• The Cardiovascular System II: Blood Vessels
Arterial system

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The cardiovascular system is divided into two circulations

- **Pulmonary circulation**
  - blood to and from the lungs
- **System circulation**
  - blood to and from the rest of the body

- Vessels carry the blood through the circuits
  - Arteries carry blood away from the heart
  - Veins carry blood to the heart
  - Capillaries permit exchange
Thoracic Aorta
Blood Supply to the Heart

- Coronary circulation provides blood supply to the myocardium and pericardium of the heart.

- The Coronary Arteries
  - Originate at the base of the ascending aorta from the corresponding aortic sinus.
  - Superior to the aortic valve.
  - Highest blood pressure of the systemic circuit
Left coronary artery (LCA)
15-20% Dominant

- **Left coronary artery** from the Aorta (Large)
- Located between the Pul. trunk. And the Lt. auricle
  In the coronary groove.
- **Divides Into**
  - Anterior descending artery (Lt. Ant. Descending or LAD).
    - Supply the Rt and Lt Vent.
    - 2/3 of the inter-vent. Septum (ant. Aspect by the Lt Diagonal Art).
  - Circumflex artery gives SA node Branch
    - Lt marginal Art.
    - Ant & Post Ventricular Br.
    - Atrial Br.
    - Br. To the S-A Node (40%)

- supplies the left atrium, most of the left ventricle, part of the right ventricle, the IV septum (the anterior 2/3) and 40% of people the SA node possible to A-V node.

**Arterial anastomoses** – interconnections between arteries (collateral Br.).
Right coronary artery (RCA)
80-85% Dominant Art.

Arises from the Aorta from the Rt Aortic sinus.
Emerges between the Pul. Trunk and the Rt auricle
Gives of Branches
- Rt. Marginal Br.
- 2-3 ventricular Br’s. (to the Ant surface Of the Rt Ventr.).
- Artery to the SA nodal branch.
- Artery to the A-V node (Septal Br).
- Br.’s to the Rt. atrium

supplies the RA, most of the RV, part of LV (diaphragmatic surface), Post 1/3 part of the IV septum, SA Br. (60% of pop.), and the AV node Br. (80% of pop.)
The Normal Heart - Coronary Artery Anatomy

- Right coronary artery (RCA)
- Left coronary artery (LCA)
- Left circumflex artery (LCX)
- Ramus intermedius
- Left anterior descending art. (LAD)
- Diagonal branch, LAD
- Posterior descending artery (PDA)
- Acute marginal branches, RCA
- Right atrium
- Left atrium
- Conus arteriosus
- Epicardial fat
- Right ventricle
- Left ventricle
- Apex
Venous Drainage of the Heart

Veins That Do open into the coronary sinus

- The coronary Sinus – Post. coronary sulcus
  - Tributaries:
    - Great and middle cardiac vein empties into the coronary sinus
    - The Small cardiac vein.
    - The Oblique vein of the Lt. atrium.
- Cardiac Veins
  - The Posterior cardiac vein, middle cardiac vein, and small cardiac vein Some time empty into the great cardiac vain.

Veins That Do not open into the coronary sinus

- Anterior cardiac veins (3-4in Number) empty into the Ant surface of the right atrium.
- The least cardiac veins (In all)
Coronary Circulation

(a) Anterior view

- Aortic arch
- Ascending aorta
- Right coronary artery
- Atrial arteries
- Anterior cardiac veins
- Small cardiac vein
- Left coronary artery
- Circumflex artery
- Anterior interventricular artery
- Marginal artery

(b) Posterior view

- Pulmonary trunk
- Coronary sinus
- Circumflex artery
- Posterior interventricular artery
- Great cardiac vein
- Middle cardiac vein
- Small cardiac vein
- Marginal artery
- Right coronary artery
Blood Supply to Heart

Aorta

- Right coronary artery
  - Posterior interventricular artery
    - Ventricular walls
  - Marginal artery
    - Walls of right atrium and right ventricle

- Left coronary artery
  - Circumflex artery
    - Walls of left atrium and left ventricle
  - Anterior interventricular artery
    - Ventricular walls

Cardiac veins

Coronary sinus

Right atrium
Arteries of the Brain Cercle of Welles

- Frontal lobe
- Optic chiasma
- Middle cerebral artery
- Internal carotid artery
- Pituitary gland
- Temporal lobe
- Pons
- Occipital lobe

Circle of Willis
- Anterior communicating artery
- Anterior cerebral artery
- Posterior communicating artery
- Posterior cerebral artery
- Basilar artery
- Vertebral artery
- Cerebellum
Abdominal aorta branches

- Common iliac vein
- Common iliac artery
- Internal iliac artery
- Internal iliac vein
- External iliac vein
- External iliac artery
- Great saphenous vein
- Femoral artery
- Femoral vein
- Popliteal artery
- Popliteal vein

- Celiac
- Hepatic
- Left gastric
- Splenic
- Renal
- Superior mesenteric
- Inferior mesenteric
Arteries of the Abdomen
Arteries of the Abdomen

Liver (cut)
Inferior vena cava
Celiac trunk
Hepatic artery proper
Common hepatic artery
Right gastric artery
Gallbladder
Gastroduodenal artery
Right gastroepiploic artery
Duodenum
Abdominal aorta

Diaphragm
Esophagus
Left gastric artery
Left gastroepiploic artery
Splenic artery
Spleen
Pancreas (major portion lies posterior to stomach)
Superior mesenteric artery
Arteries of the Abdomen

Celiac trunk
Middle colic artery
Right colic artery
Ileocolic artery
Ascending colon
Ileum
Superior rectal artery
Cecum
Appendix

Transverse colon
Superior mesenteric artery
Intestinal arteries
Left colic artery
Inferior mesenteric artery
Aorta
Sigmoidal arteries
Descending colon
Left common iliac artery
Sigmoid colon
Rectum

(d)
Arteries to the uterus and vagina
The Cardiovascular System V: Blood Vessels

Venous system
Veins of the Head and Neck
VEINS OF UPPER LIMB

- **SUPERFICIAL VEINS**
  - DORSAL VENOUS NETWORK
  - CEPHALIC VEIN
  - BASILIC VEIN
  - AXILLARY VEIN (BASILIC + BRACHIAL VEIN)
  - MEDIAN CUBITAL VEIN
  - MEDIAN VEIN OF FOREARM

- **DEEP VEINS**
  - NAMED ACCORDING TO COMPANION ARTERIES
  - RADIAL VEIN
  - ULNAR VEIN
  - BRACHIAL VEIN
  - AXILLARY VEIN
Major veins superior to the heart

- right internal jugular vein
- right external jugular vein
- right subclavian vein
- left internal jugular vein
- left external jugular vein
- left subclavian vein
- left axillary vein
- right brachiocephalic vein
- left brachiocephalic vein
- superior vena cava
- azygous vein
- left brachial vein
Veins of posterior abdominal region

- Azygos vein
- Hemiazygos vein
- Left inferior phrenic vein
- Posterior intercostal veins
- Right suprarenal vein
- Lumbar veins:
  - L1
  - L2
  - L3
  - L4
  - (L5)
- Right common iliac vein
- Left common iliac vein
- Left external iliac vein
- Median sacral vein
- Left internal iliac vein
- Hepatic veins
- Left renal vein
- Left testicular or ovarian vein
- Right testicular or ovarian vein
- Ascending lumbar vein

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