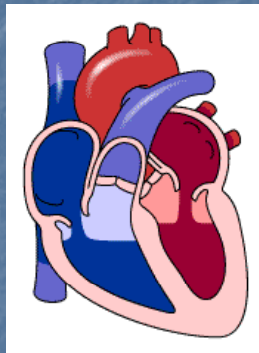


Heart/Lymph/Immune Review

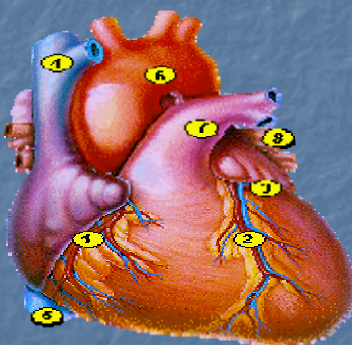
<http://www.innerbody.com/>

Check it out!

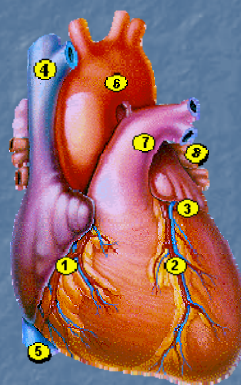
Heart: Anatomy & Physiology



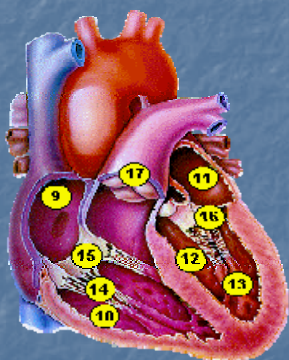
Label the numbers



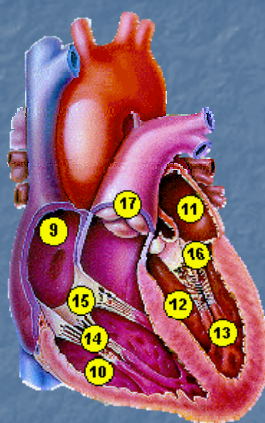
- 1 [Right Coronary](#)
- 2 [Left Anterior
Descending](#)
- 3 [Left Circumflex](#)
- 4 [Superior Vena Cava](#)
- 5 [Inferior Vena Cava](#)
- 6 [Aorta](#)
- 7 [Pulmonary Artery](#)
- 8 [Pulmonary Vein](#)



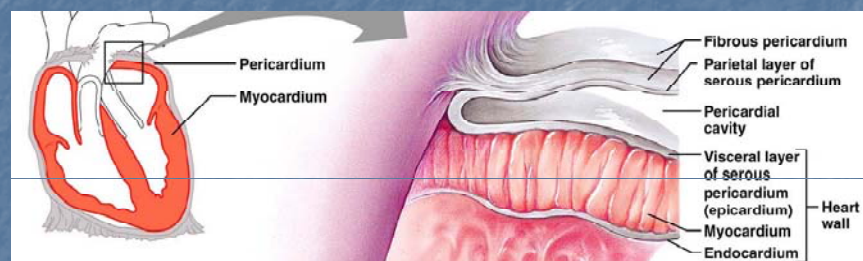
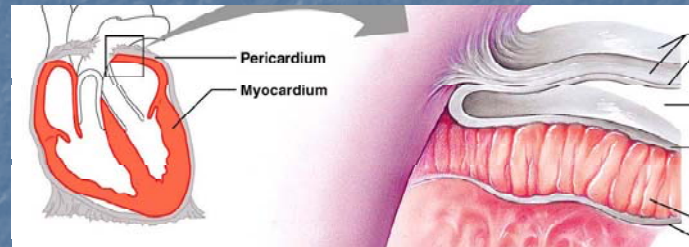
Label the numbers



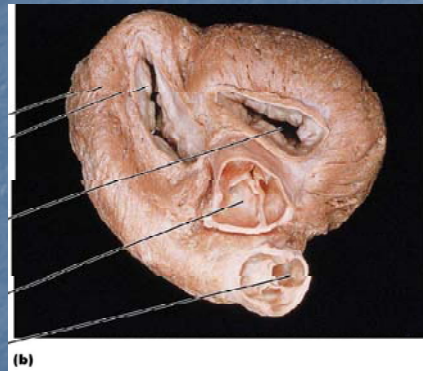
- 9 [Right Atrium](#)
- 10 [Right Ventricle](#)
- 11 [Left Atrium](#)
- 12 [Left Ventricle](#)
- 13 [Papillary Muscles](#)
- 14 [Chordae Tendineae](#)
- 15 [Tricuspid Valve](#)
- 16 [Mitral Valve](#)
- 17 [Pulmonary Valve](#)



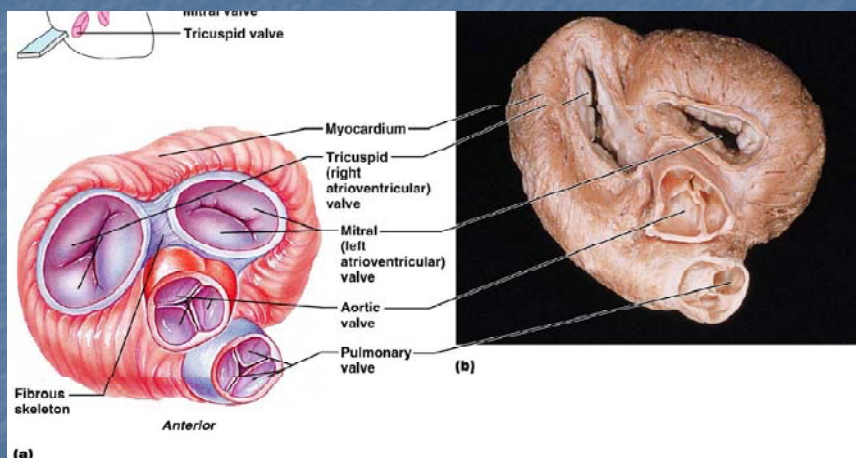
Name the layers of the heart wall



Identify the valves



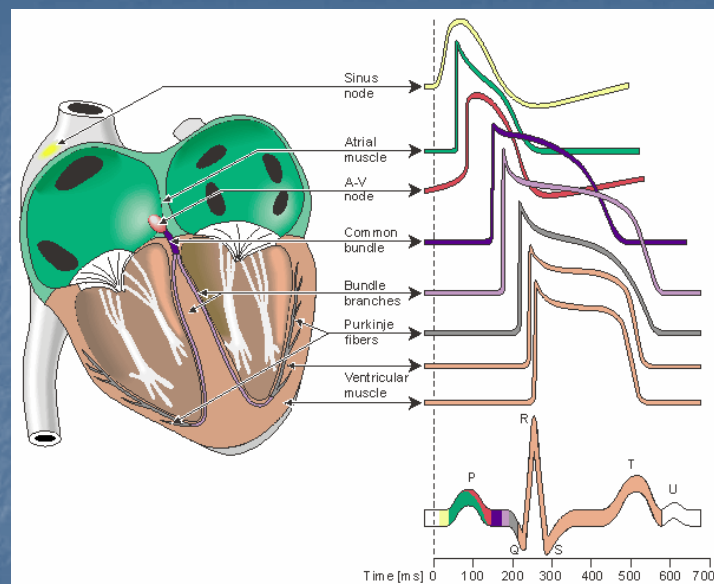
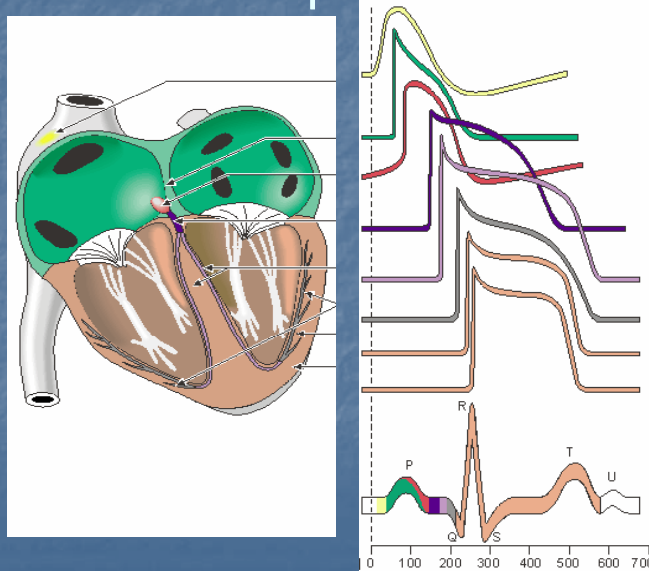
(b)



(a)

(b)

What does each colored line represent?



**Name 3 Factors
that influence cardiac
rhythmicity**

Sympathetic stimulation
Parasympathetic stimulation
Inorganic Ions
Temperature
Oxygen Supply
pH
Drugs and Toxins

Name 3 factors that influence
stroke volume

Preload
Afterload
Contractility

List 3 factors that increase
preload and 3 values that
decrease preload

Increase in Preload: IV Fluids
Blood
Vasoconstriction

Decrease in Preload: Diuretics
Dehydration
Hemorrhage
Vasodilation

What do the below sounds indicate:

Lub
Dup
Snap
Click
Swish

Lub - AV valve closing (beginning of systole)
Dup - SL valve closes (beginning of diastole)
Snap - stenosis of mitral valve
Click - stenosis of aortic valve
Swish - heart murmur (more severe can be heard as blowing, rumbling, whistling)

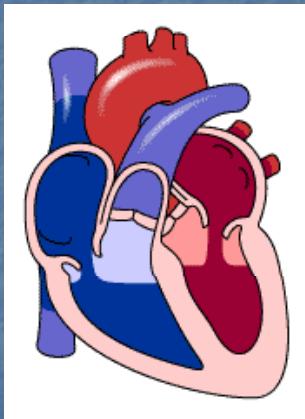
What are the observed contraction rates of the different components of the intrinsic conduction system?

SA Node
AV bundle
AV Node
Purkinje fibers

SA Node 75 bpm
AV bundle 50 bpm
AV Node 30 bpm
Purkinje fibers 30 bpm

What is the total time for impulse conduction across a healthy heart, on average?

.22 sec



- | | |
|--|-----------------------------|
| 1. Results from prolonged coronary blockage | a. Angina Pectoris |
| 2. Abnormal pacemaker | b. Bradycardia |
| 3. Allows backflow of blood | c. Congestive Heart Failure |
| 4. Because of cardiac decompensation, circulation is inadequate to meet tissue needs | d. Ectopic Focus |
| 5. A slow heartbeat, that is, below 60 bpm | e. Fibrillation |
| 6. A condition in which the heart uncoordinated and useless as a pump | f. Heart Block |
| | g. Incompetent valve |
| | h. Myocardial Valve |
| | i. Pulmonary Congestion |
| | j. Tachycardia |

- 1- H
- 2- D
- 3- G
- 4- C
- 5- B
- 6- E

- | | |
|--|-----------------------------|
| 7. A RAPID HEART RATE, THAT IS OVER 100 BPM | a. Angina Pectoris |
| 8. Damage to AV node, totally or partially releasing the ventricles from the control of the SA nodes | b. Bradycardia |
| 9. Chest pain, resulting from ischemia of the myocardium | c. Congestive Heart Failure |
| 10. Result of the initial failure of the left side of the heart | d. Ectopic Focus |
| | e. Fibrillation |
| | f. Heart Block |
| | g. Incompetent valve |
| | h. Myocardial Valve |
| | i. Pulmonary Congestion |
| | j. Tachycardia |

7- J
8- F
9- A
10-I

What is the effect of the below on the heart:

Hypercalcemia

Hyperkalemia

Hypocalcemia

Hypokalemia

Hypercalcemia – Spastic contractions

Hyperkalemia – Lowers resting potential

Hypocalcemia – Depresses heart

Hypokalemia – Feeble contractions,
abnormal rhythms

Give 3 examples of congenital heart defects

Ventricular Septal Defect – superior part of the interventricular septa fails to form, blood mixes between ventricles

Coarctation of the Aorta – part of the Aorta is narrowed, increasing work load on left ventricle

Tetralogy of Fallot – multiple defects, pulmonary trunk too narrow, pulmonary valve stenosed (resulting in right ventricle hypertrophy), ventricular defect, aorta opens from both ventricles, wall of right ventricle thickened from overwork

Blood Vessels

Question:

What is the largest blood vessel in the body?

Answer

Aorta

Question:

What are the smallest blood vessels called?

Answer

Capillaries

Question:

What are the functions of pericytes?

Answer

- Protection
- Blood flow regulation

Question:

Name the three tunics which compose the arteries and veins and give an identifier for each.

Answer

<u>Tunic</u>	<u>Identifier</u>
■ Tunica interna (a.k.a. tunica intima)	endothelial cell
■ Tunica media	circular smooth muscle concentric elastic lamina
■ Tunica externa (adventitia)	collagen

Question:

How can you differentiate between someone having a problem with high blood pressure vs. diabetes?

Answer

- Diabetic, arteries & veins thick
- HBP, arteries only

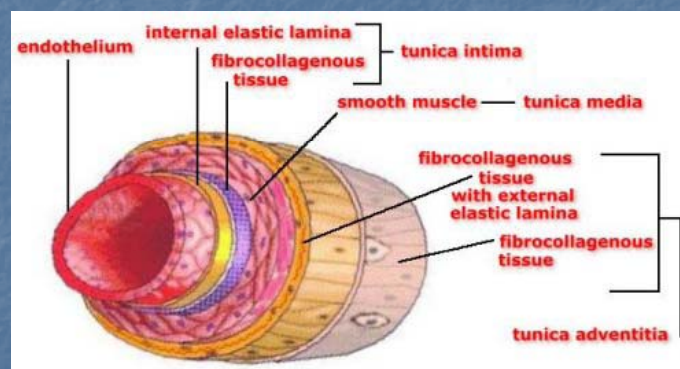
Question:

Your pulse is the rate at which your heart beats. Where can it be detected?

Answer

*Temporal	Facial
*Common Carotid	*Brachial
Radial	*Femoral
*Popliteal	Posterior
*Dorsalis pedis	

Question: What is this an illustration of?



Answer

Muscular Artery

Question: What's happening here?
Why?



Answer

- The picture shows a red and swollen thigh and leg caused by a blood clot (thrombus) in the deep veins (in the iliofemoral veins).
- It prevents normal return of blood from the leg to the heart.
- *Diagnosis:* DVT, Deep Vein Thrombosis

Blood Flow Through the Heart

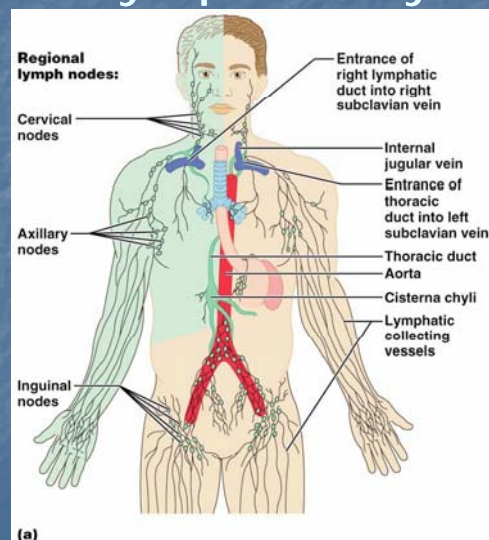
- 1. Blood from the body is carried into the heart's _____ by blood vessels called the *vena cava*.
- (a) _____ **vena cava** brings blood from the legs and the lower part of the body.
- (b) _____ **vena cava** brings blood from the head, neck, and arms.

- 1. Blood from the body is carried into the heart's **right atrium** by blood vessels called the *vena cava*.
- (a) **Inferior vena cava** brings blood from the legs and the lower part of the body.
- (b) **Superior vena cava** brings blood from the head, neck, and arms.

- 2. When the *right atrium* fills with blood, it contracts, sending blood to the _____.
- 3. When the _____ fills with blood, it contracts, sending blood to the *lungs* through blood vessels called the _____.
- 4. In the lungs, blood picks up oxygen, and then returns to the heart's *left atrium* through blood vessels called the _____.
- 5. When the _____ contracts, it sends blood to the *left ventricle*.
- 6. From the *left ventricle*, blood is pumped out the _____ and through the body.

- 2. When the *right atrium* fills with blood, it contracts, sending blood to the right ventricle.
- 3. When the right ventricle fills with blood, it contracts, sending blood to the *lungs* through blood vessels called the pulmonary arteries.
- 4. In the lungs, blood picks up oxygen, and then returns to the heart's *left atrium* through blood vessels called the pulmonary veins.
- 5. When the left atrium contracts, it sends blood to the *left ventricle*.
- 6. From the *left ventricle*, blood is pumped out the aorta and through the body.

The Lymphatic System



Name the two most important functions of the lymphatic system?

1. Maintenance of fluid balance in the internal environment.

*It drains fluid from around cells to prevent fluid build up.

*Lymphatic capillaries are also able to absorb fat from the

- intestines.
- *The fluid that is circulated by the lymphatic system is called
- lymph.
- Lymph is filtered by the lymphatic system to remove such things as
- microorganisms and wandering cancer cells.

2. Immunity

Name the two semi-independent parts of the lymphatic system?

1. A network of lymphatic vessels
2. Lymphoid tissues and organs

The Lymphatic system consists of:

- - lymph
- - network of vessels
- - lymph nodes and nodules
- - tonsils
- - spleen
- - thymus gland
- - bone marrow

Lymph flows in which
direction?

The lymphatic system is one-way and flows toward the heart.

There is no pump for the lymphatic system, so how is lymph moved?

- - *constriction of vessels*
- - *skeletal muscle pump*
- - *respiratory pump*

What is the structure pictured below?



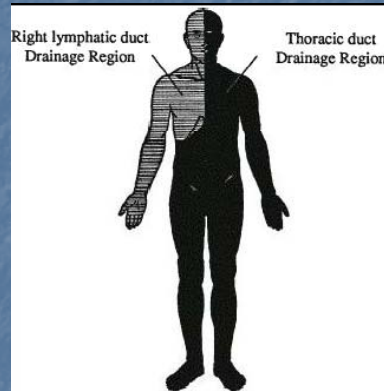
Right lymphatic duct

Right lymphatic duct –

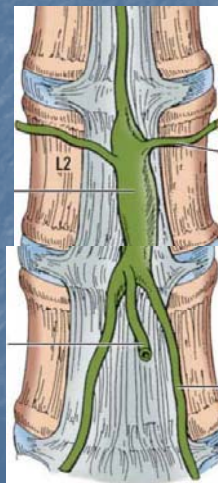
- drains the right upper
- arm and the right side of
- the head and thorax

Thoracic duct –

- arises
- from the cisterna chyli
- and drains the rest of the
- body



The enlarged sac that originates the thoracic duct?

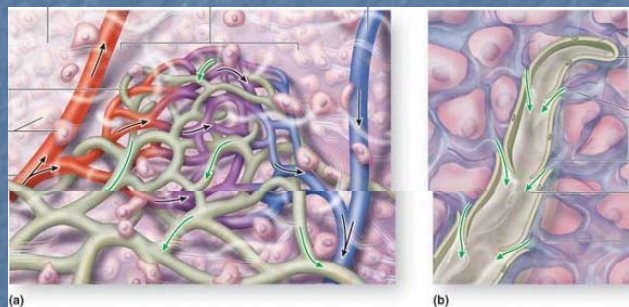


Cisterna chyli

Collects lymph from 2 large lumbar trunks that drain the lower limbs

Collects lymph from intestinal trunk that drains the digestive organs

How do lymphatic capillaries differ from blood capillaries?



Very permeable
Loosely joined endothelial minivalves
Withstand interstitial pressure and
remain open

Name the two main Lymph cells
and their function.

Can you name a few more lymphoid cells?

T cells (manages immune response, some will directly attack and destroy infected cells)

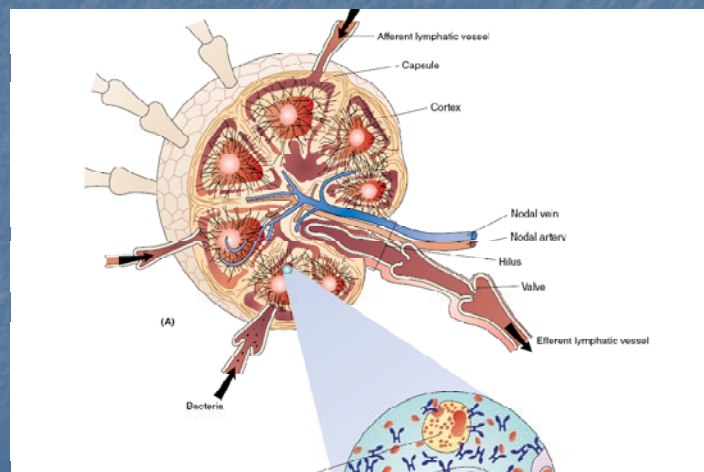
B cells (produce plasma cells, which are daughter cells that secrete antibodies)

Macrophages – phagocytize foreign substances and
 ■ help activate T cells

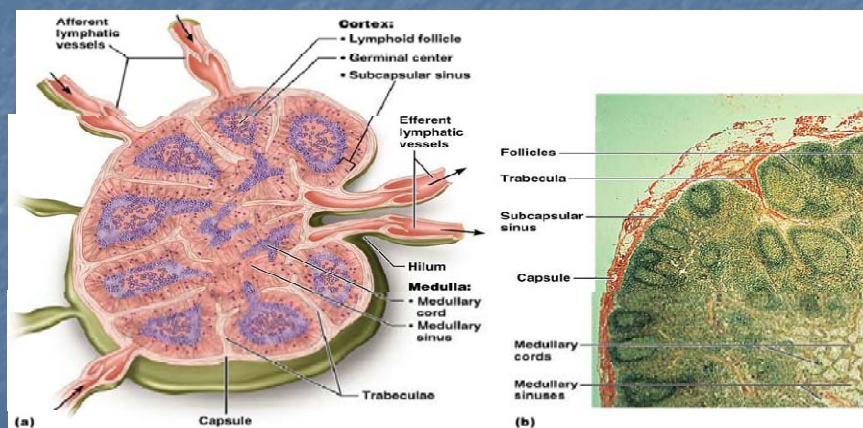
Dendritic cells – spiny-looking cells with functions
 ■ similar to macrophages

Reticular cells – fibroblast-like cells that produce a
 ■ stroma, or network, that supports other cell types in
 ■ lymphoid organs

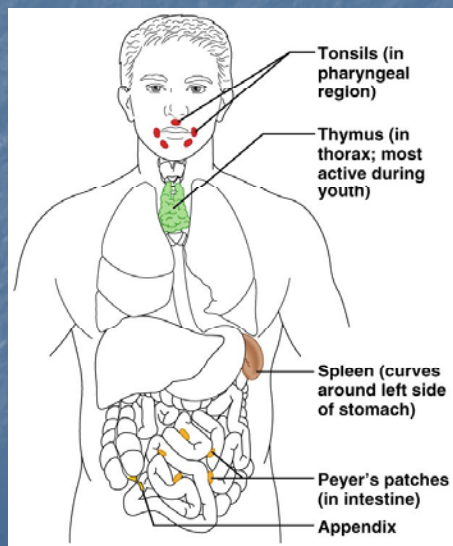
List two basic functions of Lymph Node:



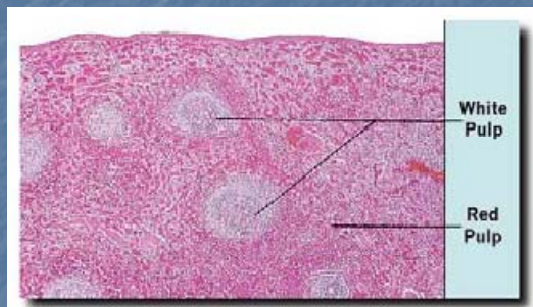
- Filtration – macrophages
- destroy microorganisms
- and debris
- Immune system activation
- – monitor for antigens
- and mount an attack
- against them



Lymphoid organs

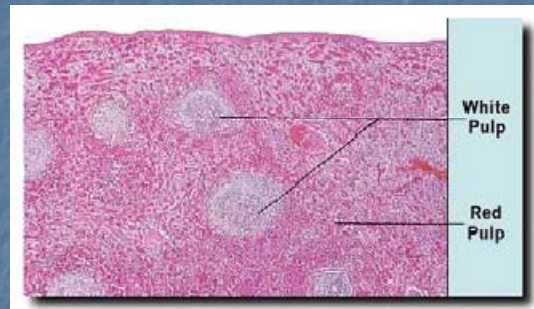


What organ is this from?

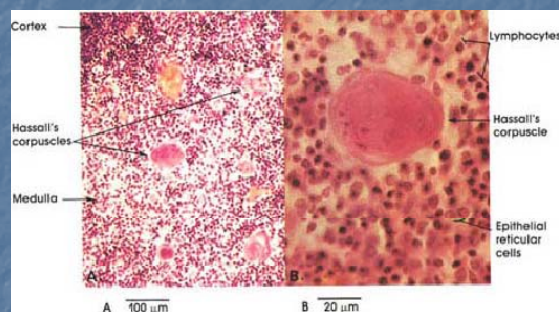


Spleen

Site of lymphocyte proliferation
Immune surveillance and response
Cleanses the blood



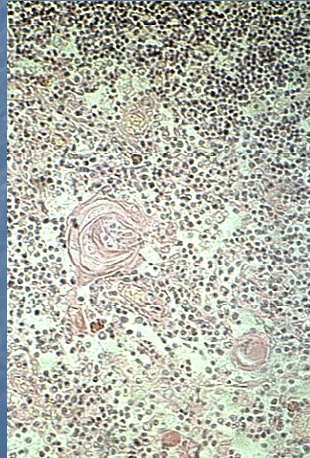
What organ do these pictures represent?



Thymus

It functions strictly in T lymphocyte maturation

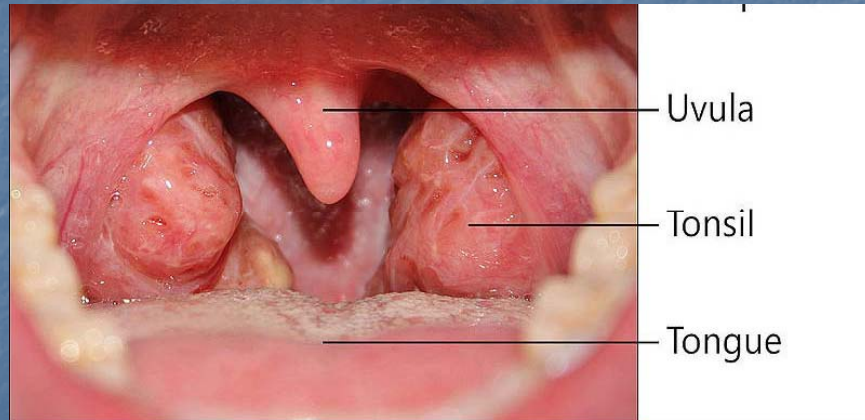
It does not directly fight antigens



What organ does this represent?



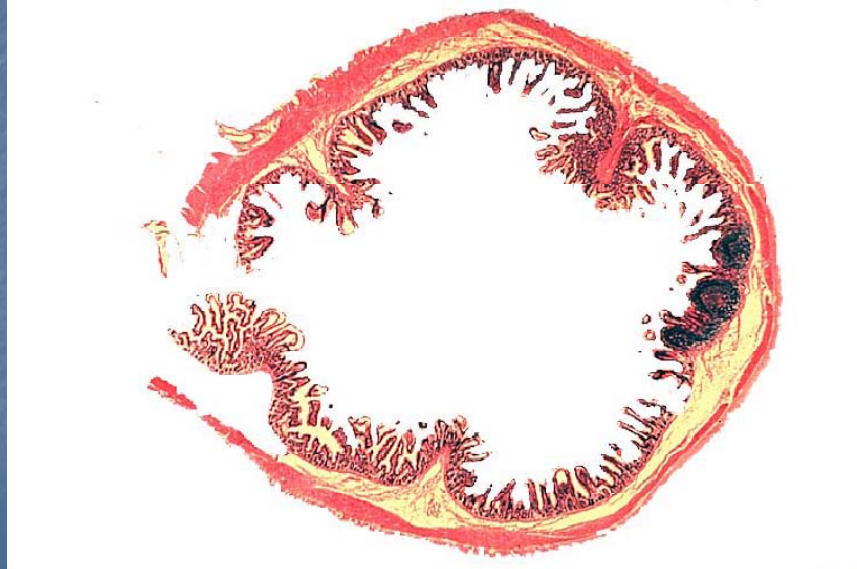
Tonsils



What does this picture represent?



Peyer's Patches (located in small intestine)



What organs make up MALT?

Do you know what the acronym stands for?

MALT – mucosa-associated lymphatic tissue

- **Peyer's patches, tonsils, and the appendix** (digestive tract)
- Lymphoid nodules in the walls of the bronchi (respiratory tract)
- Main function: protects the digestive and respiratory systems from foreign matter/ Protects passages that are open to the exterior

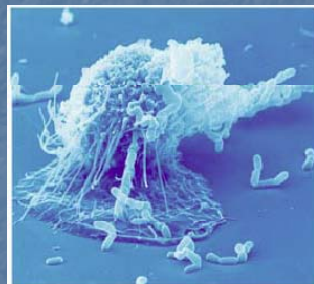
Match the terms with the appropriate description.

- | | |
|---|------------------|
| 1. The largest lymphatic organ | A. Lymph Nodes |
| 2. Filter Lymph | B. Peyer's Patch |
| 3. Particularly large and important during youth, produces hormones that help program the immune system | C. Spleen |
| 4. Collectively called MALT | D. Thymus |
| 5. Removes aged and defective blood cells | E. Tonsils |
| 6. Contains red and white pulp | |
| 7. Exhibit's Hassall's corpuscle | |
| 8. Includes the adenoids | |
| 9. Acts against bacteria breaching the intestinal wall | |
| 10. Lack a complete capsule and have crypts in which bacteria can become trapped | |

Matching Answers

1. C
2. A
3. D
4. B,E
5. C
6. C
7. D
8. E
9. B
10. E

Immunology



Increased blood flow

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

F. Local hyperemia

Inflammatory chemical
released by
degranulating mast
cells.

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

D. Histamine

Promotes release of
white blood cells from
the bone marrow.

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

E. Leukocytosis-inducing
factor

Cellular migration
directed by a
chemical gradient.

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

A. Chemotaxis

Fluid leaked from the
blood stream.

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

C. Exudate

Phagocytic progeny of monocytes.

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

G. Macrophages

Leukocytes pass
through the wall of a
capillary.

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

B. Diapedesis

First leukocytes to
migrate into the
injured area,

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

I. Neutrophils

White blood cells cling to capillary walls as blood flow slows due to fluid loss from the bloodstream.

Choices:

- A. Chemotaxis
- B. Diapedesis
- C. Exudate
- D. Histamine
- E. Leukocytes-inducing factor
- F. Local hyperemia
- G. Macrophages
- H. Margination
- I. Neutrophils

H. Margination