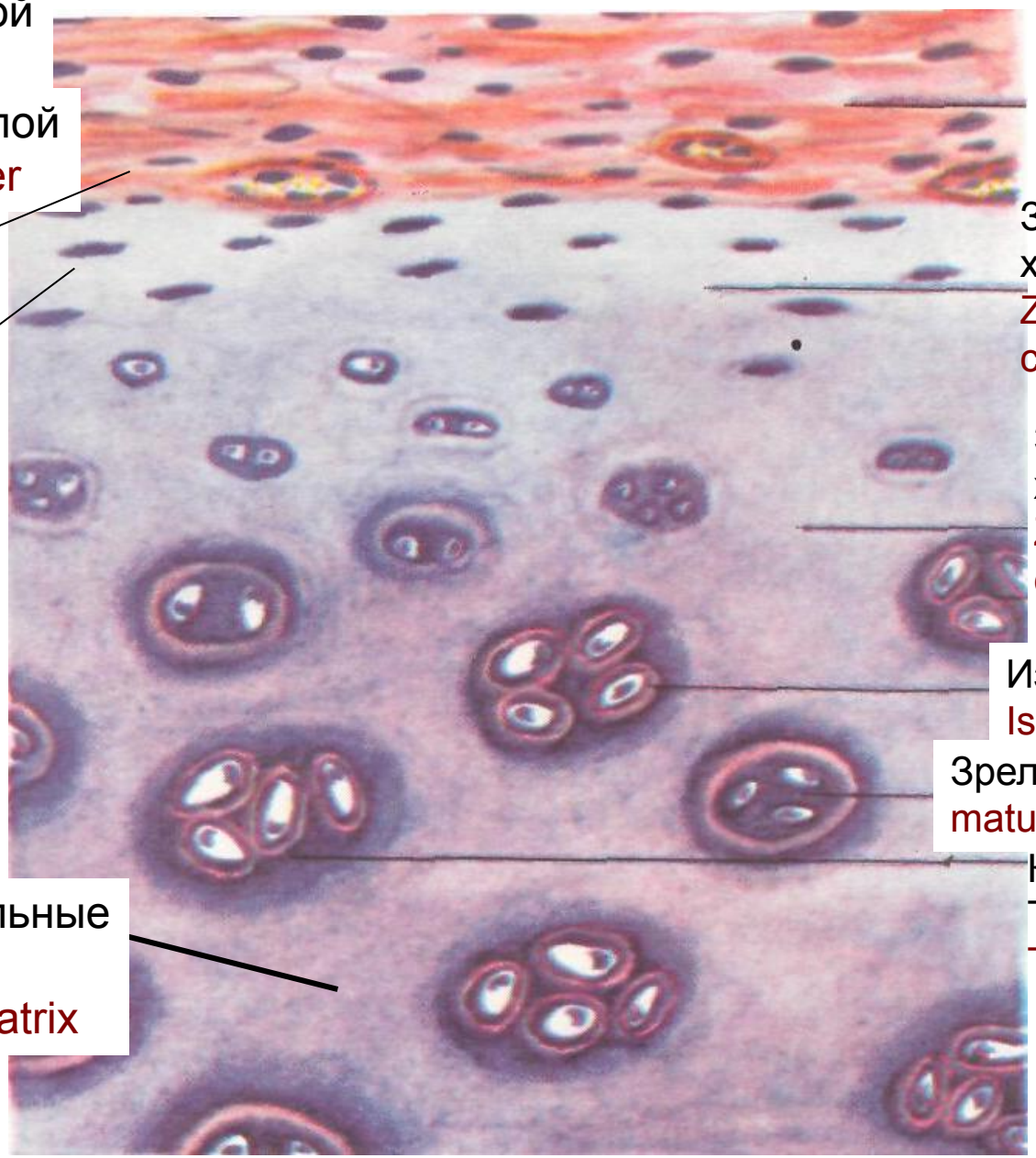
Хондриновые волокна:

- коллагеновые collagenic
- эластические elastic

Основное вещество – ***Хондромукоид***
(amorphous substance):

- 80% воды (water)
- 4-7 % минеральных солей (salts)
- белки – гликопротеиды, протеогликаны, альбумин, glycoproteins, proteoglycans, albumin
- ГАГ (GAG) - гиалуроновая кислота, хондроитинсульфаты

Гиалиновая хрящевая ткань *Hyaline cartilage tissue*



Волокнистый слой
Fibrous layer

Хондрогенный слой
Chondogenic layer

Хондробласты
Chondroblasts

Молодые
Хондроциты
Young
chondrocytes

Межтерриториальные
зоны
Interterritorial matrix

Надхрящница
Perichondrium

Зона молодого
хряща
Zone of young
chondrocytes

Зона зрелого
хряща
Zone of mature
chondrocytes

Изогенные группы
Isogenic group

Зрелые хондроциты
mature chondrocytes

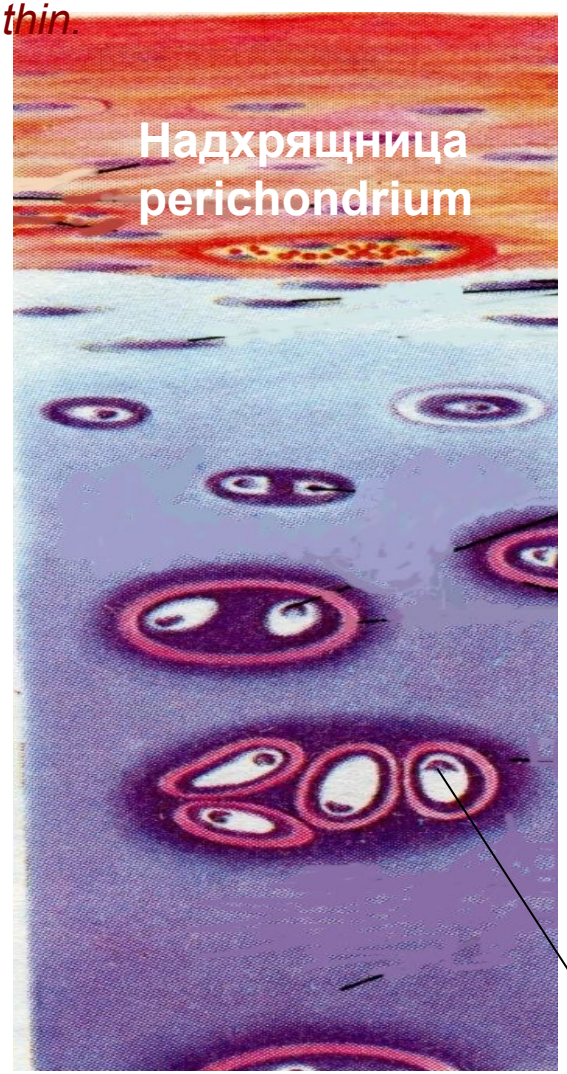
Клеточная
Территория
Territorial cell matrix

The cartilage grows in two ways:

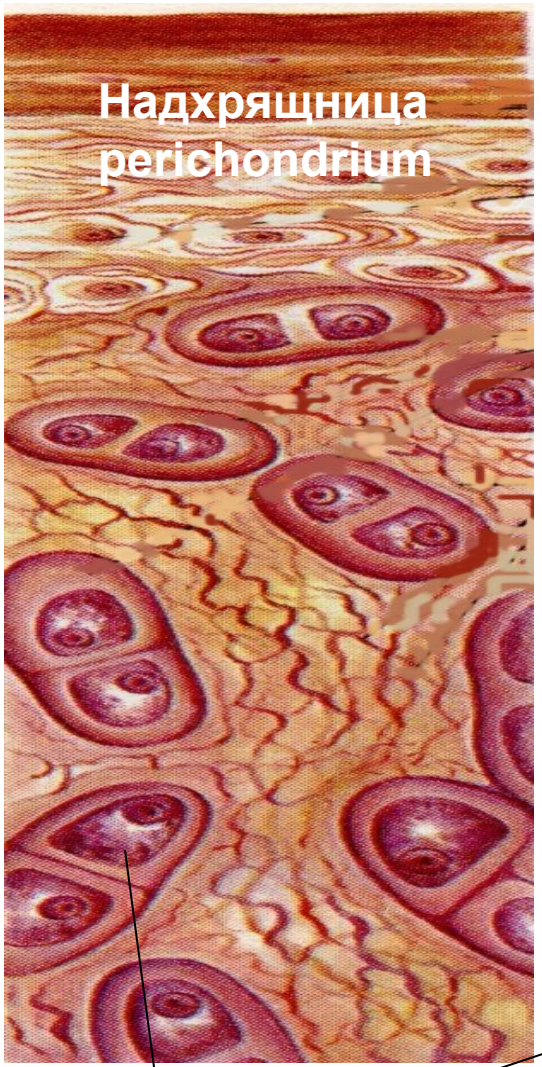
- interstitial growth (inside) by formation **isogenic groups**,
- appositional growth (outside) by stratification new ***young chondrocytes.***

Виды хрящевой ткани *Types of* **cartilage tissue**

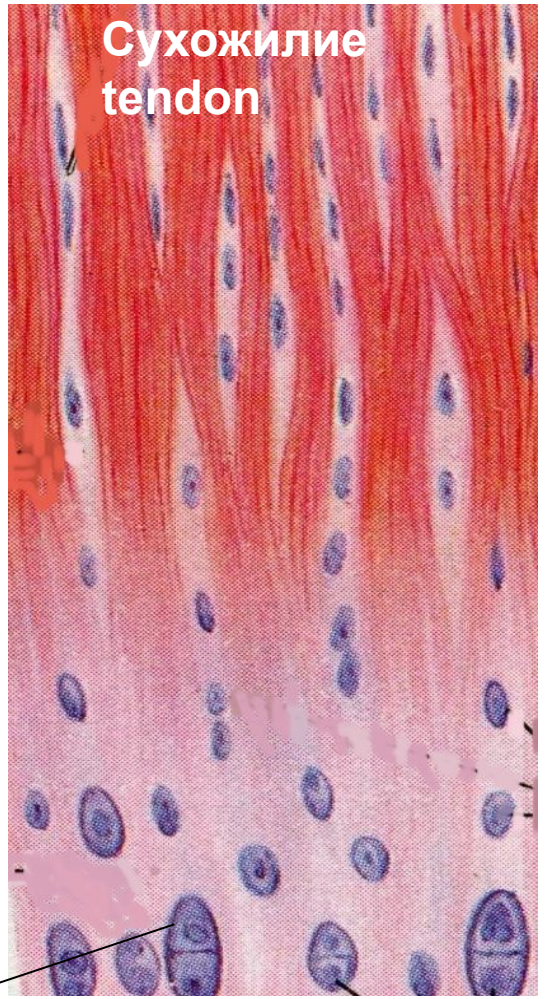
Гиалиновый (***hyaline)*** хрящ
- *a lime-$CaCO_3$- is put inside,*
- *collagenic fibres 2 type, thin.*



Эластический (**elastic)** хрящ
- *a lime is not put inside,*
- *very much elastic fibres*



Волокнистый (**fibrous)** хрящ (*thick bunches of collagenic fibres passing in a sinew or a bone).*



Изогенные группы (Isogenic groups)