London School of Massage

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Circulatory System – CVS & Lymphatic System

At the end of this section you will understand and appreciate:

Cardiovascular System

- Structure and function Blood, Blood Vessels and the Heart
- Main arteries and veins of the body
- Circulation of blood in the body (Systemic & Pulmonary)
- Basics about the blood clotting mechanism
- Blood groups (ABO classification)
- Disorder of the Cardiovascular system
- How massage affects the Cardiovascular system

Lymphatic System

- Structure and function Lymph and Lymph vessels
- Formation of lymph
- Movement and drainage pathways of lymph in the body
- Location of main lymph nodes of the body
- Structure and function of the Spleen
- Disorder of the Lymphatic system
- How massage affects the Lymphatic system

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Circulatory System

CONSTITUENT PARTS OF THE CIRCULATORY SYSTEM

The Circulatory system includes the ***Cardiovascular System (CVS)*** and the ***Lymphatic System***. These systems respectively consist of:

1. **Blood**
2. **Blood Vessels** } Cardiovascular System
3. **Heart**

4. **Lymph** } Lymphatic System
5. **Lymphatic Vessels**

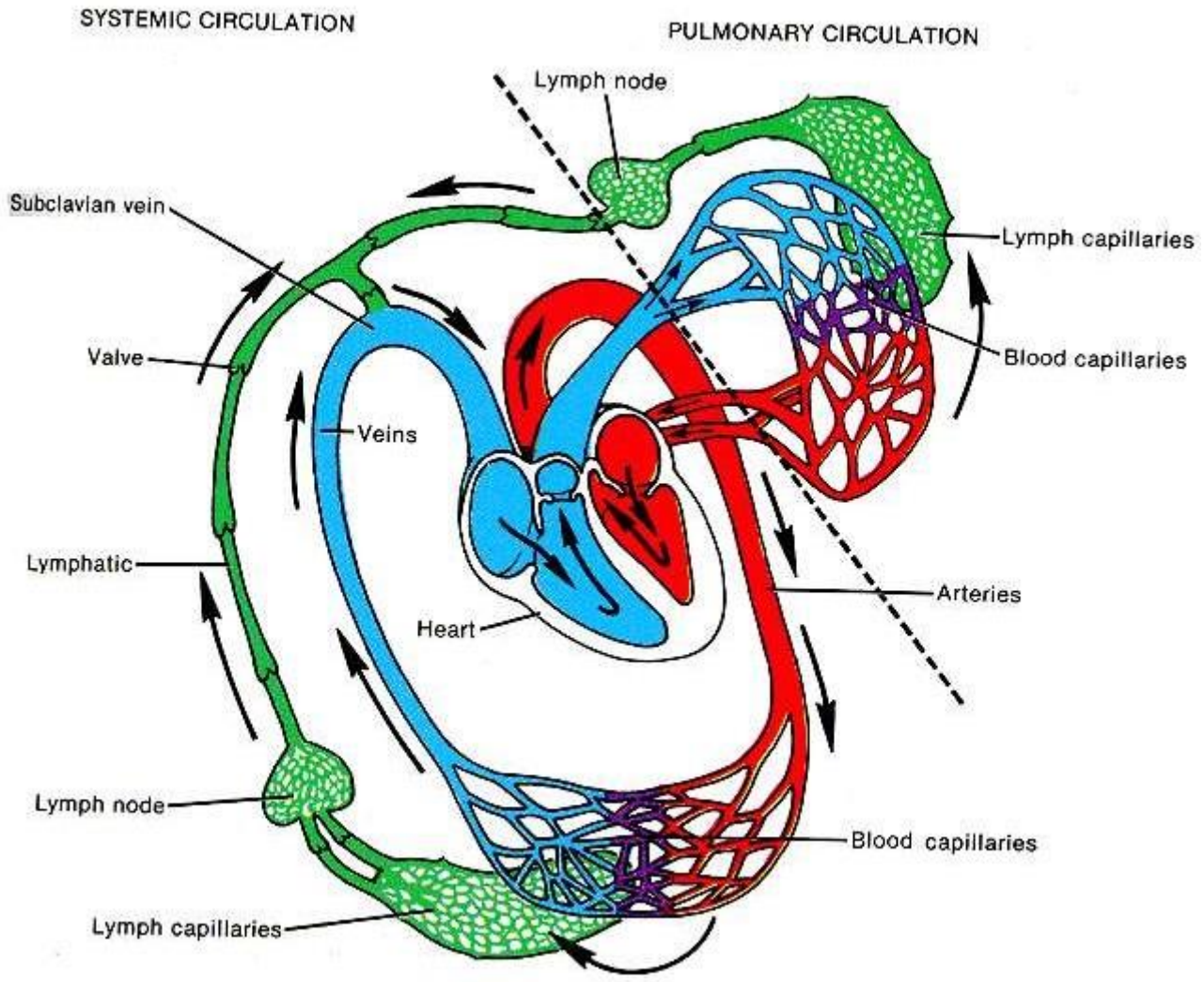


Diagram showing the CVS & Lymphatic System

Cardiovascular System

BLOOD

Blood is a **fluid connective tissue** found in the body and is pumped around the body by the heart through arteries and veins.

Blood is **alkaline (pH 7.4)** in nature.

There are approximately **4-5 litres** of blood in the adult body

FUNCTIONS OF BLOOD

1. **Transportation** of oxygen, nutrients, hormones and enzymes around body as well as waste material to organs of excretion.

2. Helps fight **infection** through white blood cells and antibodies

3. Prevents loss of body fluid through wounds via a **clotting** mechanism.

4. **Regulates** body temperature.

BLOOD CONSTITUTION

There are two parts to blood: A plasma & B cells

A. PLASMA (55%)

Plasma is a **straw** coloured fluid consisting of mainly **water** (90%) and **plasma proteins** (10%) (**Fibrinogen, Globulin, Thrombin, Albumin).**

Plasma also helps to **transports** the following substances around the body:

1. **MINERAL SALTS** e.g. sodium chloride, sodium carbonate, salts of phosphorus, magnesium, calcium, iron, copper, iodine
2. **NUTRIENTS** e.g. proteins, glucose, vitamins
3. **WASTE PRODUCTS** e.g. urea
4. **HORMONES** (chemical messengers)
5. **ENZYMES** (biological catalysts)
6. **GASES** e.g. oxygen and carbon dioxide
7. **ANTIBODIES & ANTIGENS** part of the immune system

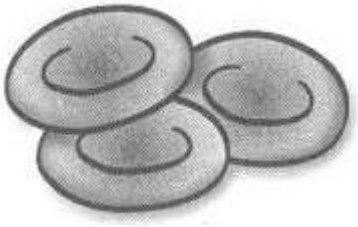
B. CELLS (45%)

- **ERYTHROCYTES (RED BLOOD CELLS)**

Function: Transport oxygen in the body bound to cell as **oxyhaemoglobin** for which iron and vitamin B12 are required.

Characteristics:

a. Small **biconcave** disc shaped cells



b. Have no **nucleus**

c. Produced in **red** bone marrow

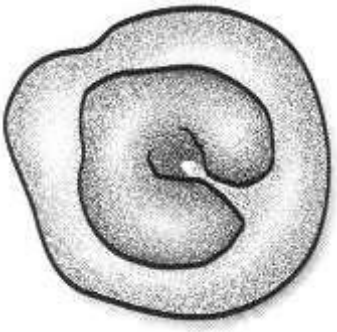
d. Have a life span of approx. **120** days

e. Broken down in the spleen and then the liver where any spare **iron** is recycled.

f. Oxyhaemoglobin gives blood its characteristic red colour.

- **LEUCOCYTES (WHITE BLOOD CELLS)**

Function: Protect the body from ***infection***



Characteristics

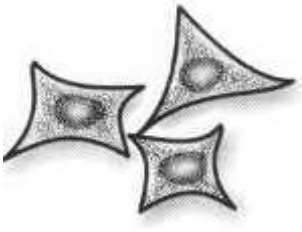
a. Have a large ***nucleus***

b. Rapidly increase in number when there is an **infection**

c. Can pass through capillary walls into tissues

- **THROMBOCYTES (PLATELETS)**

Function: Responsible for clotting of blood



Characteristics

a Contain mitochondria but no **nucleus**

b. Life span of approx. **10** days

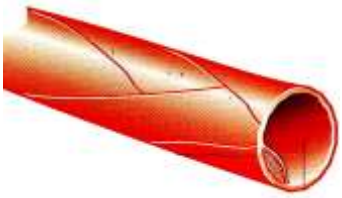
BLOOD VESSELS

Blood is circulated throughout the body in blood vessels. These change names as the type of blood they carry alters as well as the way they change in structure.

Arteries
(exit the heart)

Arterioles
(Smaller version of arteries)

Capillaries
(where exchange of gases and
fluids take place between cells and blood)

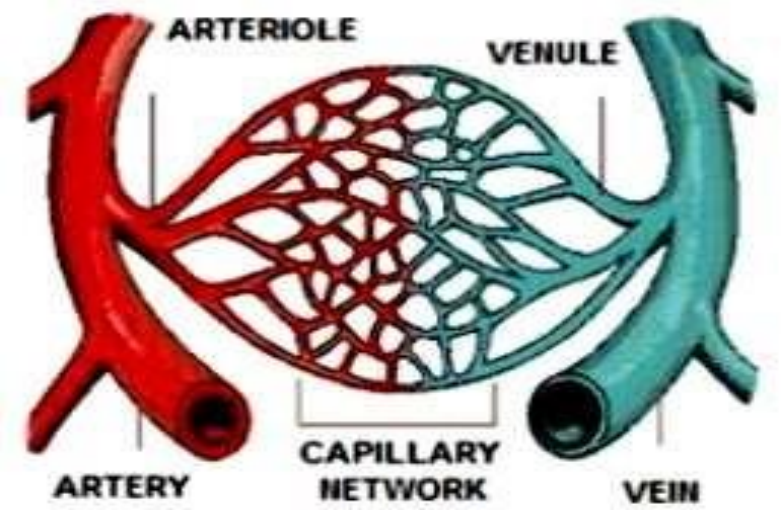


Venules
(Smaller version of veins)

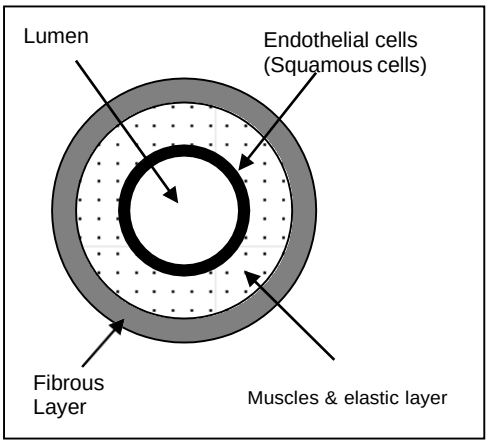
Veins
(return to the heart)

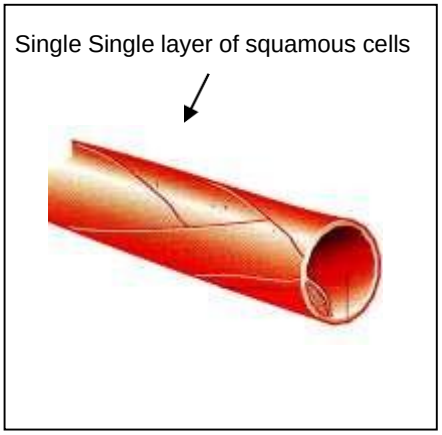
Note: All Arteries carry Oxygenated blood (except Pulmonary Artery)

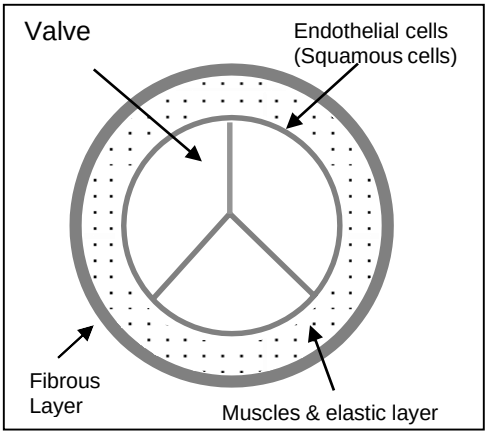
All Veins carry Deoxygenated blood (except Pulmonary Vein**)**



COMPARISON OF THE STRUCTURES OF ARTERIES, CAPILLARIES & VEINS







Artery

- Muscle layer helps to maintain blood pressure
- Movement of blood in vessels helps keep it free of obstruction.
- In arterioles, the muscle layer is involuntary – i.e. it is controlled by nerves which control the diameter of the vessel controlling flow of blood

Capillary

- Walls are one cell thick and porous which allows passage of gases, nutrients and water out of the vessel into the tissue spaces (TISSUE / INTERSTITIAL FLUID)

Vein

- Blood pressure is lower in veins then arteries
- The lumen of the vein is generally larger than the artery.
- Because of low pressure, there are valves to prevent back flow of blood.
- Action of skeletal muscle helps massage blood back up.

TABLE TO SHOW DIFFERENCES BETWEEN ARTERIES & VEINS

Characteristic of Arteries	**Characteristics of Veins**
Transport blood away from heart	Transport blood to the heart
Oxygenated blood (except Pulmonary Artery)	Deoxygenated blood (except Pulmonary Vein)
Blood pumped by heart and muscle tissue in wall	Blood pumped by skeletal muscle pump
No valves	Valves present
Lumen is small	Lumen is large
Thick, muscular and elastic walls	Thin walls, not very muscular or elastic

Blood contains high amounts of nutrients	Blood contains large amounts of waste products

THE HEART

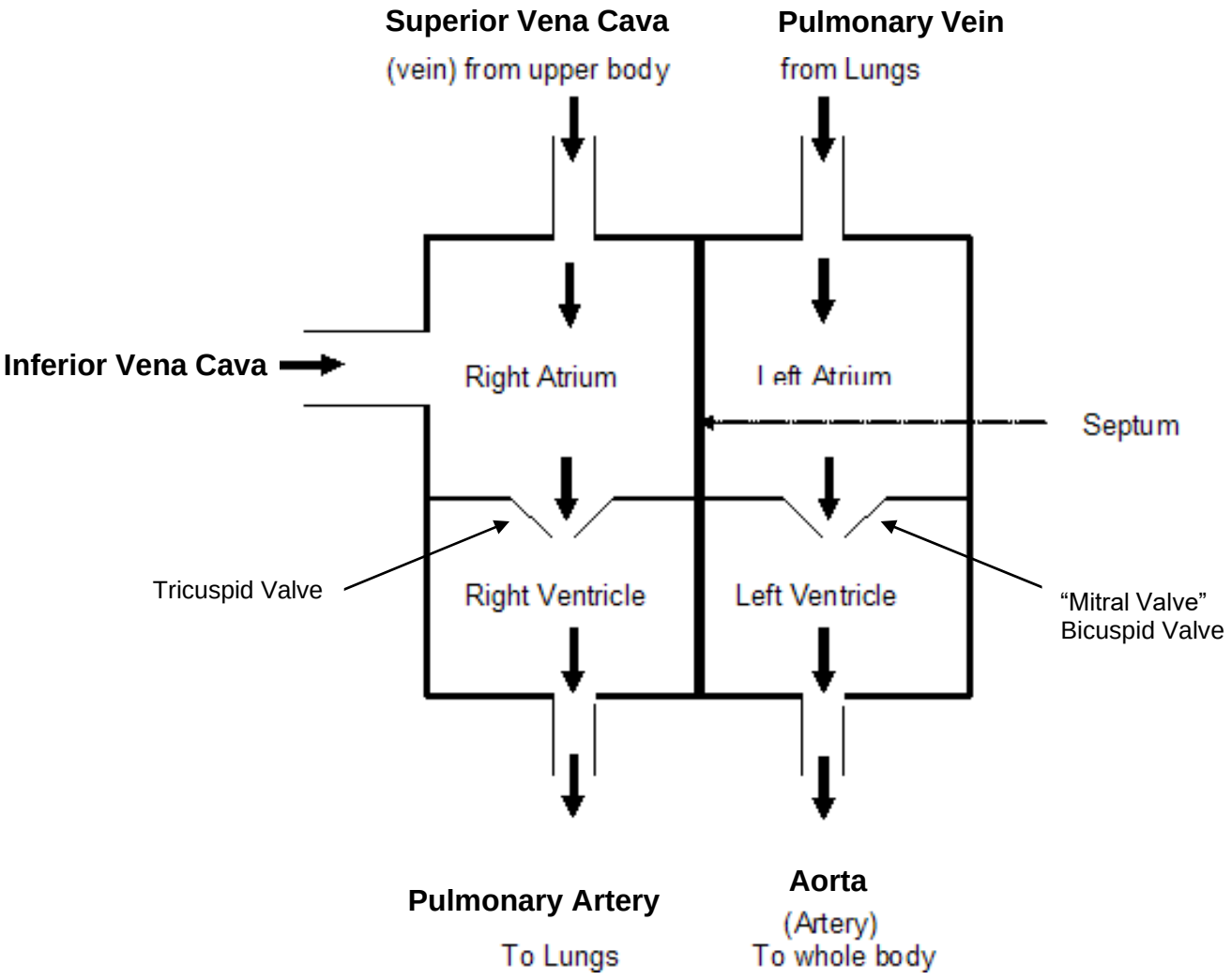
The heart is an **ORGAN**, which is at the centre of the cardiovascular system. It acts like a **PUMP**, contracting rhythmically forcing blood through vessels and maintains circulation of blood.

The adult heart rate averages to approximately **70 beats per minute.**

The heart is divided into **4 chambers:**

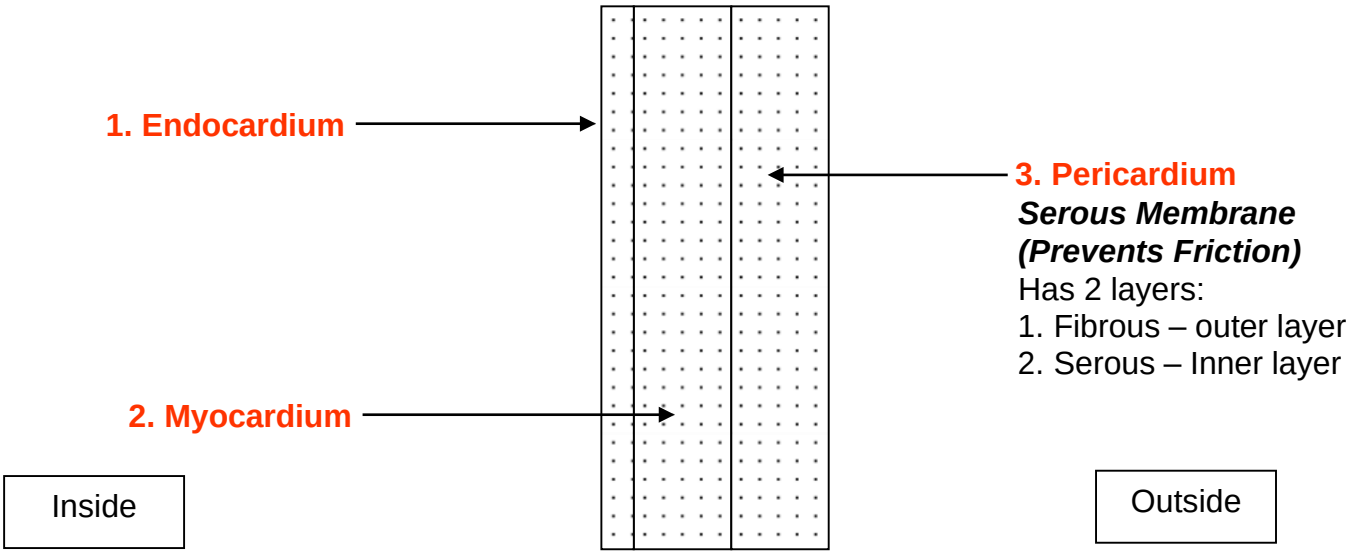
- **Right and left <u>atrium</u>**
- **Right and left <u>ventricle</u>**

The blood vessels attached to the heart are:

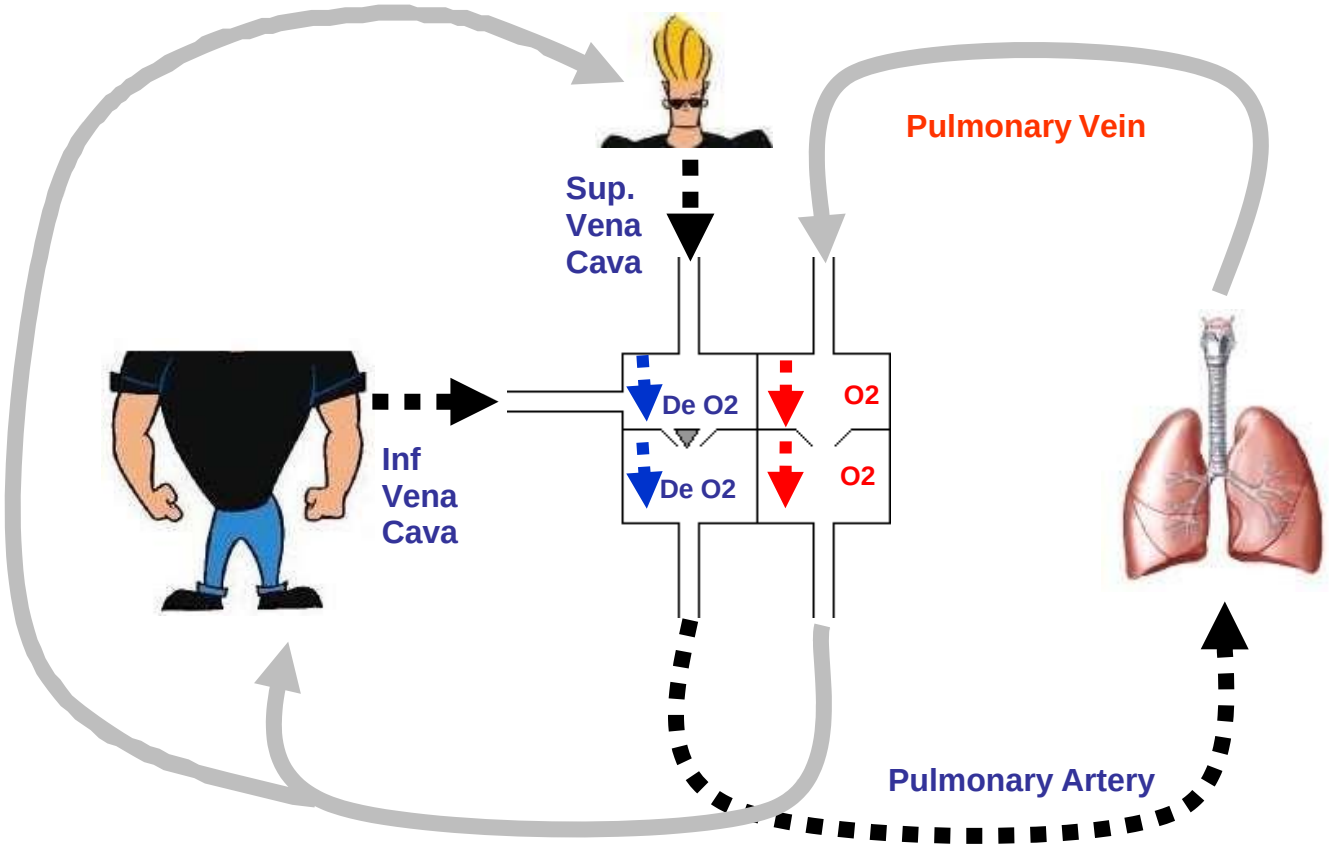


Schematic Diagram of the Heart & Blood Vessels

DIAGRAM OF THE HEART WALL



SCHEMATIC DIAGRAM OF CIRCULATION OF BLOOD IN THE BODY



Schematic diagram of circulation of blood in the body

THE CIRCULATION OF BLOOD

Blood has to pass through the heart twice before it has made a full circulation of the body.

The circulation is divided into two principal systems:

1. **SYSTEMIC / GENERAL CIRCULATION**: This is the circulation to all body parts and includes the **CORONARY CIRCULATION**, which is circulation of blood to the myocardium (heart muscle) itself (since the heart is also made up of muscular tissue which will require oxygen).

   CORONARY CIRCULATION: The right and left **coronary arteries** leave the aorta and branch into the heart wall as **capillaries**. These then continue to become the **coronary veins** where they enter the **right atrium** of the heart**.**

2. **PULMONARY CIRCULATION**: This is the circulation of blood to and from the **lungs.**

HEART CONTRACTION AND BLOOD CIRCULATION

- Blood pours in from the SVC & IVC into the right Atrium, and from the Pulmonary Vein into the left Atrium.
- The Atria contract together forcing blood into the left and right ventricles respectively.
- As the Ventricles contract together, (Atria relax), the Bicuspid and Tricuspid Valves close preventing back flow of blood from the ventricles into the atria.
- Blood is forced into the vessels and throughout the body.

SCHEMATIC DIAGRAM OF THE MAIN ARTERIES OF THE BODY

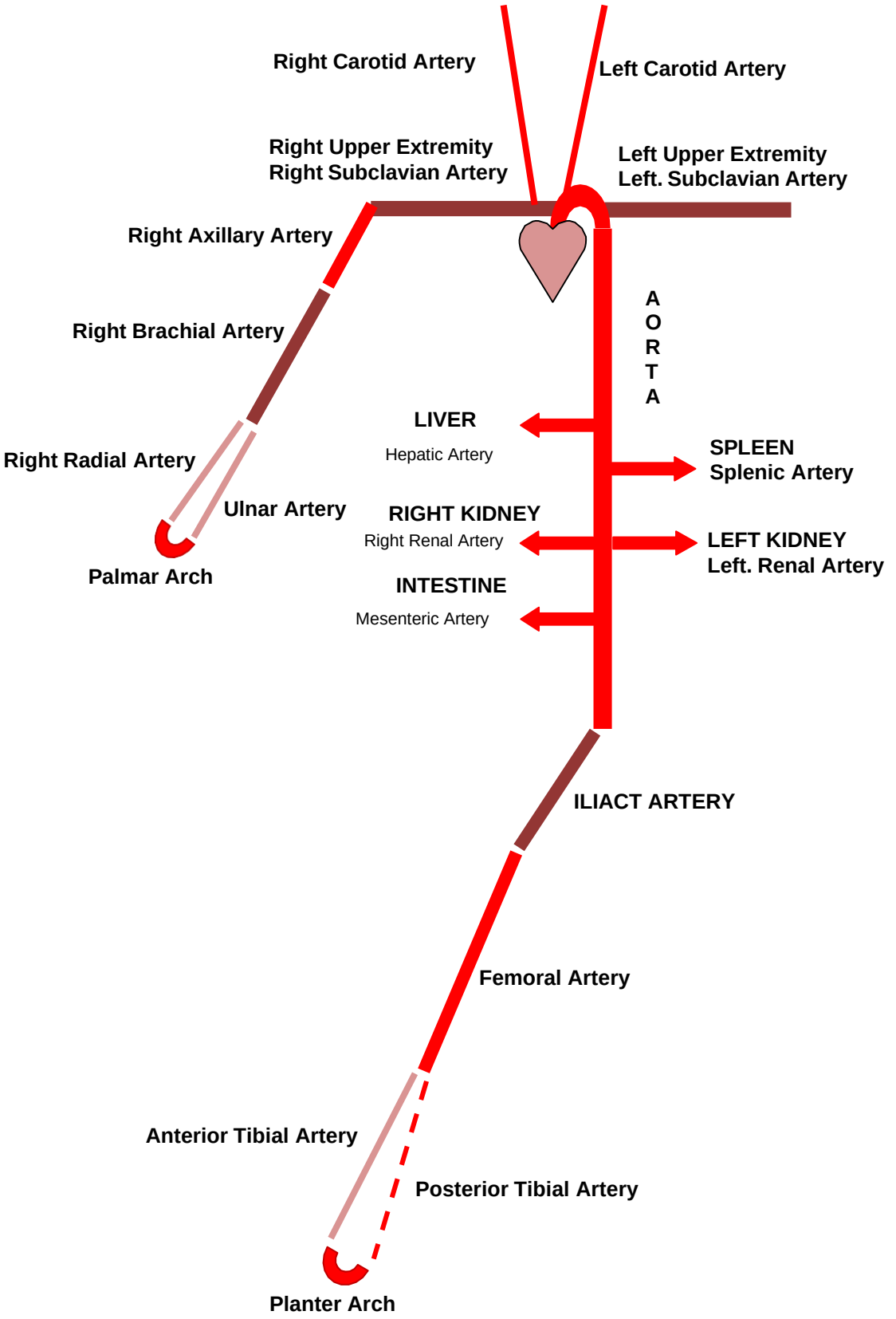


Diagram of the main arteries of the body

Veins: The names of the veins are very similar except:

Neck:
There is the Jugular Vein & no Carotid

Trunk: There is the Vena Cava and no Aorta

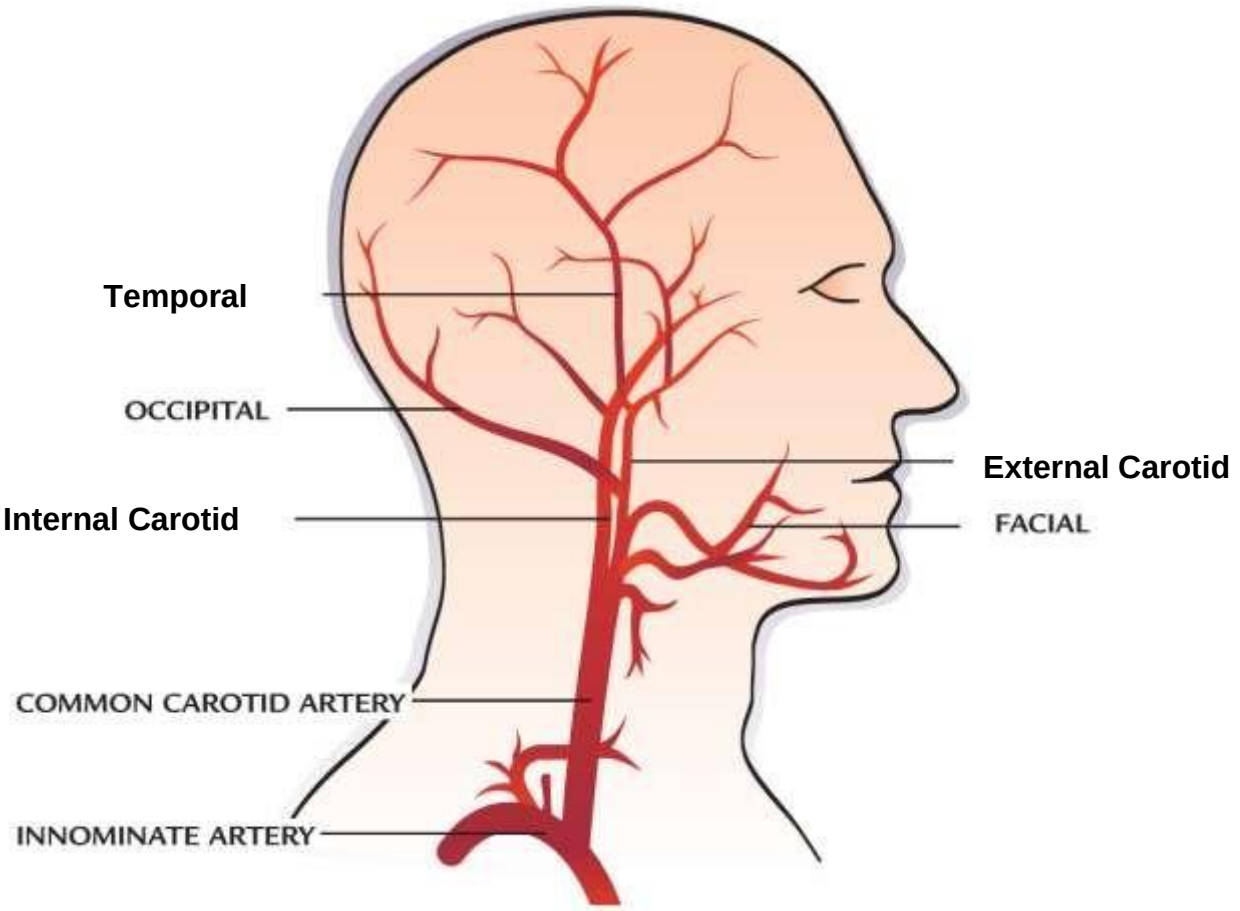
Upper Extremity:
There are some additional veins –

Cephalic & **Basilic** veins

Lower Extremity:
There are some additional veins –
Saphenous Veins

Veins: The names of the veins are very similar except in the:
Neck: There is the Jugular Vein & no Carotid
Trunk: There is the Vena Cava and no Aorta
Upper Extremity: There are some additional veins – **Cephalic** & **Basilic** veins
Lower Extremity: There are some additional veins – **Saphenous Veins**

MAIN ARTERIES OF THE HEAD



MAIN VEINS OF THE HEAD

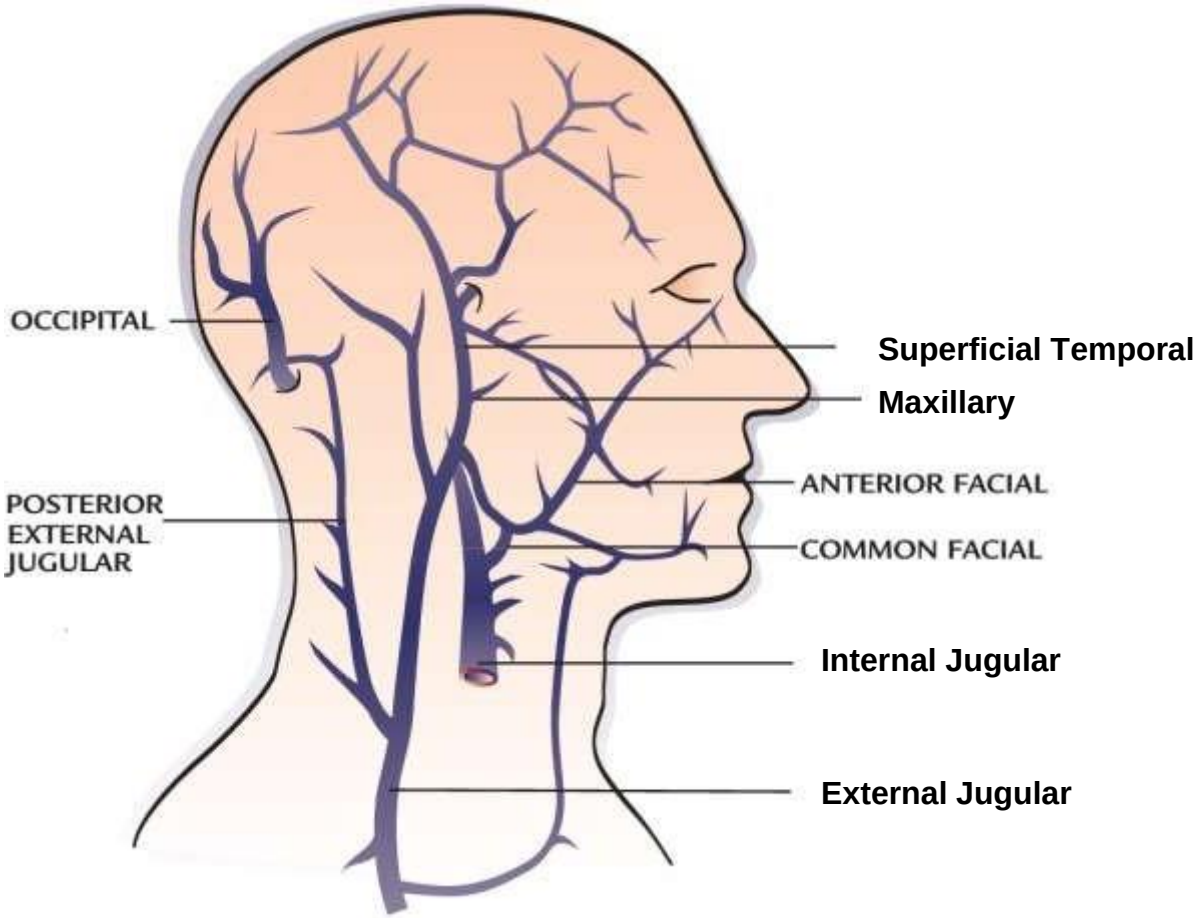


DIAGRAM OF THE MAIN ARTERIES & VEINS OF THE BODY

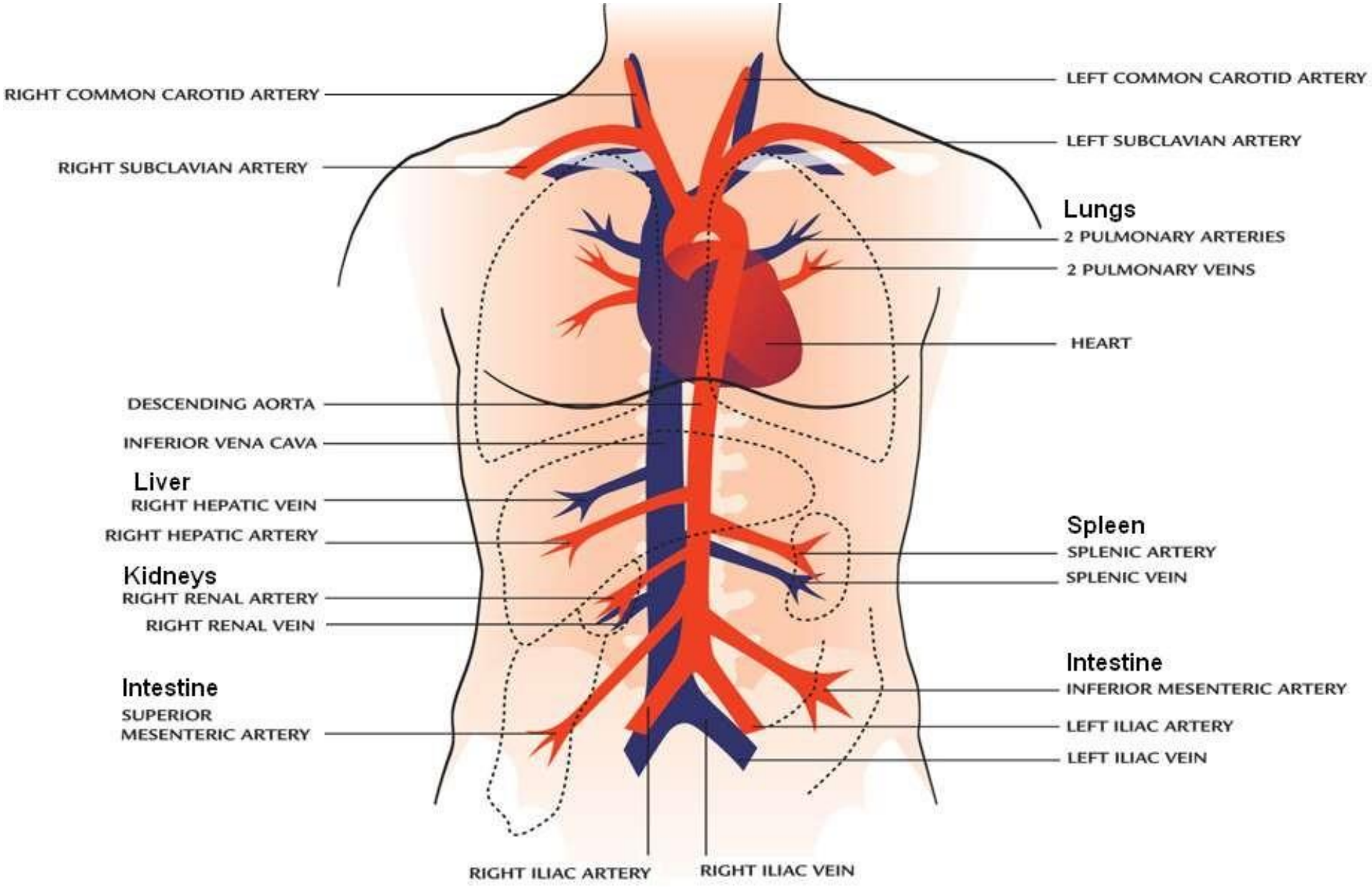
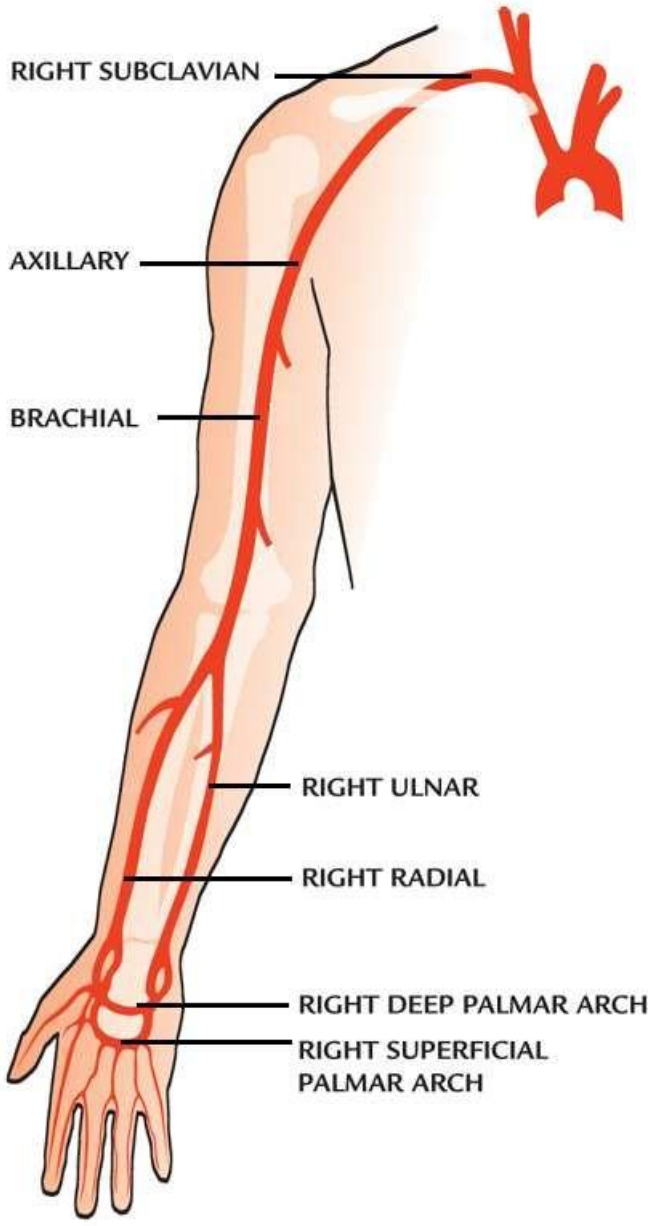


DIAGRAM OF THE MAIN ARTERIES & VEINS OF THE UPPER EXTREMITY



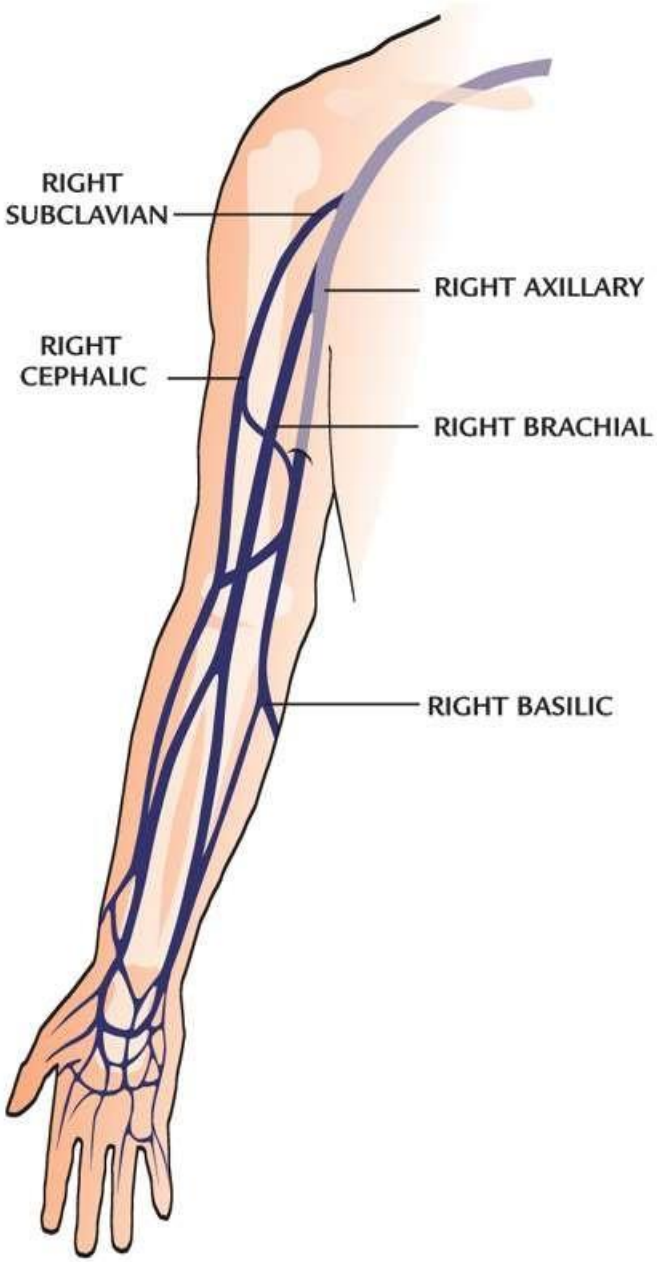
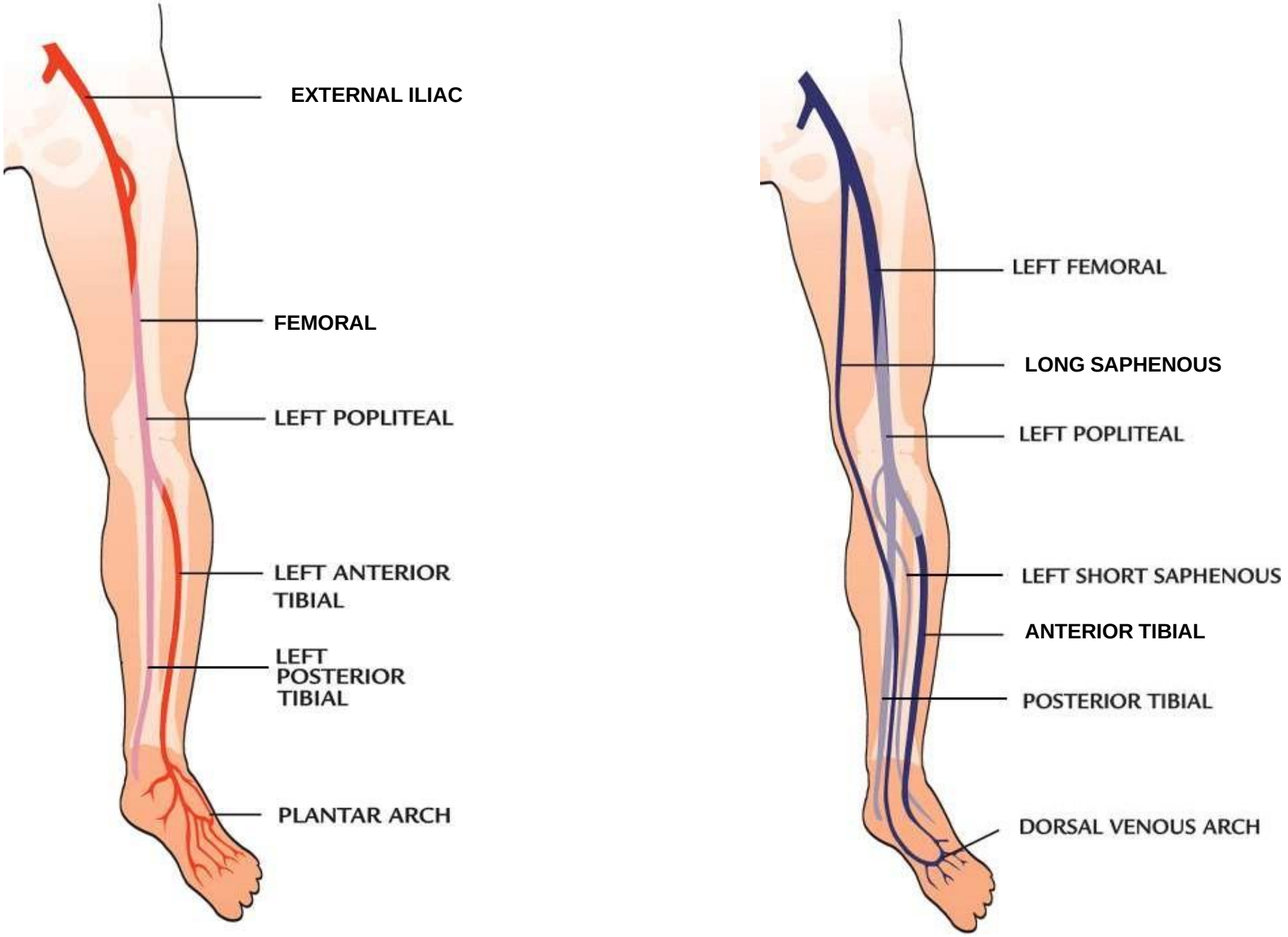


DIAGRAM OF THE MAIN ARTERIES & VEINS OF THE LOWER EXTREMITY



BLOOD PRESSURE

Blood pressure is the measure of pressure of blood on the **ARTERY** walls during ventricular systole (contraction) and ventricular diastole (relaxation).

This **PRESSURE** is required to maintain flow of blood, i.e. maintain circulation.

HOW IS BLOOD PRESSURE MEASURED

Blood pressure is measured using a **SPHYGMOMANOMETER**.

Blood pressure is given as **TWO** readings.

SYSTOLIC: when the ventricles are contracting

DIASTOLIC: when the ventricles are relaxing

Normal blood pressure is considered as **120 / 80**

120 = systolic pressure

80 = diastolic pressure

FACTORS WHICH DETERMINE BLOOD PRESSURE

Blood pressure is variable and can change with activity and rest.

Factors that determine blood pressure are:

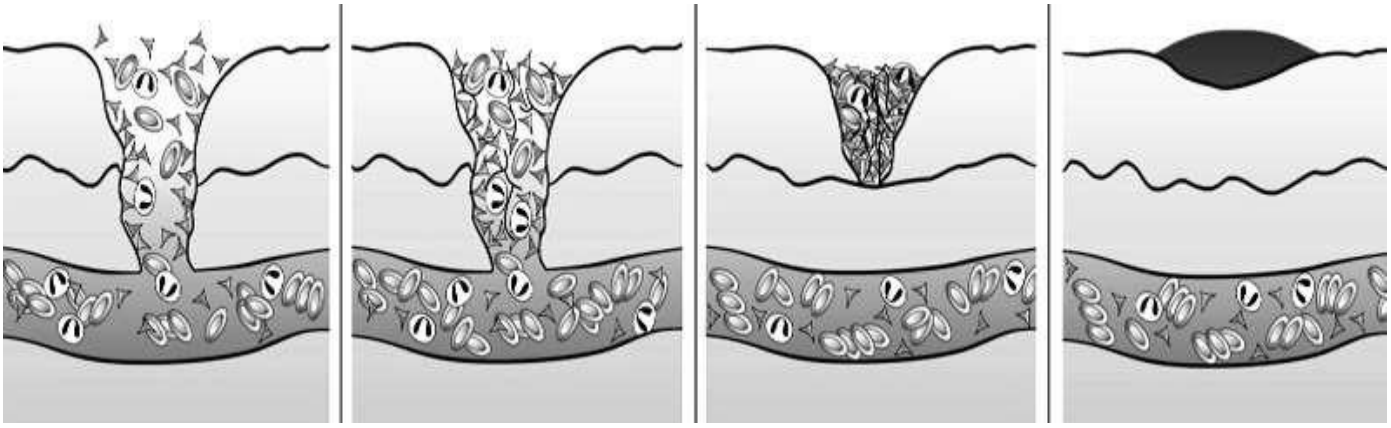
1. **Cardiac Output** - higher the cardiac output, the higher the BP
2. **Arteriole resistance** - higher the Arteriole resistance, the higher the BP
3. **Total blood volume** - higher the blood volume, the higher the BP
4. **Viscosity of blood** - the higher the viscosity, the higher the BP
5. **Elasticity of artery walls** - higher the elasticity, the lower the BP

CAUSES OF HIGH & LOW BLOOD PRESSURE

Type	Cause	Symptoms
Hypertension **High Blood Pressure**	▪ Stress ▪ Medication ▪ Kidney disease ▪ Narrowing of arteries ▪ Hardening of arteries ▪ Smoking ▪ Increased alcohol & high salt diet ▪ Obesity ▪ Hereditary	Stroke Heart attack
Hypotension **Low Blood Pressure**	▪ Hereditary ▪ Loss of blood	Fainting Dizziness

BLOOD CLOTTING

Blood clotting is necessary to prevent loss of blood through damage to blood vessels. This bleeding can be **INTERNAL** or **EXTERNAL**.



Injury to platelets cause release of **THROMBOPLASTIN**	**THROMBOPLASTIN** **+** **PROTHROMBIN** **+** **Calcium** ↓ **THROMBIN**	**THROMBIN** **+** **FIBRINOGEN (SOLUBLE)** ↓ **FIBRIN (INSOLUBLE)**	**FIBRIN** **+** **BLOOD CELLS** ↓ **CLOT**

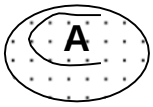
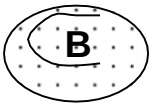
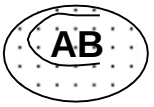
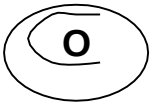
BLOOD GROUPS

Blood is “typed” or classified according to the nature of the protein found on the **surface** of the Erythrocyte (Red Blood Cell).

ABO CLASSIFICATION

This system of classification is based on two types of proteins found on the **Red Blood Cell** surface: **A** or **B.** An individual may thus be classified as type **A, B, AB** or **O** (where A or B do not exist).

The blood **plasma** contains genetically determined antibodies. We all have antibodies, but not ones that react against our own typing.

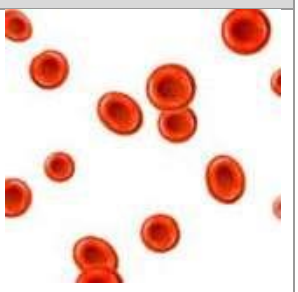
			
Antibody in plasma: **B**	Antibody in plasma: **A**	Antibody in plasma: **“None”**	Antibody in plasma: **A & B**
Antibody B in plasma will not react with protein A on blood cell, but will if protein B is introduced.	Antibody A in plasma will not react with protein B on blood cell, but will if protein A is introduced.	No antibodies in plasma exist that can react with proteins A or B on the blood cell.	Antibodies A & B in plasma will react with protein A or B on blood cell if they are introduced.

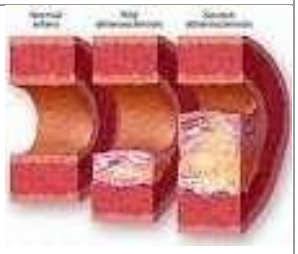
Thus O is the Universal donor and AB the Universal recipient.

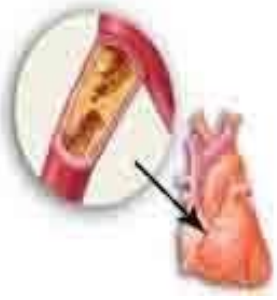
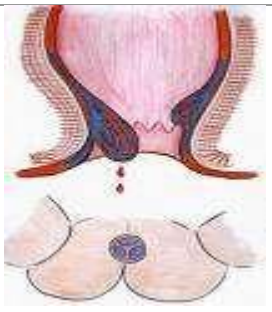
It is therefore important that when blood transfusions are done, that the correct blood group or match is received.

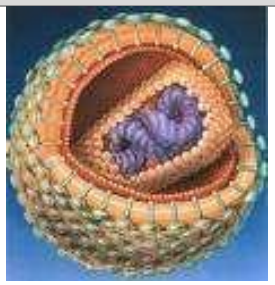
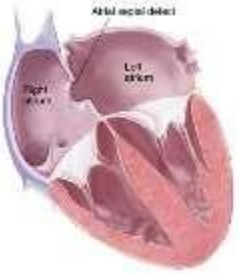
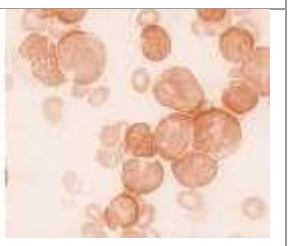
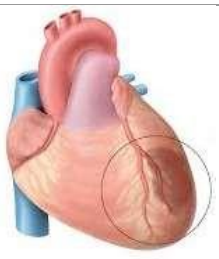
Type	**A**	**B**	**AB**	**O**
Can give to:	A, AB	B, AB	AB	A, B, AB, O
Can receive from:	A, O	B, O	A, B, AB, O	O

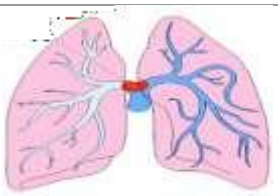
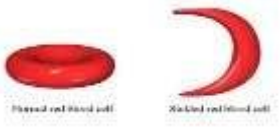
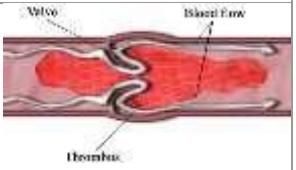
DISORDER AND DISEASES OF THE CARDIOVASCULAR SYSTEM

Condition	Description	Picture
Anaemia	Anaemia is a reduction in the blood's ability to carry oxygen, caused either by a decrease in red blood cells, or the haemoglobin they carry, or both. It may be caused by extensive loss of blood, lack of iron in the diet, the failure of bone marrow to produce the normal level of cells or it may be inherited	
Angina	Angina is chest pain or discomfort that occurs when an area of your heart muscle doesn't get enough oxygen-rich blood.	
Aneurysm	An aneurysm is a balloon-like bulge in an artery. It can grow large and burst (rupture) or cause a split in one or more layers of the artery wall. Rupture causes dangerous bleeding inside the body.	

Arteriosclerosis	A degenerative disease of the arteries, in which the walls of the vessels harden and lose elasticity. The loss of elasticity causes an increase in blood pressure. This condition mainly affects the elderly. *till*	
Atherosclerosis/ Atheroma	A build-up of fats, including cholesterol, inside the arteries, which causes a narrowing of the artery passage, hardening of the vessel walls and a loss of elasticity.	
Cardiac Arrhythmia	Is a term for any over large group of conditions in which there is abnormal electrical activity in the heart. **Tachycardia**: Abnormally rapid heartbeat (over 100 beats per minute). **Bradycardia**: Abnormally slow heartbeat.	

Condition	Description	Picture
Coronary Thrombosis	A blood clot in the heart or in the blood vessels.	
Deep Vein Thrombosis (DVT)	DVT is the formation of a blood clot in a deep vein.	
Epistaxis (Nose Bleeds)	Is the relatively common occurrence of haemorrhage from the nose, usually noticed when the blood drains out through the nostrils.	
Gangrene	Is a complication of cell death characterised by the decay of body tissues, which become black (and all green) and malodorous.	
Haemophilia	The blood's inability to clot. This is an inherited disease which affects mainly men but which can be carried by women.	
Haematoma	A haematoma is a collection of blood outside the blood vessels, generally the result of bleeding, or more specifically, internal bleeding.	
Haemorrhoids	Also known as piles, these are enlarged veins in the rectum or anus, which may collapse or contain blood clots.	

Condition	Description	Picture
HIV/AIDS	Acquired Immune Deficiency Syndrome (AIDS) is a complex disease that follows infection with the Human Immunodeficiency Virus (HIV). The virus attacks T-lymphocytes, making the immune system incapable of fighting disease. It is transmitted through blood and other body fluids.	
High Cholesterol	High cholesterol is an excessive build up of the fatty substance called cholesterol, which can cause a reduction in arterial capacity (atherosclerosis) and thus high blood pressure.	
High blood pressure (hypertension)	Chronic medical condition in which the blood pressure is elevated.	
Intermittent Claudication	This is weakness due to pain in the leg muscles because the blood supply is in adequate; pain subsides with the rest.	
Hole in the heart (Septal Defects)	This is a condition where there are small holes in the septa between atria and ventricles.	
Low blood pressure (hypotension)	Hypotension refers to an abnormally low blood pressure which can be life-threatening.	
Leukaemia	Leukemia is a cancer of the blood, caused by over-production of white blood cells.	
Myocardial infarction	The destruction of heart tissue resulting from the obstruction of the blood supply to the heart muscle.	

Condition	Description	Picture
Phlebitis	Inflammation of a vein. Thrombophlebitis is the inflammation of a vein where a blood clot has formed.	
Pulmonary Embolism	Is a blockage of the pulmonary artery by foreign matter or a blood clot.	
Raynaud's Disease	Is a vascular disease that affects blood flow to the extremities (fingers, toes, nose, and ears) when exposed to cold temperatures or in response to psychological stress.	
Septicaemia	Septicaemia is a bacterial infection of the blood, commonly known as blood poisoning.	
Sickle-cell Anaemia	Congenital fall of anaemia occurring mostly in people with black skin; characterised by abnormal blood cells having a crescent shape.	
Stress	Stress is any factor that affects mental or physical well-being. Emotions such as anxiety, fear and other negative feelings can affect the nervous system causing **increased heart rate**, breathing difficulties, sleep disturbances and stomach problems. All of these physical effects are caused by the nervous system over-working in response to stress.	
Thalassemia	A hereditary anaemia resulting from reduced production of either alpha or beta haemoglobin. Depending on the type, the condition can be fatal before or just after birth, or can result in varying levels of anaemia and development difficulties.	
Thrombus	A blood clot in the heart or in the blood vessels.	
Varicose Veins	When veins become varicose, the leaflets of the valves no longer meet properly, and the valves don't work. This allows blood to flow backwards and they enlarge even more	

INTERRELATIONSHIP OF CIRCULATORY SYSTEM WITH OTHER BODY SYSTEMS

Respiratory	Carries oxygen to every cell and system of the body (internal respiration); removes waste gas for the body through diffusion between capillary/ alveoli (external respiration).
Lymphatic	Linked to the lymphatic system at tissue level – the circulatory system transports waste products away from the tissues (mainly carbon dioxide) and any additional waste products are carried away by the lymphatic system. The circulatory and lymphatic systems also work together to protect the body (immunity). Lymphatic system empties back into the blood system.
Endocrine	Hormones carried in the blood to various target organs.
GIT (Digestive)	Nutrients broken down in the digestive process are transported by blood from the small intestine to the liver and then around the body
Muscular	Blood transports glucose for energy conversion to the muscles.
Urinary	Blood passes through the kidneys for purification of toxins
Skeletal	Erythrocytes and leucocytes are manufactured in the bone marrow of long bones
Skin	Circulation transport oxygen and nutrition to skin, hair and nails.

EFFECTS OF MASSAGE ON THE CARDIOVASCULAR SYSTEM

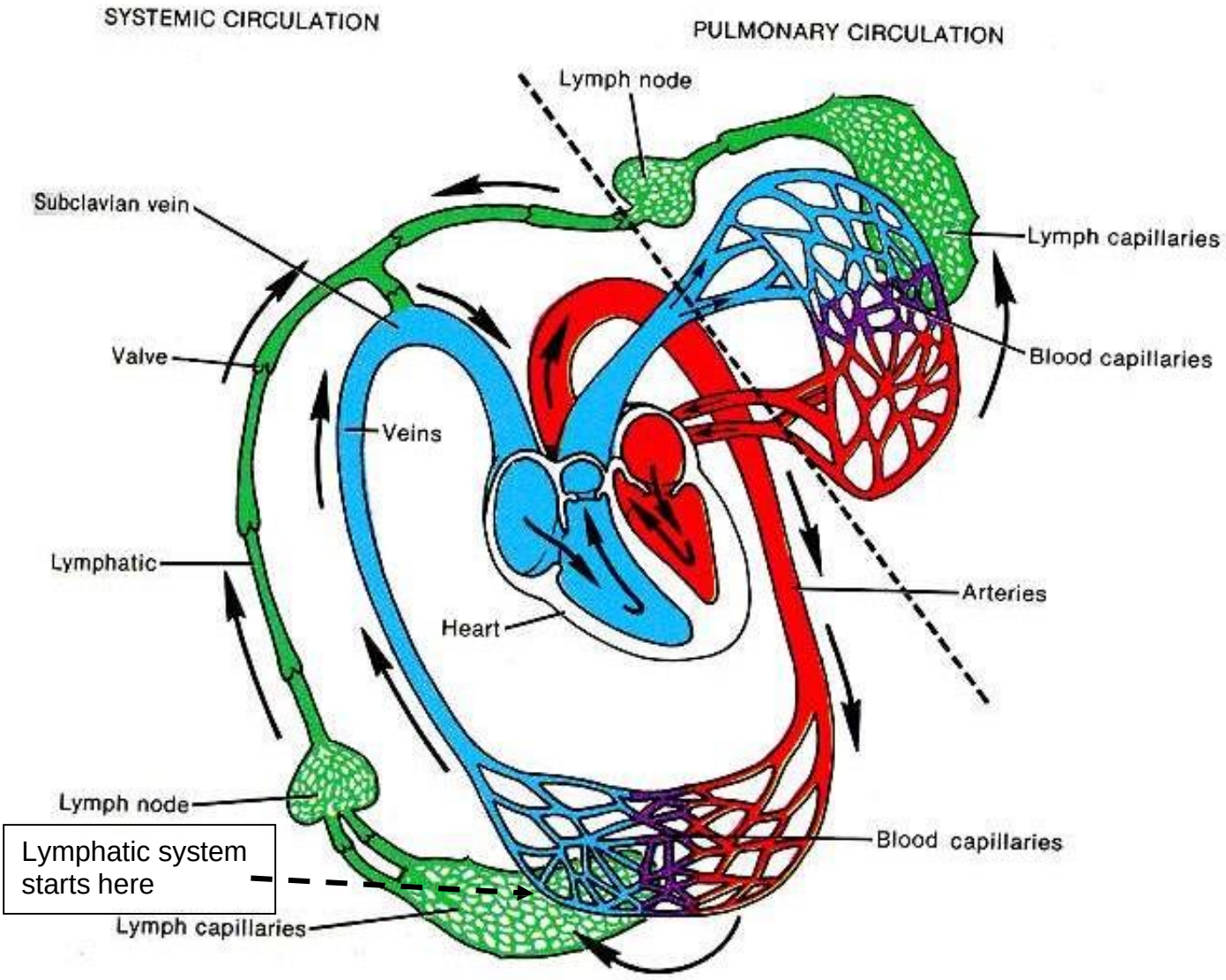
1. Increases the blood circulation and drainage, thereby improving nutrition and drainage
2. Creates local **Erythema** (redness) – blood to surface of skin
3. Helps to warm up cold extremities
4. Generally complements the hearts function by assisting in circulation

SYMPTOMS OF THE CARDIOVASCULAR SYSTEM

- Chest Pain (Angina)
- Shortness of breath (SOB)
- Swelling (Oedema) of the extremities, especially hands and feet
- Headaches (with high blood pressure)
- Cough due to fluid build up on the lungs in case of heart failure
- Radiation of pain into the arms, especially left, jaw and mid back (with heart attack).

The Lymphatic System

This is a divisional part of the circulatory system. The Cardiovascular system and the Lymphatic system are intimately connected.



Schematic diagram of the Circulatory System

FUNCTION OF THE LYMPHATIC SYSTEM

1. Uptake of **TISSUE FLUID** into lymph capillaries

2. Adding **LEUCOCYTES** & **LYMPHOCYTES** (white cells) into the circulatory system

3. **FILTER** the circulatory system of harmful foreign organisms

4. Absorb **FATS** from the **SMALL INTESTINE**

5. Return excess tissue fluid to blood – about 3 litres per day

TISSUE FLUID (INTERSTITIAL FLUID)

All body tissues are bathed in “Tissue Fluid”. This consists of diffusible elements of the blood (through diffusion or osmosis) and waste materials from cells. See diagram below.

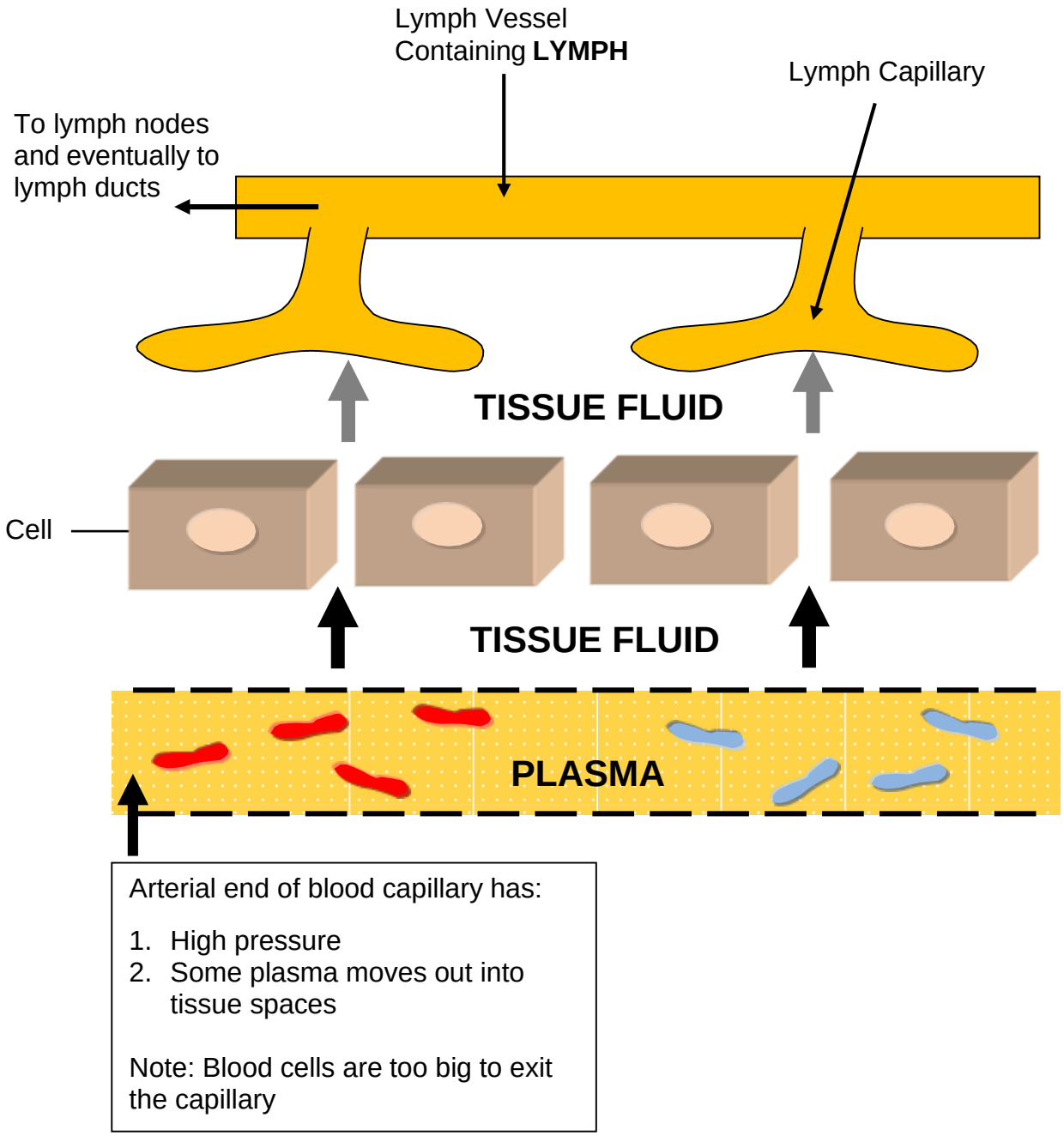
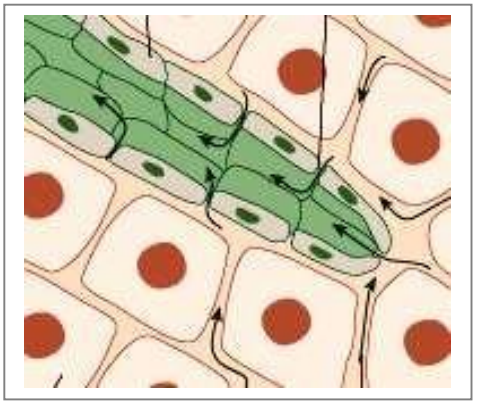


Diagram showing formation of Tissue Fluid & Lymph

COMPONENTS OF THE LYMPHATIC SYSTEM

1. LYMPHATIC CAPILLARIES



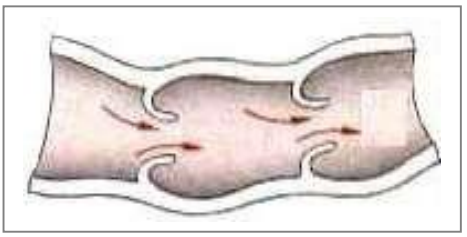
Structure:

- Single layer of **ENDOTHELIAL (SQUAMOUS)** cells
- Are "**blind ending**" i.e. they have a dead end.
- Are in all parts of the body except the **NERVOUS SYSTEM**

Function:

- Carry excess **TISSUE FLUID** away from tissue spaces

2. LYMPHATIC VESSELS



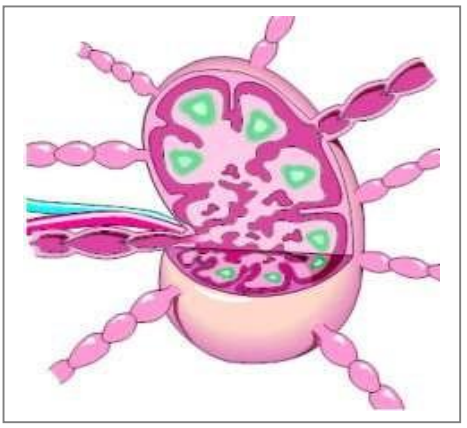
Structure:

- Thin walled, **COLLAPSIBLE** vessels
- They have **VALVES** to prevent back flow
- Valves give a **KNOTTED** appearance
- Have a middle **muscular** and **elastic** layer

Function:

- Collect lymph from lymphatic capillaries to push towards the heart
- Can be found subcutaneous to skin (beneath dermis of skin)

3. LYMPH NODE



Structure:

- Consist of **LYMPHATIC** tissue surrounded by fibrous tissue and inward strands called **TRABECULAE**

Function:

- **FILTER** lymph of harmful microorganisms etc.
- Produce **LYMPHOCYTES** & **ANTIBODIES** to add to blood stream via lymph when necessary

4. LYMPHATIC DUCTS

All lymph vessels finally join to form a one large duct on each side to return lymph to the blood.

i. Right side: **LYMPHATIC DUCT** joins the **right SUBCLAVIAN VEIN**

ii. Left side: **THORACIC DUCT** joins the **left SUBCLAVIAN VEIN**

5. LYMPH FLUID

COMPOSTION OF LYMPHATIC TISSUE

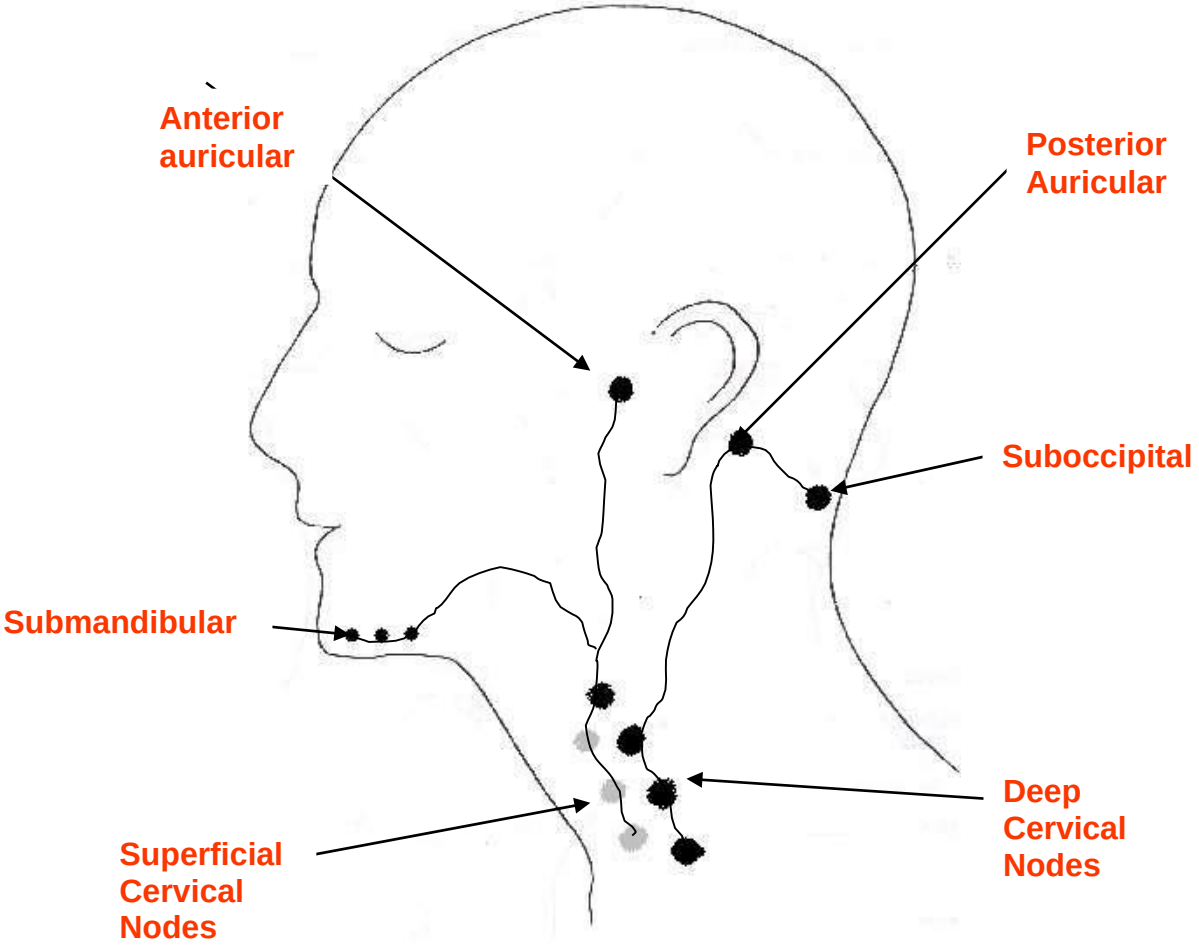
Lymphatic tissue consists of:

- **Phagocytes**: white blood cells which engulf (eat) harmful waste and bacteria
- **Lymphocytes**: white blood cells that produce antibodies

MOVEMENT OF LYMPH

1. Through the contraction of **SKELETAL MUSCLE** (massage action)
2. Slight on-coming pressure from tissue fluid
3. **SUCTION** movement of lymph towards the **THORAX** during **INHALATION** (breathing in).
4. **VALVES** are present to prevent backflow

POSITION OF LYMPH NODES ON THE HEAD AND FACE



☞ **Know this for the Practical Exam**

POSITION OF LYMPH NODES IN THE BODY

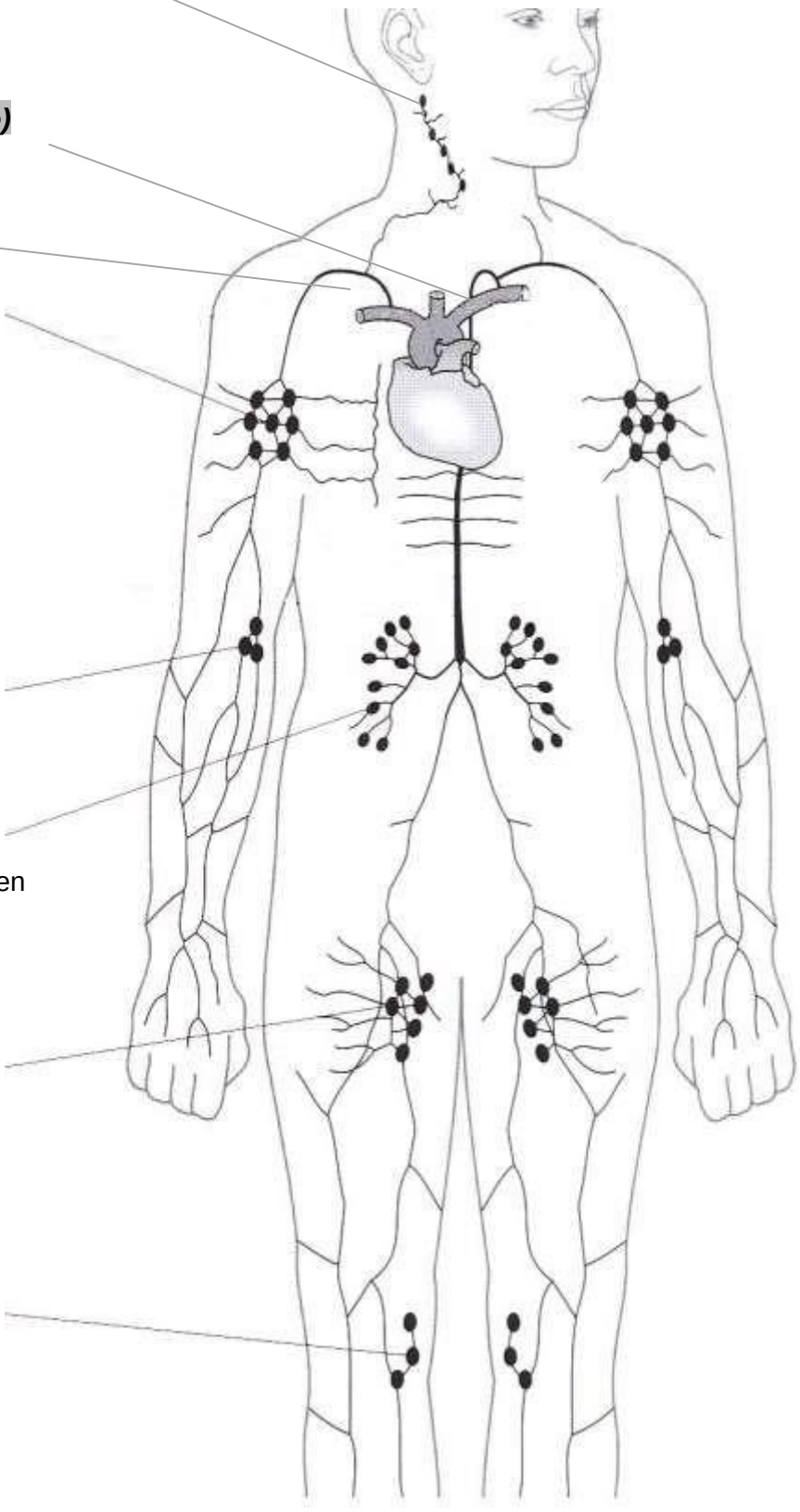
☞ **Know this for the Practical Exam**

Cervical lymph nodes
Location: In the neck

Thoracic Duct (left side)

Lymphatic Duct (right side)

Axillary lymph nodes
Location: In the armpit



Supratrochlear lymph nodes
Location: Elbow pit

Abdominal lymph nodes
Location: Deep in the abdomen

Inguinal lymph nodes
Location: In groin crease

Popliteal lymph nodes
Location: Behind the knee

Position of major Lymph nodes in the body

<u>Note: Lymph from BOTH LOWER EXTREMITIES drains into the LEFT SUBCLAVIAN VEIN via the Thoracic Duct</u>

DRAINAGE OF LYMPH IN THE BODY

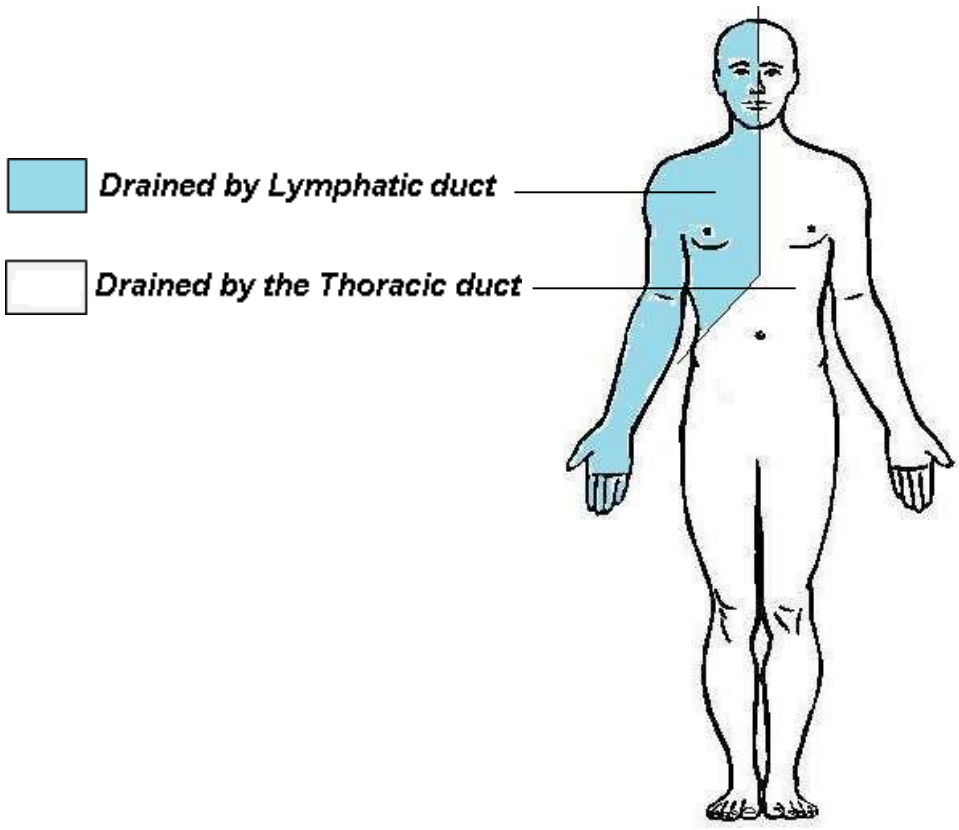
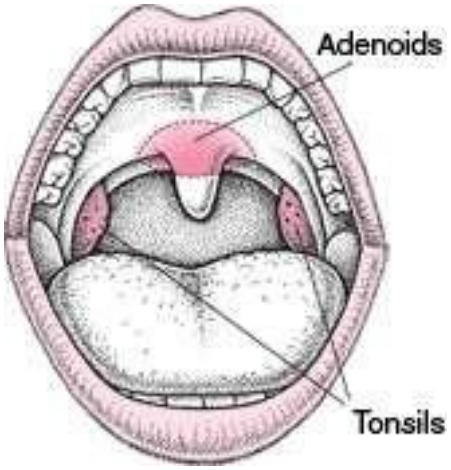


Diagram showing the major lymph drainage of the body

OTHER AREAS CONTAINING LYMPHATIC TISSUE

There are other areas in the body, which contain lymphatic tissue. These are:

- **Tonsil** & **Adenoids** – found in the back of the throat



- **Thymus Gland** – found behind the sternum. (See later notes on Endocrine System)
- **Peyer's Patches** – found in the Small Intestine
- **Appendix**
- **Spleen**

SPLEEN

The spleen is an organ found on the left side of the abdomen, below the diaphragm and posterior to the stomach

Structure:

It an outer fibrous tissue extending into a network of fibrous stands called **TRABECULAE** which are a network that acts as a supporting tissue for the spleen i.e. it is like scaffolding.

Functions:

1. Forms new **LYMPHOCYTES**
2. Destroys **red blood cells** and **thrombocytes**
3. Helps remove foreign particles from the circulation
4. Helps fight **INFECTION**
5. Acts as a **BLOOD RESERVOIR**. The spleen contracts **2-3 times** a minute or faster during shock or exercise to help maintain blood pressure.

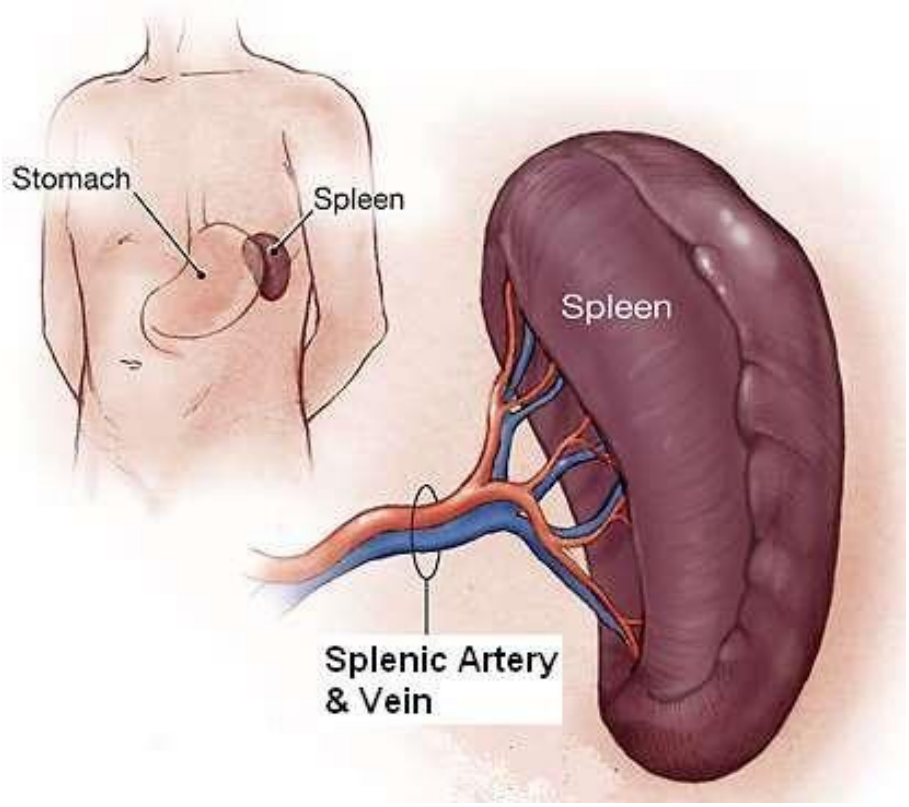
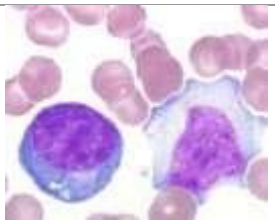
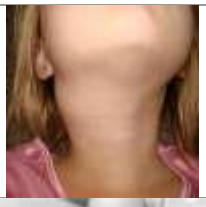


Diagram showing position and blood supply of Spleen

DISORDER AND DISEASES OF THE LYMPHATIC SYSTEM

Condition	Description	Picture
Cellulite	Cellulite is a term used to describe the dimpled appearance of skin caused by fat deposits that are just below the surface of the skin. It generally appears on skin in the abdomen, lower limbs, and pelvic region, and it usually occurs after puberty.	
Hodgkin's Disease ***Non-Hodgkin's Lymphoma***	- Cancer of one type of lymphatic tissue cells. - Cancer of the lymphatic tissue, but different to cells affected in Hodgkin's type only. The distinction is important because the treatment and outcomes for each type can be very different.	
Infectious Mononucleosis (Glandular Fever)	Mononucleosis is a viral infection caused by the Epstein-Barr virus. It begins slowly with fatigue, a general ill feeling, headache, and sore throat and the lymph nodes in the neck are frequently swollen and painful.	
Lymphadenitis	Lymphadenitis is the inflammation of lymph nodes.	
Lymphoedema	Oedema associated with an obstruction is the lymphatic vessel and flow of lymph.	
Oedema/Water Retention	Swelling due to excess fluid in the tissue spaces and serous cavities.	
Hashimoto's Thyroiditis	Hashimoto's thyroiditis or chronic lymphocytic thyroiditis is an autoimmune disease in which the thyroid gland is attacked by a variety of cell and antibody immune processes	

INTERRELATIONSHIP OF CIRCULATORY SYSTEM WITH OTHER BODY SYSTEMS

Circulatory	Transports excess waste and toxins, which is the circulatory system cannot cope with, away from the cells and tissues. Also works closely with the circulatory system to strengthen the bodies immunity.
GIT (Digestive)	Lymphatic vessels in the small intestine (inside the lacteal of the ileum) help with the absorption of fats during digestions. These are then transported around the body in the circulatory system and distributed to cells to be used as energy.
Muscular	Lactic acid formed when over exercising muscles, or from tension and general fatigue in the muscular system, is drained in the lymphatic system.

EFFECTS OF MASSAGE ON THE LYMPHATIC SYSTEM

1. Increases the flow of lymph into and from the lymphatic system
2. Ensures glands or vessels keep fluid moving through them
3. Helps with the body immune system by stimulating the lymphatic system