Wall of the heart

1.Endocardium

- 1. Endothelium
  - Simple squamous epithelium
- 2. Sub-endothelial C.T.
- 3. Dense C.T. Layer
- 4. Sub-endocardial layer
  - A. Loose C.T. layer that contains:
    - Purkinje fibers
    - Small blood vessels
    - Nerves
  - B. It attaches to the endomysium of the cardiac muscle

2.Myocardium

- 1- The middle layer
- 2- The thickest layer
- 3- Contains cardiac muscle cells with endomysium (loose C.T)
- Cardiac Muscle Fibers (Striated and involuntary)
  - L.M. Picture
    - 1- Cylindrical
    - 2- Intermediate in diameter
    - 3- Branched and anastomose
    - 4- Covered by a thin sarcolemma
    - 5- Mononucleated (oval and central)
    - 6- Sarcoplasm is acidophilic and shows non clear striations
    - 7- Divided into short segments by intercalated discs
  - E.M. Picture
    - 1- Few myofibrils
    - 2- Numerous mitochondria
    - 3- Less abundant Sarcoplasmic Reticulum
    - 4- T-tubules come in contact with only one cisterna of SR forming (diads)
    - 5- Glycogen & myoglobin
    - 6- Intercalated discs

3.Epicardium

(Visceral layer of pericardium)

- Mesothelium
  - Simple squamous epithelium
- Subepicardial C.T. Layer
  - Loose C.T. contains:
    - The coronary vessels
    - Nerves
    - Ganglia
    - Fat cells

Heart valves "Cardiac Valves"

Leaflets "cusps" Which are Avascular

Formed of a core of dense irregular C.T.

This core is covered by Endocardium

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The Blood Vessels

1- Elastic Arteries

Example:
- Aorta
- Common Carotid
- Subclavian

Tunica Intima
1- Endothelium
2- Subendothelial C.T.
3- Internal elastic lamina:
- Not prominent
- Indistinct

Tunica Media
A. Fenestrated Elastic Membranes "sheets, lamellae" (The main component)
B. In between, there are:
1. Smooth muscle cells
2. Collagen fibers (Type I)
3. Reticular fibers (Type III)
4. Elastic Fibers

Tunica Adventitia
1. Much Thinner than T.M.
2. Composed of loose C.T.
3. Contains vasa vasorum
→ sends branches to the outer part of T.M.

2- Muscular (medium-sized) Arteries

Example:
- Brachial
- Ulnar
- Renal

Tunica Intima
1- Endothelium
2- Subendothelial C.T. Layer
3- Internal Elastic Lamina:
- Prominent
- Displays an undulating surface

Tunica Media
(Thicker than T.Adventitia or similar in thickness)
A. Smooth muscle cells (predominant component)
B. In between there are:
- Elastic fibers
- Type III collagen fibers
- Type I collagen fibers
C. External elastic lamina:
- May be identifiable

Tunica Adventitia
Loose C.T.

3- Medium-sized Veins

Thickness of the wall: thinner than the accompanying artery

Tunica Intima
- Usually forms valves
- No internal elastic lamina

Valves of the veins:
A. Composed of 2 leaflets:
- Each leaflet has a thin fold of T.Intima
B. Components:
- Endothelium
- Core of C.T.

Tunica Media
1- Thinner than T. Adventitia
2- Consists of:
- Fewer Smooth Muscle Cells
- Type I & III Collagen Fibers

Tunica Adventitia
Thicker than T. Media

4- Blood Capillaries

Diameter: usually 8-10 mm
1. Single layer of squamous endothelial cells
2. Basal Lamina
3. Pericytes

A. Continuous Blood Capillaries
1. Microscopic structure:
- No pores or fenestrae in their walls
2. Distribution:
- In muscles nervous T.
- C.T.

B. Fenestrated Blood Capillaries

A. With Diaphragms
1. Microscopic structure:
- The walls of their endothelial cells have pores (fenestrae)
- These pores are covered by a diaphragm
2. Distribution :
- In the the intestines
- Pancreas
- Endocrine glands

B. Without Diaphragms
1. Microscopic structure:
- The walls of their endothelial cells have pores (fenestrae)
- These pores are not covered by a diaphragm
2. Distribution:
- In renal glomerulus

C. Sinusoidal Blood Capillaries
irregular diameter (30-40mm)
1. Microscopic structure:
- Their endothelial cells have fenestrae without diaphragms
- They possess both discontinuous endothelial cells and basal lamina
- Macrophages may be located in or along the outside of the endothelial wall
2. Distribution:
- Red bone marrow
- Liver
- Spleen
- Certain endocrine glands

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