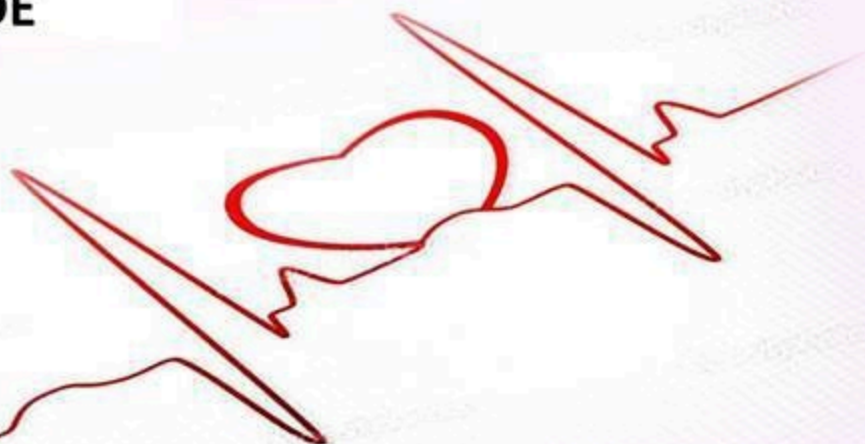


SHEET



SLIDE



Slide :

12



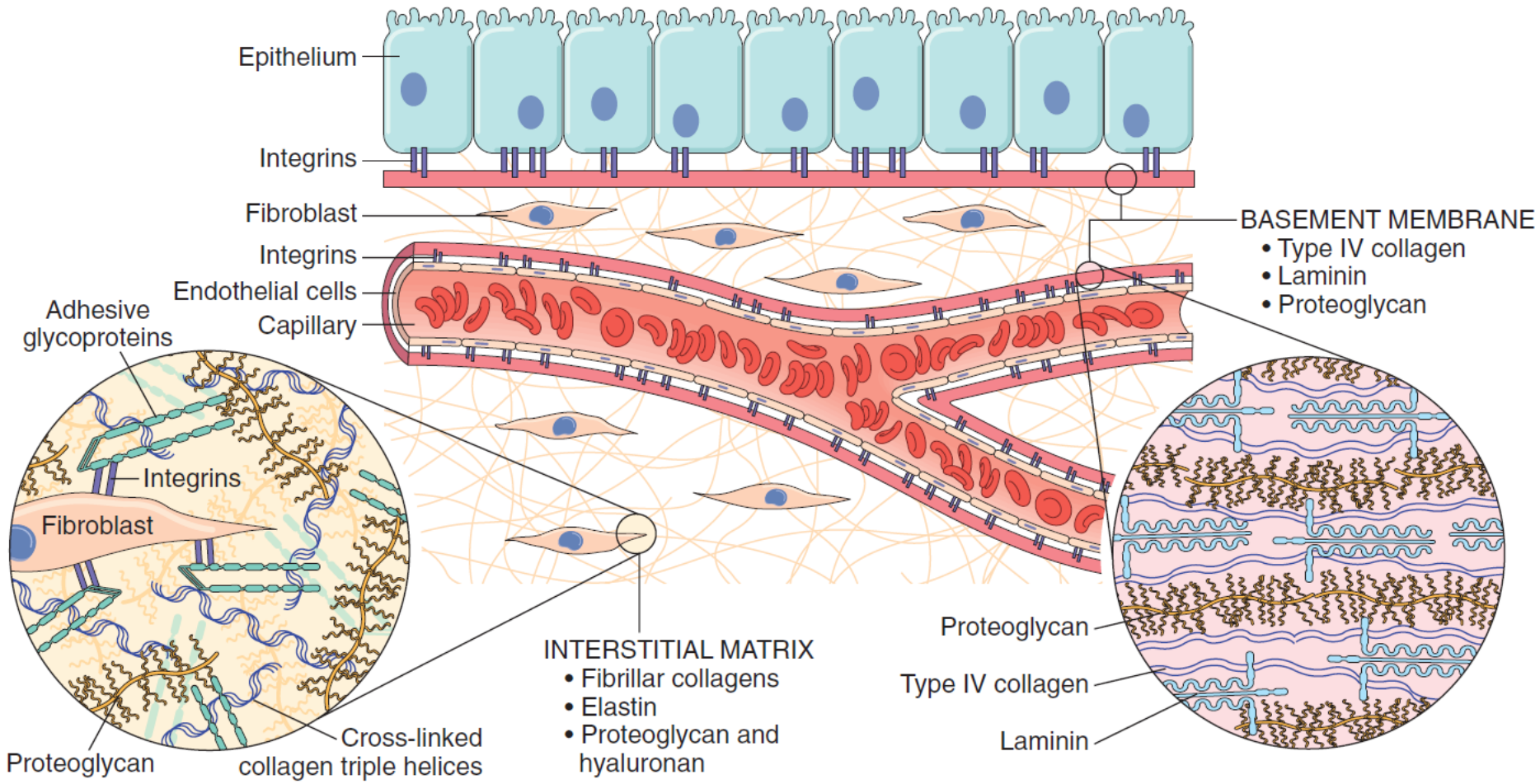
Doctor: Mazen Al-Salhi





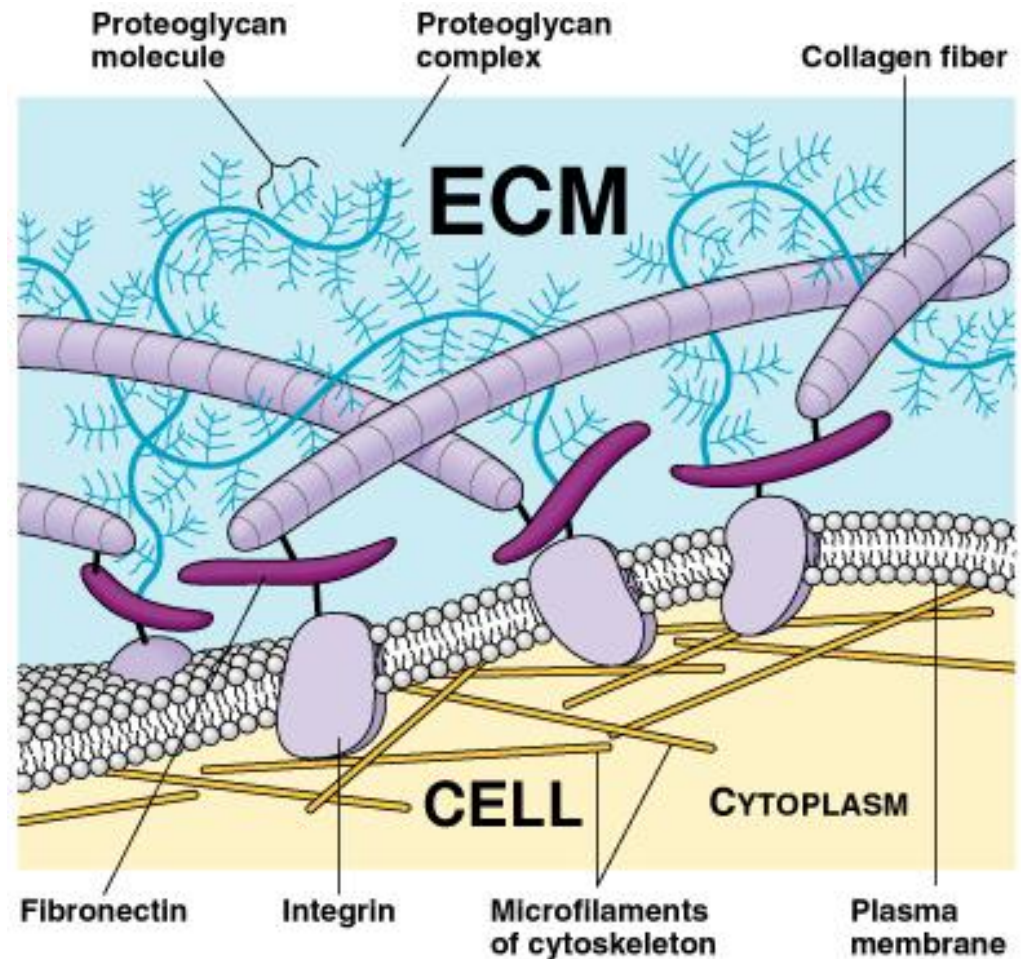
Role of the ECM

Extracellular Matrix

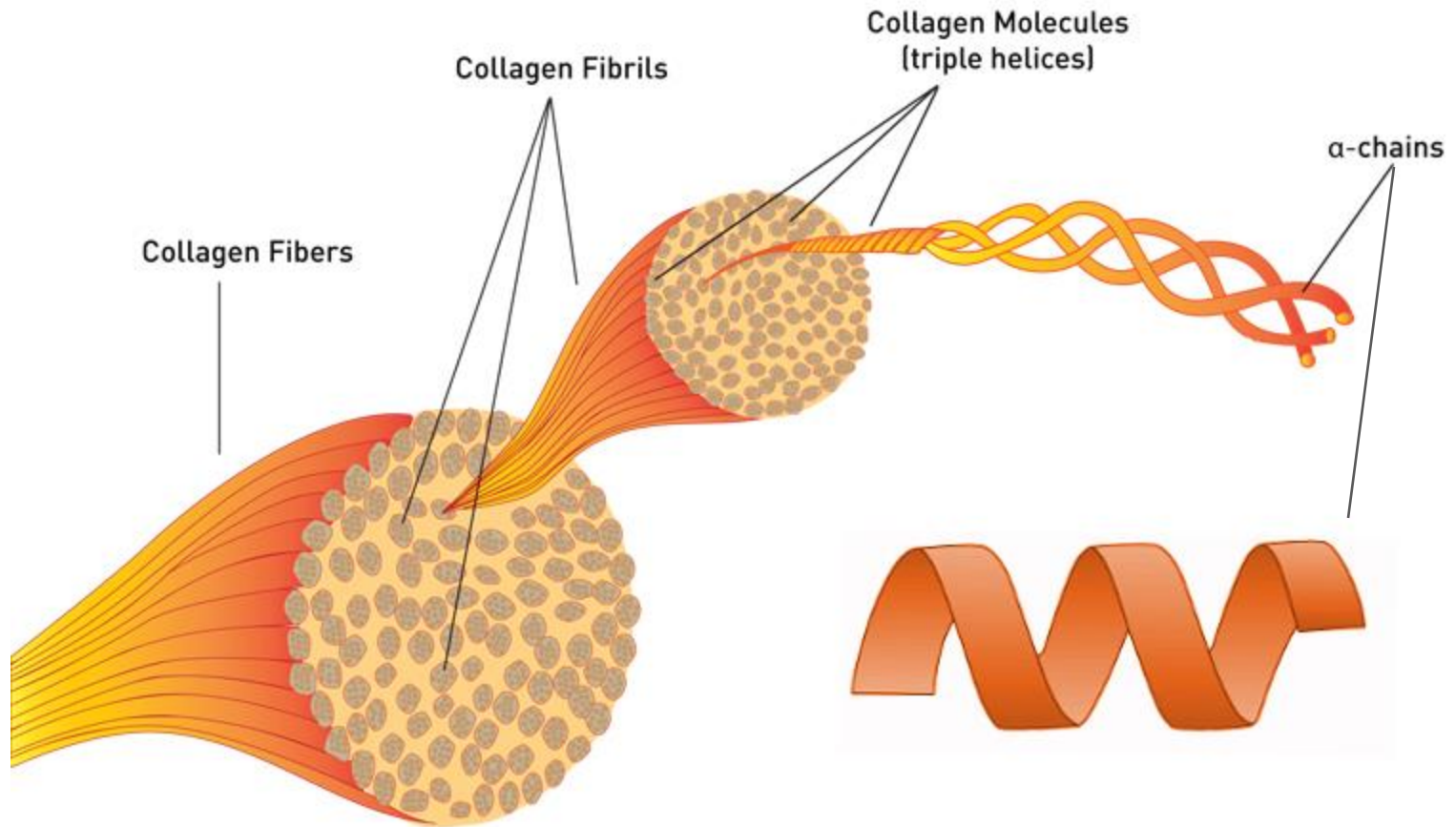


ECM components

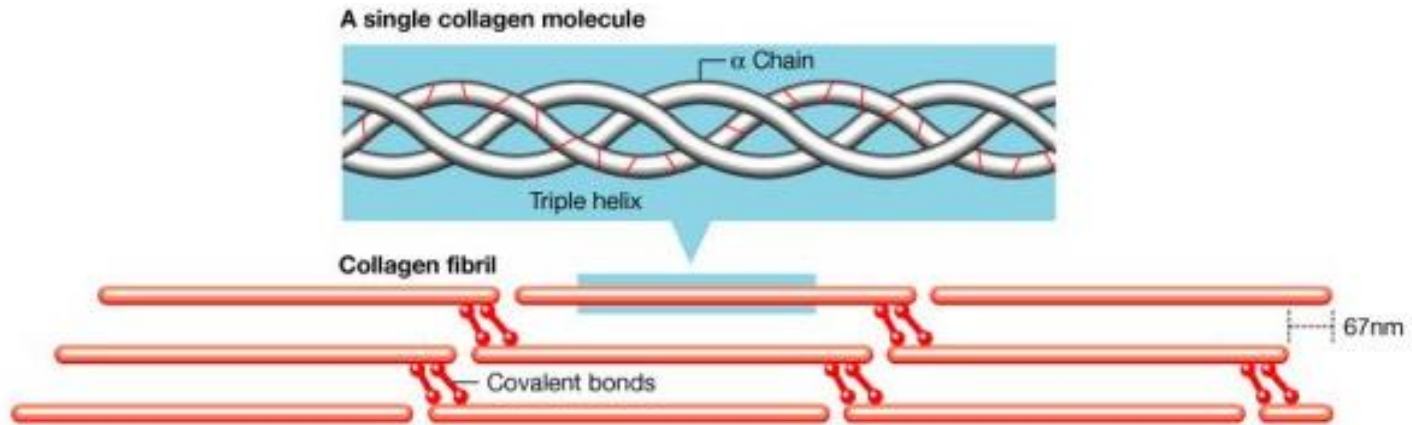
1. Fibrous structural proteins
 - collagen & elastin
 - tensile strength and recoil
2. Water-hydrated gels
 - proteoglycans & hyaluronan
 - resilience and lubrication
3. Adhesive glycoproteins
 - fibronectin & laminin
 - Matrix/matrix-cell connections



Collagen (fibrillar)



Collagen (fibrillar)



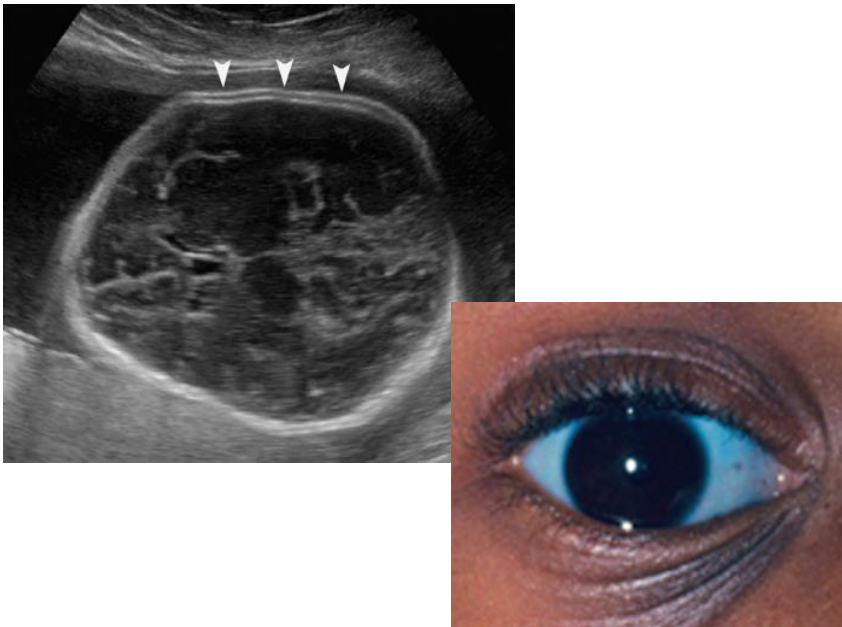
- types I, II, III, and V
 - major proportion of the connective tissue in healing/scarring
 - Lateral cross-linking of the triple helices catalyzed by lysyl-oxidase (Copper dependent)/lysyl-**hydroxylase** (Vit C dependent)
-



Examples of Collagen defects

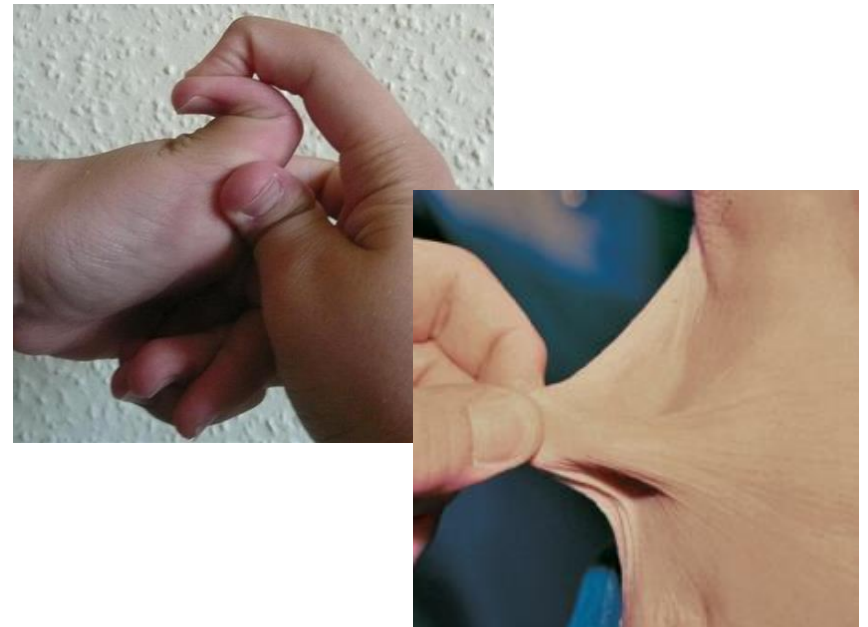
Osteogenesis Imperfecta

- ▶ aka brittle bone disease
- ▶ 8 types commonly due to a Type-I collagen deficiency

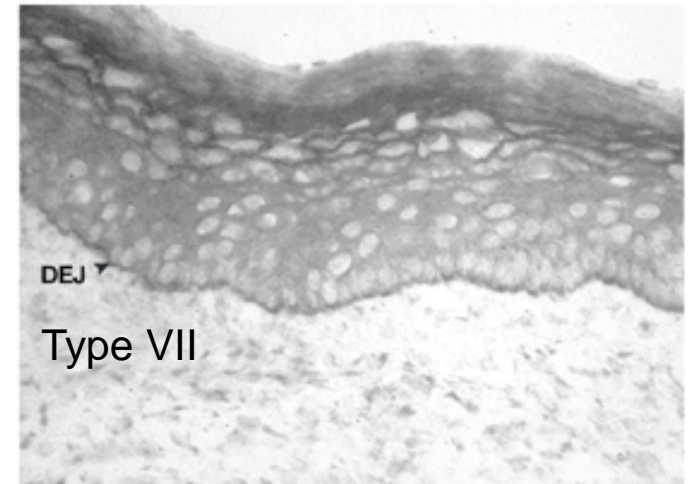
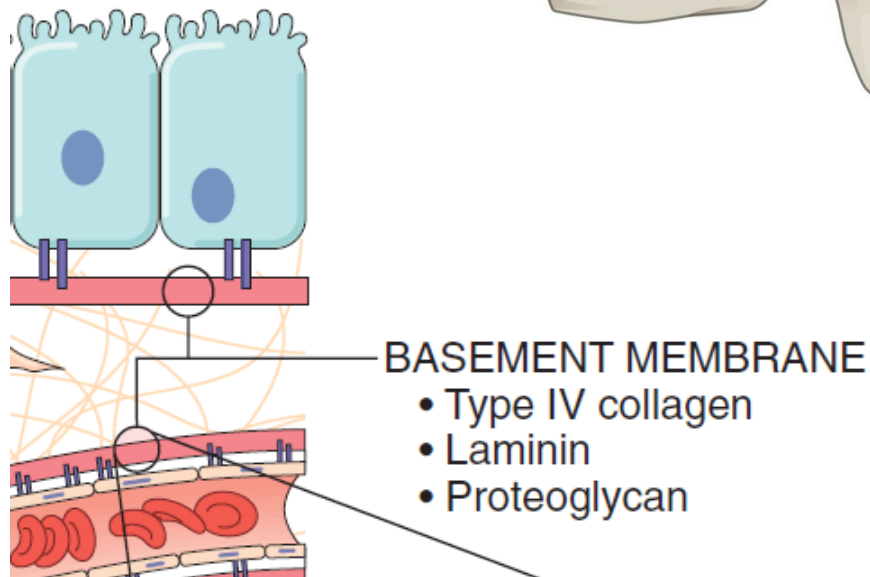
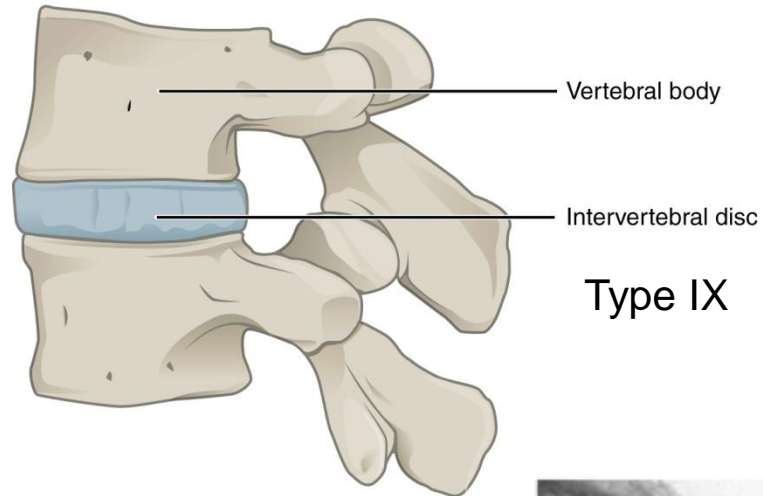


Ehlers-Danlos Syndrome

- ▶ Hyperextensible skin
- ▶ Lax joints
- ▶ Vascular defects

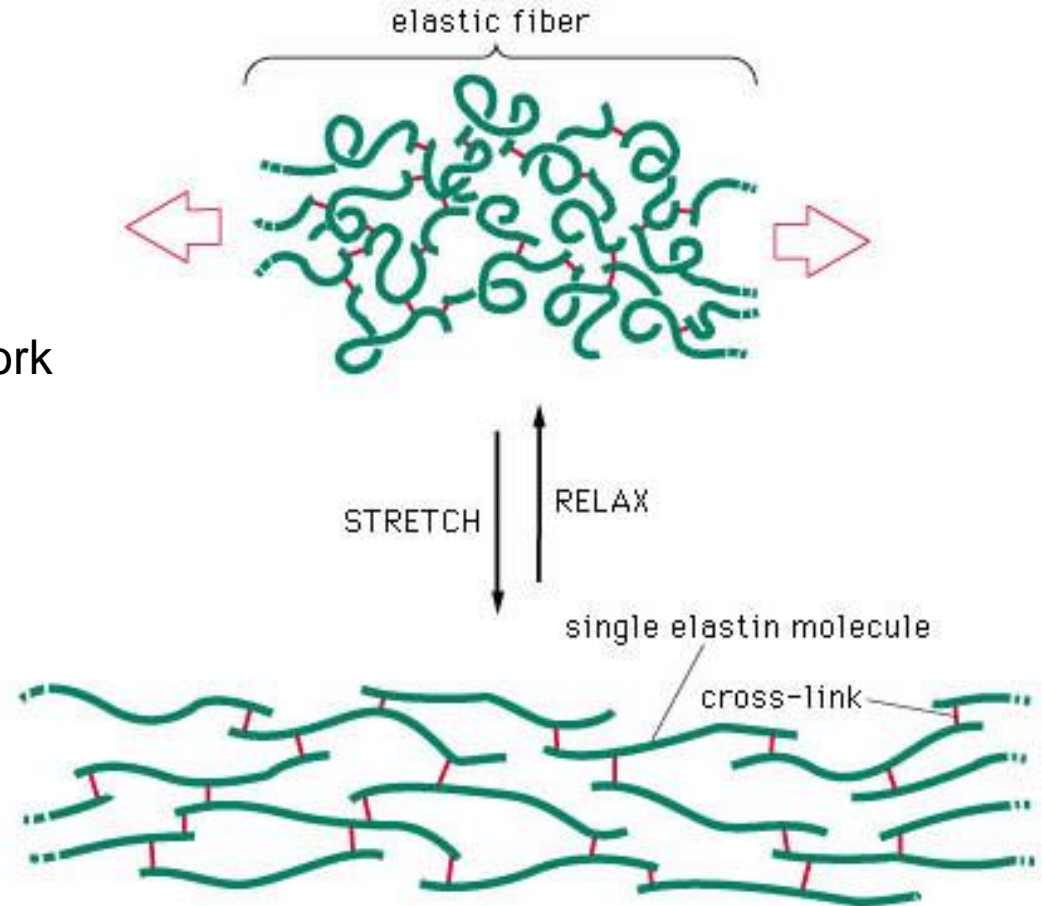


Collagen (nonfibrillar)



Elastin

- Important in the walls of large vessels, the uterus, skin, and ligaments
- The central core of elastin is surrounded by a mesh-like network of fibrillin glycoprotein
- *FBN1* mutation = Marfan Syndrome

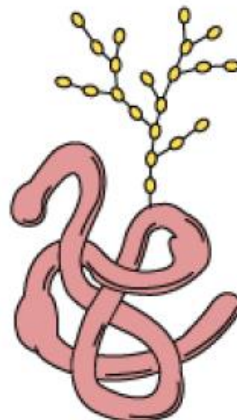
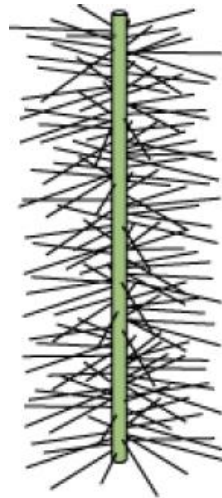


Proteoglycans and Hyaluronan

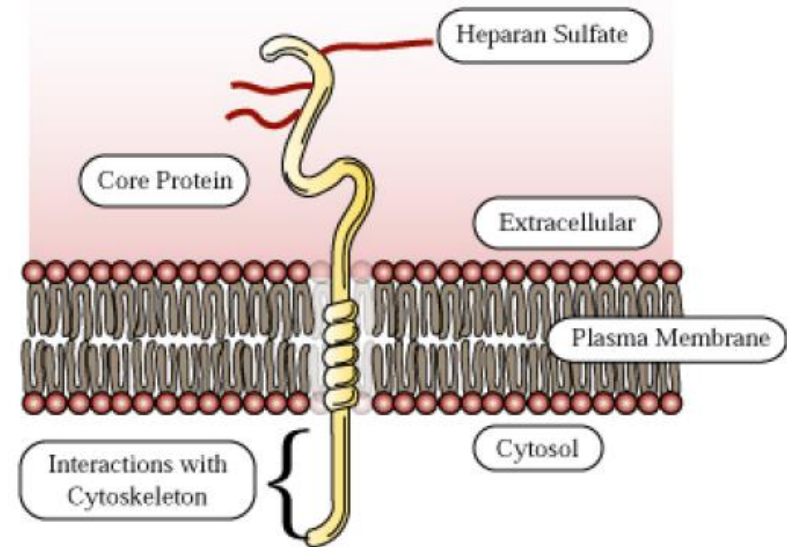
↓
highly hydrated compressible gels conferring resilience and lubrication, and serve as reservoirs for growth factors

Proteoglycans have a protein core to which glycosaminoglycans are attached

Glycoproteins are globular proteins with branched monosaccharide chains



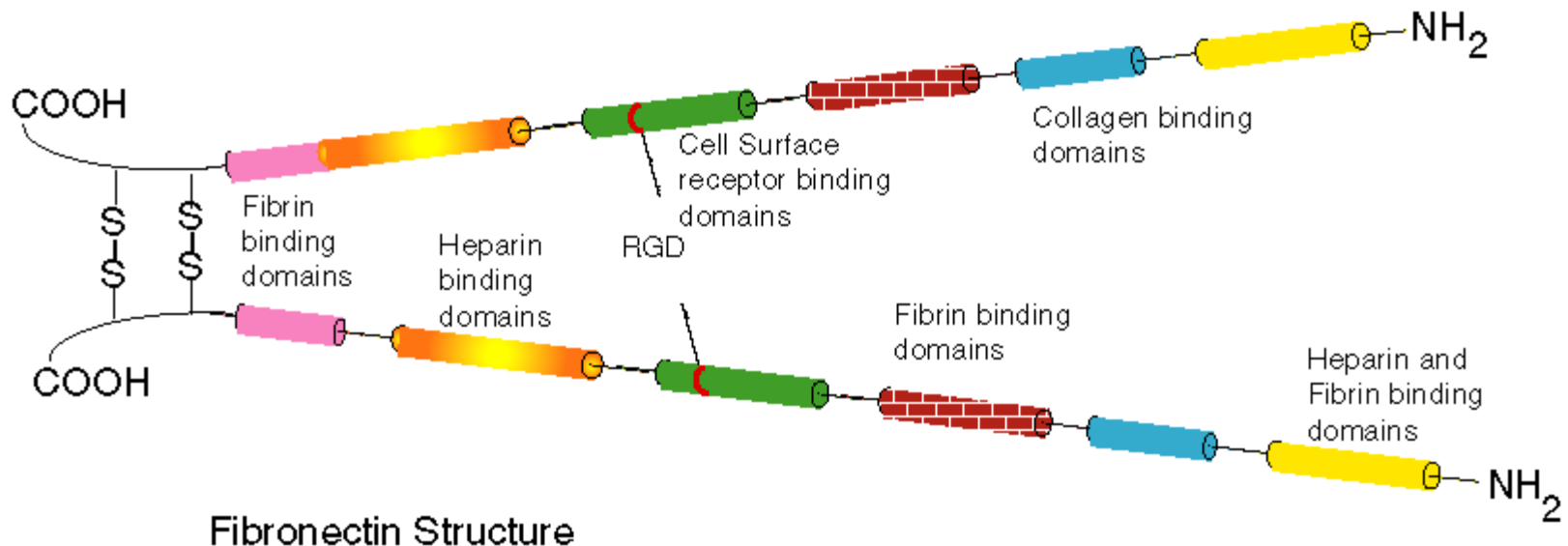
↗ huge mucopolysaccharide without a protein core, binds water, and forms a viscous, gelatin-like matrix



Some proteoglycans are integral cell membrane proteins that have roles in cell proliferation, migration, and adhesion

Adhesive Glycoproteins & Adhesion Receptors

- 1 cell-to-cell adhesion
- 2 cell-to-ECM
- 3 binding between ECM components



Adhesive Glycoproteins & Adhesion Receptors

1

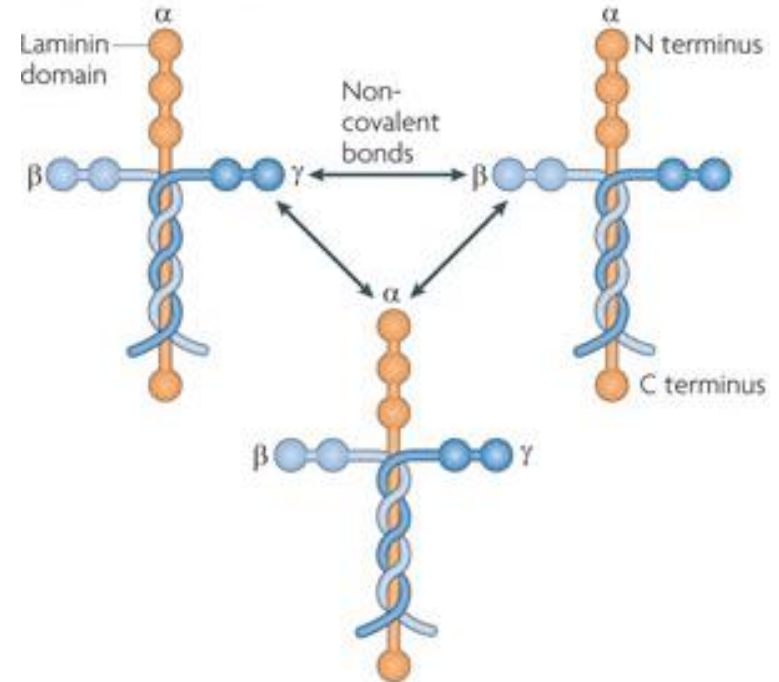
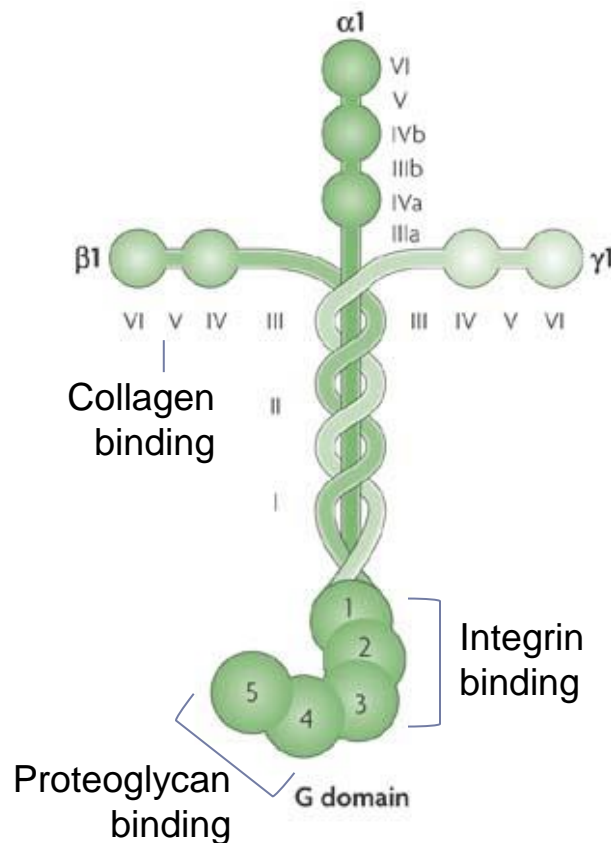
cell-to-cell adhesion

2

cell-to-ECM

3

binding between ECM components



Adhesive Glycoproteins & Adhesion Receptors

1

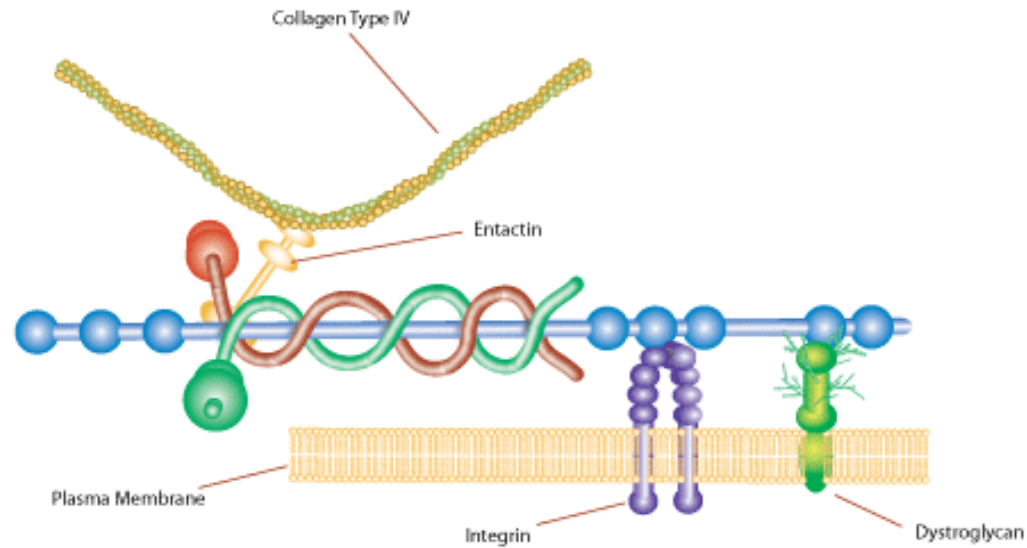
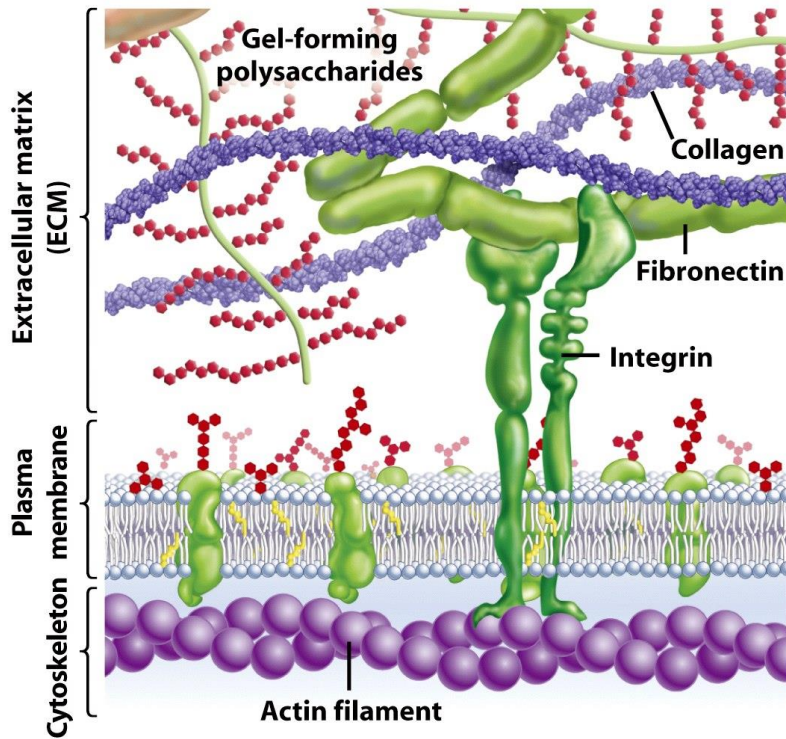
cell-to-cell adhesion

2

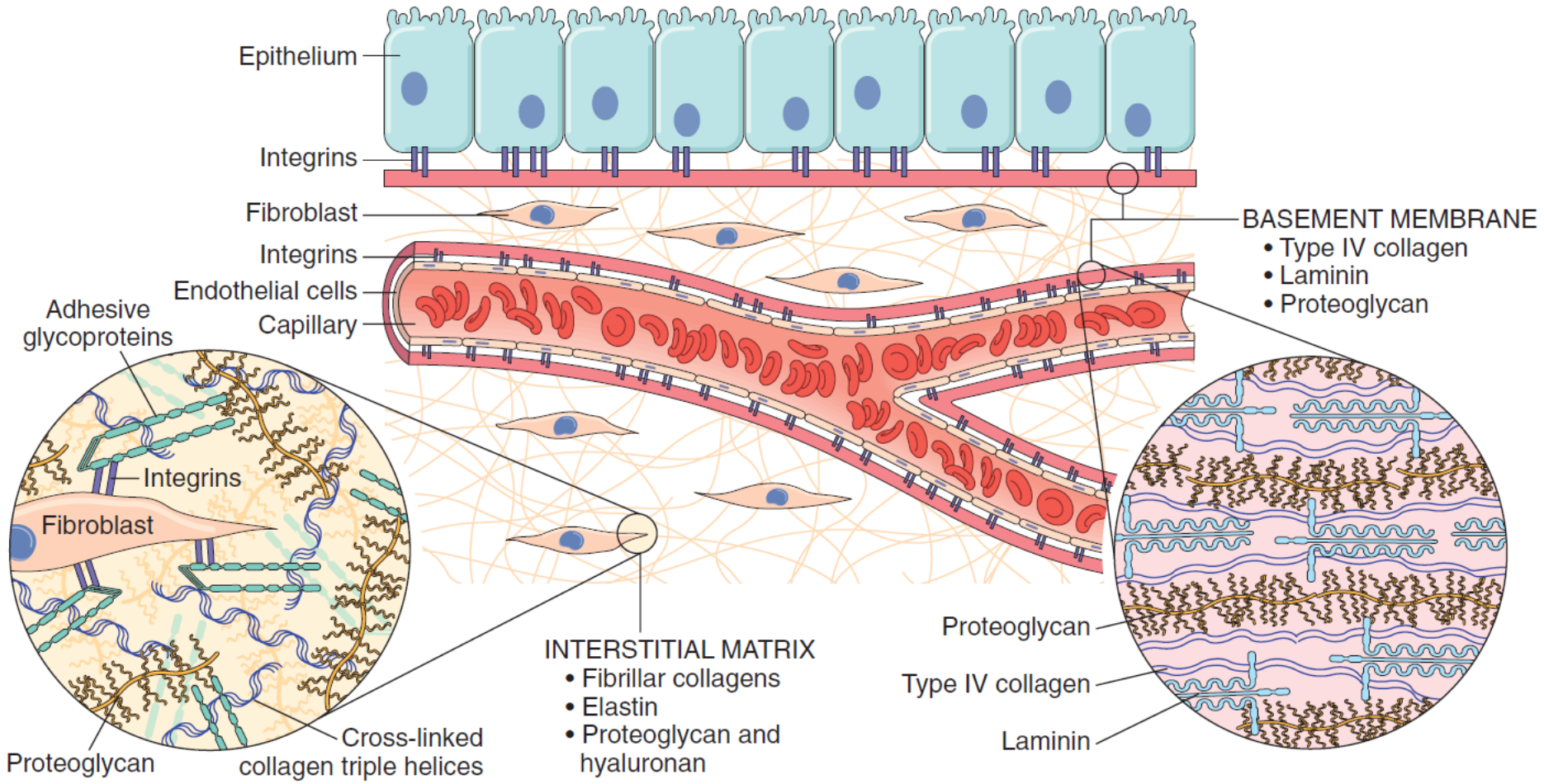
cell-to-ECM

3

binding between ECM components



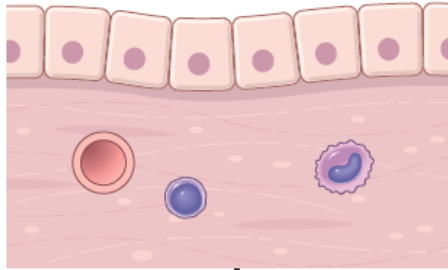
Now this slide makes a lot more sense



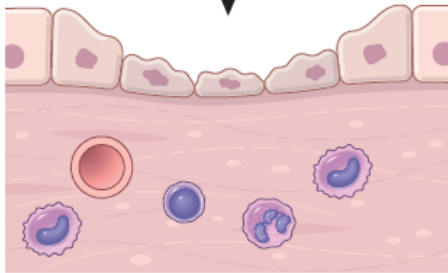


Regeneration

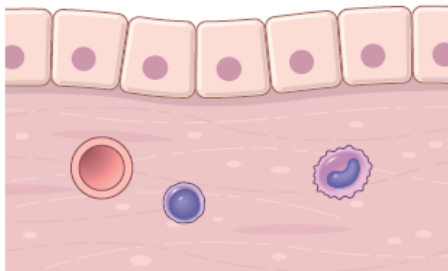
NORMAL



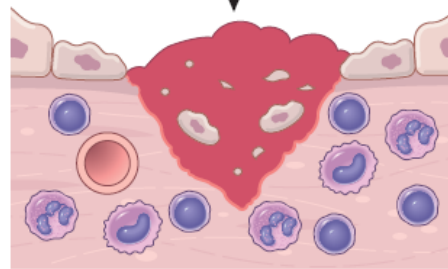
Mild, superficial injury



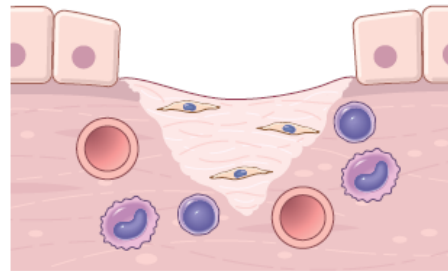
REGENERATION



Severe injury



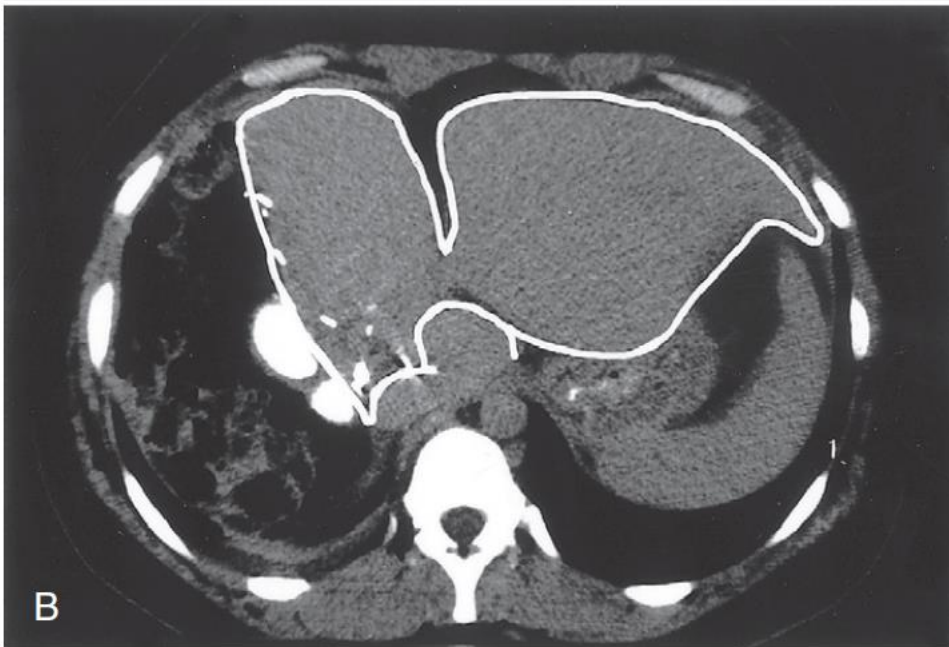
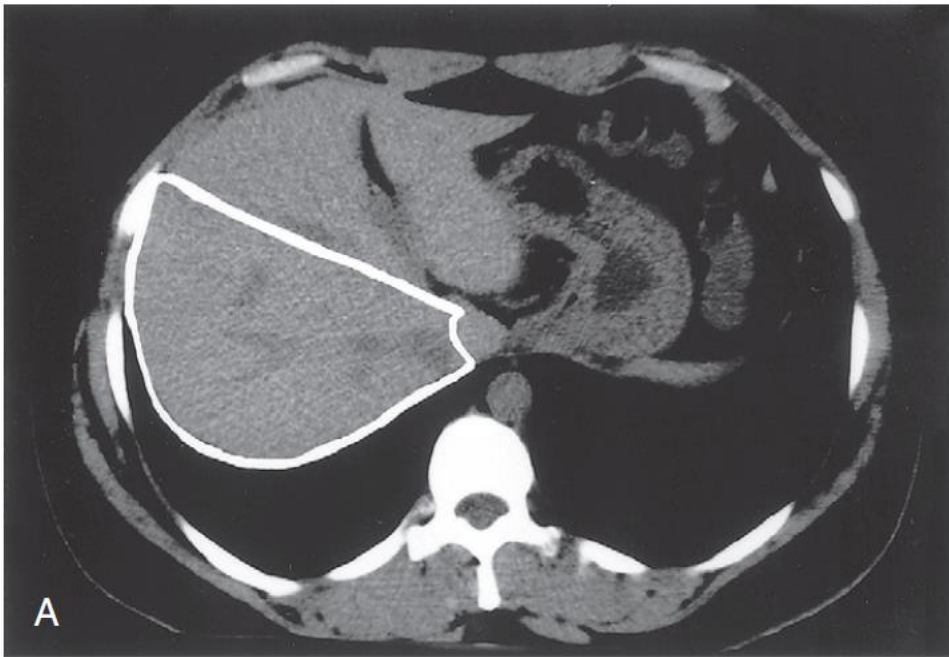
SCAR FORMATION



Labile tissue

injured cells replaced by regeneration **provided** the underlying basement membrane is intact

e.g. Epithelium
BM



Stable tissue

Limited regeneration can occur in parenchymal organs with stable cell populations

Liver is the exception (resection for donation or due to disease)

Can occur **only** if the residual connective tissue framework is structurally intact

Overview of Tissue Response to Injury

