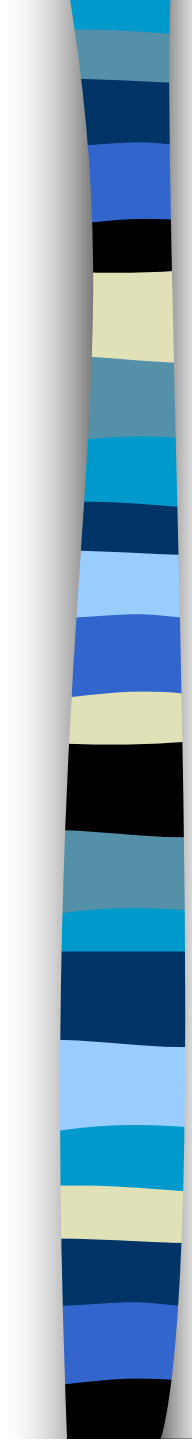




## 38a A&P: Lymphatic System and Immunity



# 38a A&P: Lymphatic System and Immunity

## Class Outline

5 minutes	Attendance, Breath of Arrival, and Reminders
10 minutes	Lecture:
25 minutes	Lecture:
15 minutes	Active study skills:
60 minutes	Total



# 38a A&P: Lymphatic System and Immunity

## Class Reminders

### Assignments:

- 41a Review Questions (Packet A: 173-185)
- 43a Swedish: Outside Massages (Packet A: 57-62) Emailed/turned in to your instructor. Assignment must be 4 pages total- 2 case studies/OMF forms and 2 SOAP notes.

### Quizzes and Exams:

- 43a Kinesiology Quiz  
(adductor magnus, gracilis, iliopsoas, sartorius, TFL, piriformis, quadratus femoris)
- 44a Quiz (33b, 35a, 36a, 37a/b, 38a, 39a, 40a, 41a/b, 42b, and 43a)
- 46a Exam (see syllabus for material covered)

### Practical Exam:

- 44b Integration Massage: Practical Exam (60-minute Swedish, Passive Stretches, and BMTs)

### Preparation for upcoming classes:

- 39a Pathology: Lymph and Immune System
  - Packet E: 79-82
  - RQ Packet A-173
- 39b BMTs: Technique Demo and Practice - Supine
  - Packet F: 83-84



# Classroom Rules

**Punctuality** - everybody's time is precious

- Be ready to learn at the start of class; we'll have you out of here on time
- Tardiness: arriving late, returning late after breaks, leaving during class, leaving early

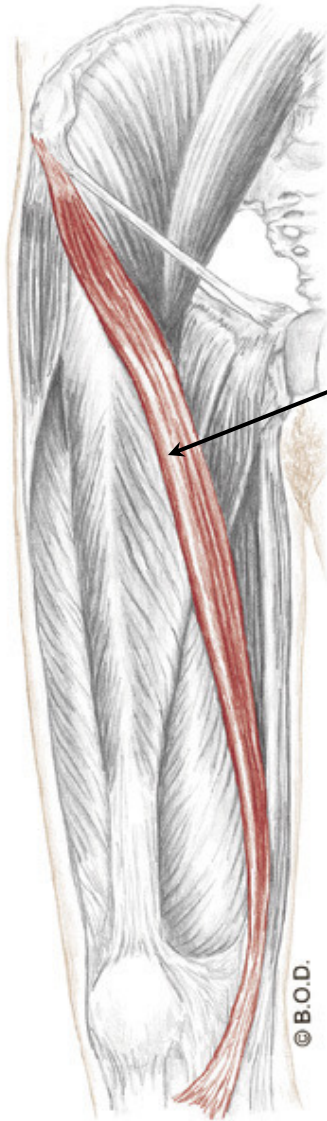
**The following are not allowed:**

- Bare feet
- Side talking
- Lying down
- Inappropriate clothing
- Food or drink except water
- Phones that are visible in the classroom, bathrooms, or internship

*You will receive one verbal warning, then you'll have to leave the room.*

# Sartorius

## Trail Guide, Page 326



**Sartorius** is the longest muscle in the body.

It travels from the ASIS to the medial knee.

The slender belly of sartorius is entirely superficial, but it is still difficult to palpate.

*Sartor* means *tailor* in Latin.

This refers to the ability of sartorius to bring the thigh and leg into the position a tailor would use when sewing.

Anteromedial View

**A** Flex the hip (coxal joint)

Laterally rotate the hip (coxal joint)

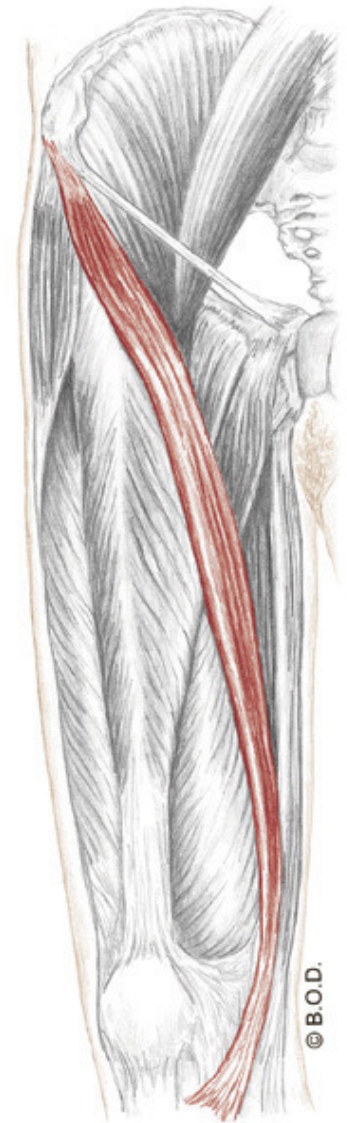
Abduct the hip (coxal joint)

Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)

**O** Anterior superior iliac spine (ASIS)

**I** Proximal, medial shaft of the tibia  
at pes anserinus tendon



Anteromedial View

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Laterally rotate the hip (coxal joint)

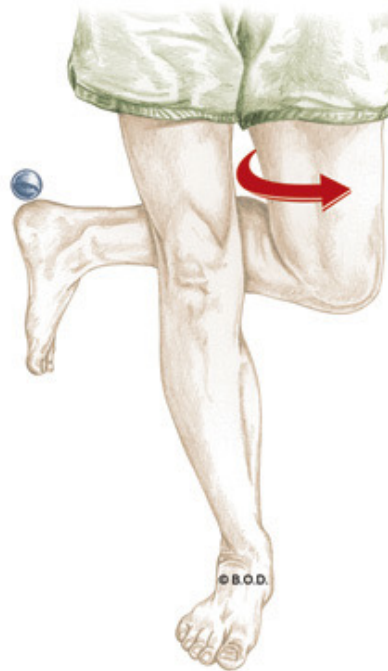
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Anteromedial View



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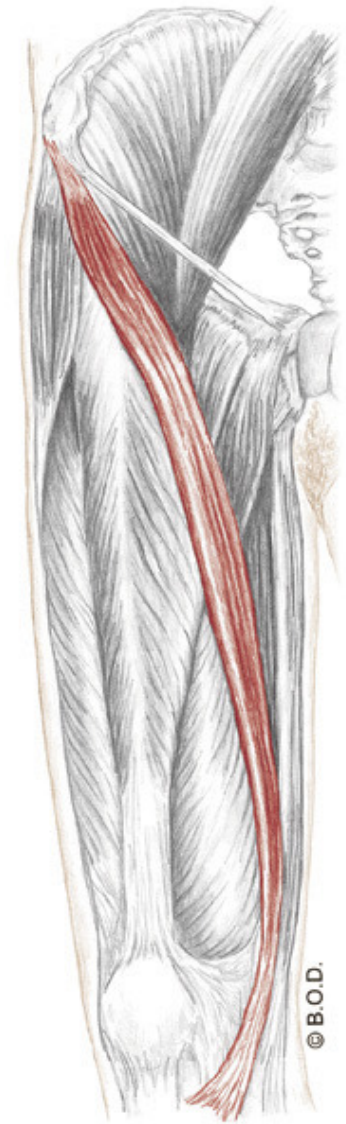
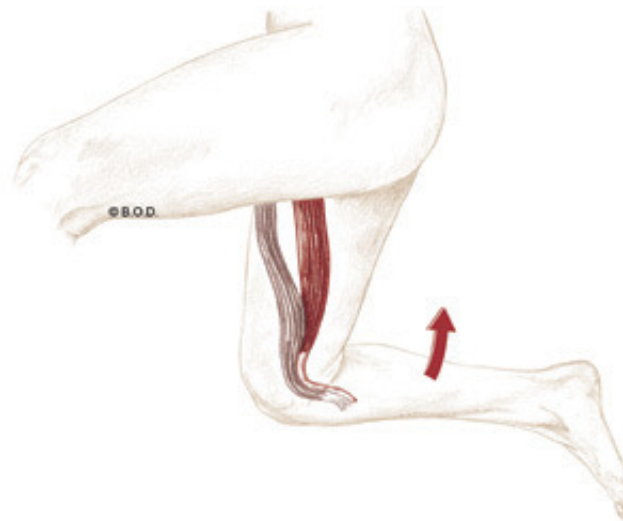
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Anteromedial View

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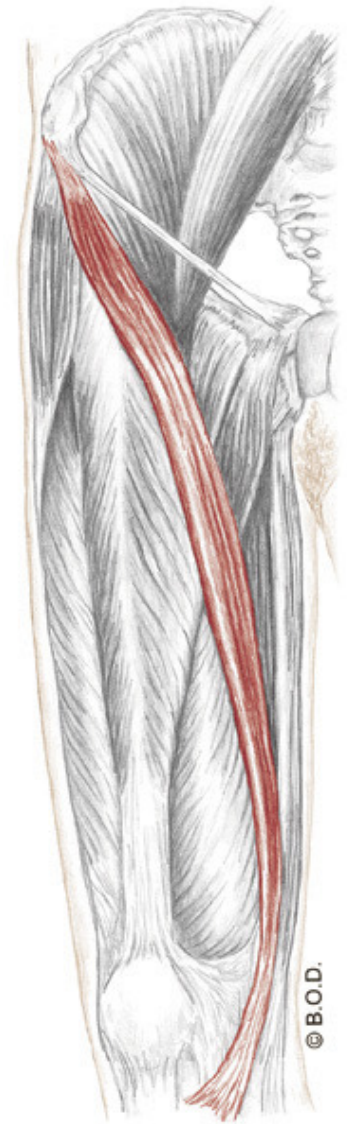
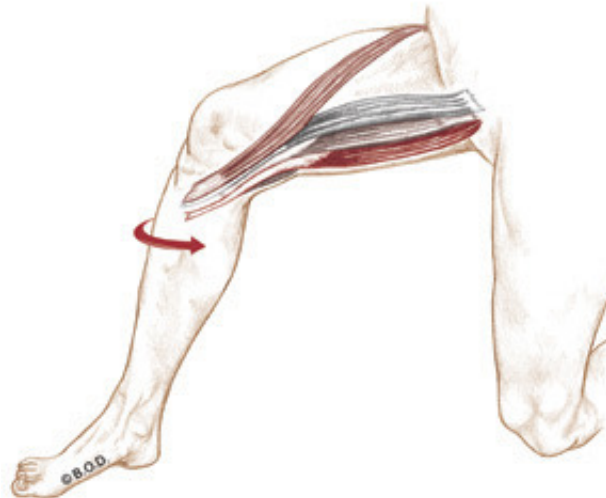
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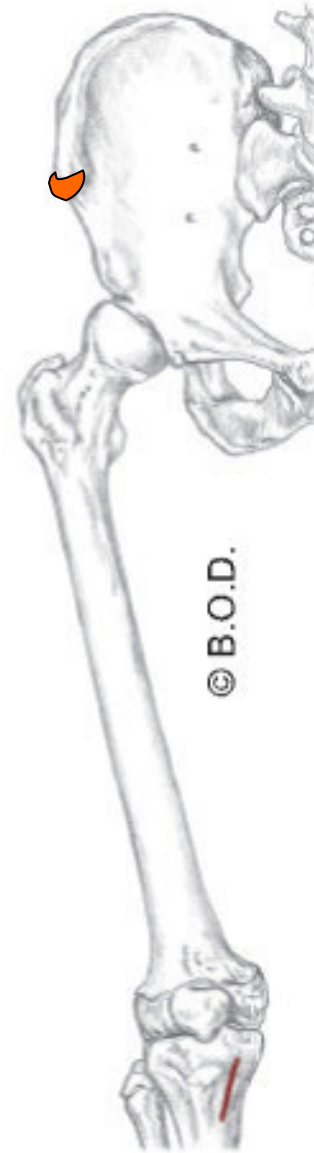


Anteromedial View

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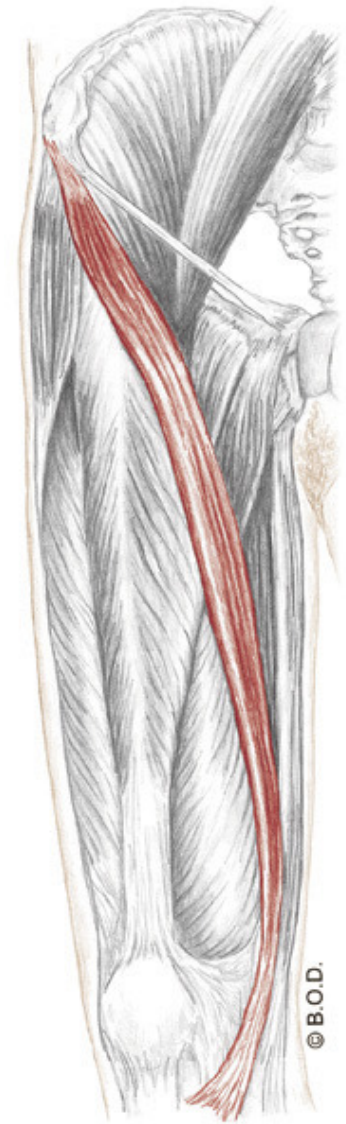
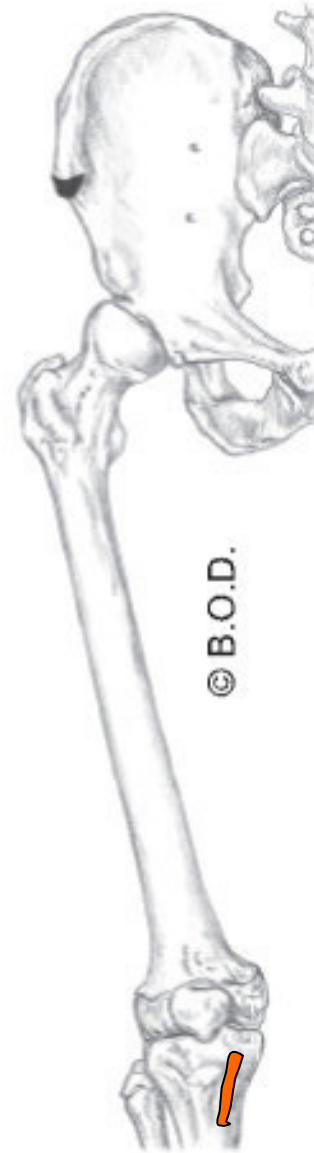


Anteromedial View

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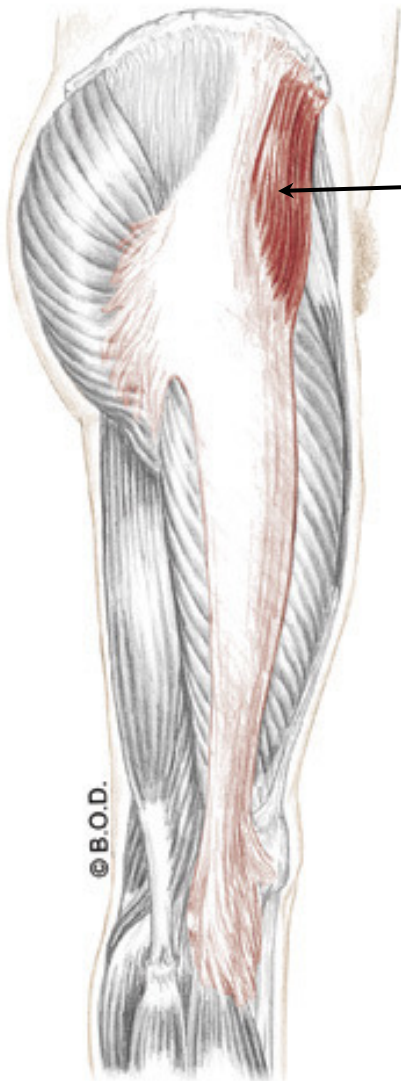
**I** Proximal, medial shaft of the tibia  
at pes anserinus tendon



Anteromedial View

# Tensor Fasciae Latae

Trail Guide, Page 324



**Tensor fasciae latae** is a small, superficial muscle.

Approximately 3 fingers wide, the TFL is located on the lateral side of the upper thigh.

*Tensor* means *something that stretches*.

*Fasciae* means *band or bandage*.

*Latae* means *broad*.

“Broad band that stretches or adds tension”

Lateral View



# Tensor Fasciae Latae, page 324

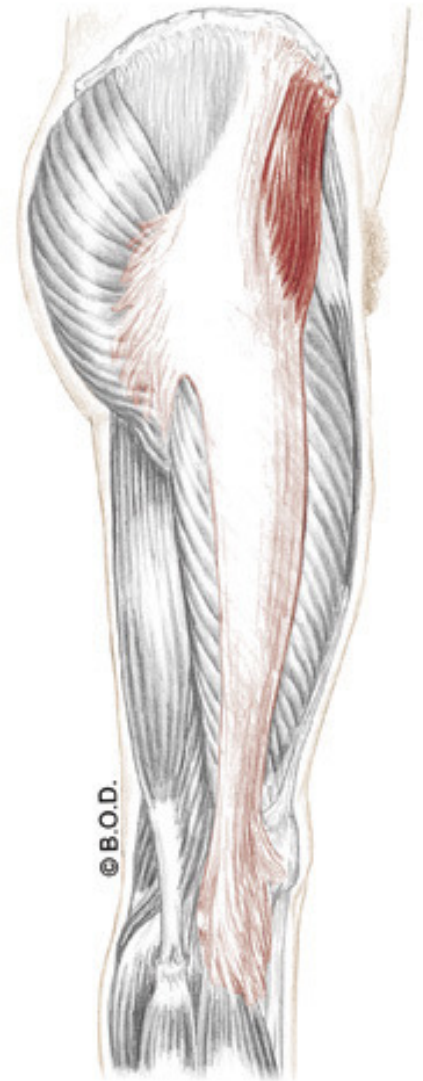
**A** Flex the hip (coxal joint)

Medially rotate the hip (coxal joint)

Abduct the hip (coxal joint)

**O** Iliac crest, posterior to the ASIS

**I** Iliotibial tract



Lateral View

# Tensor Fasciae Latae, page 324

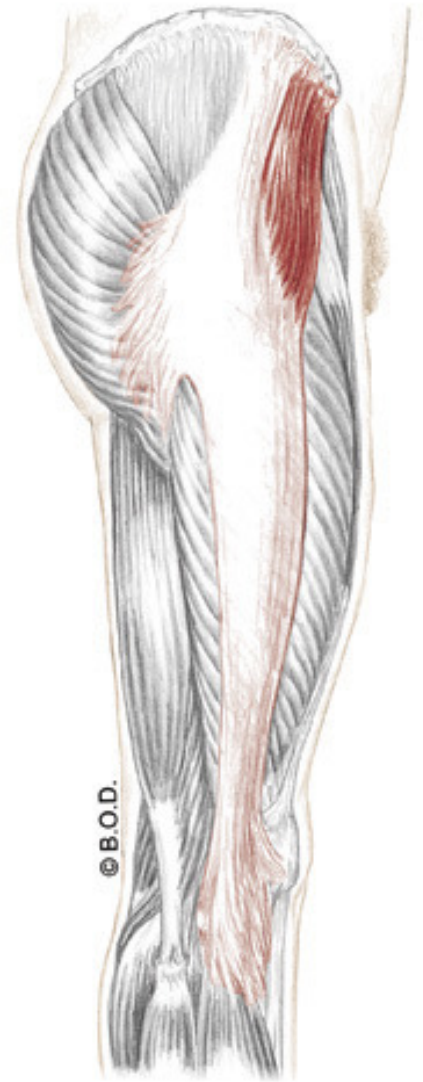
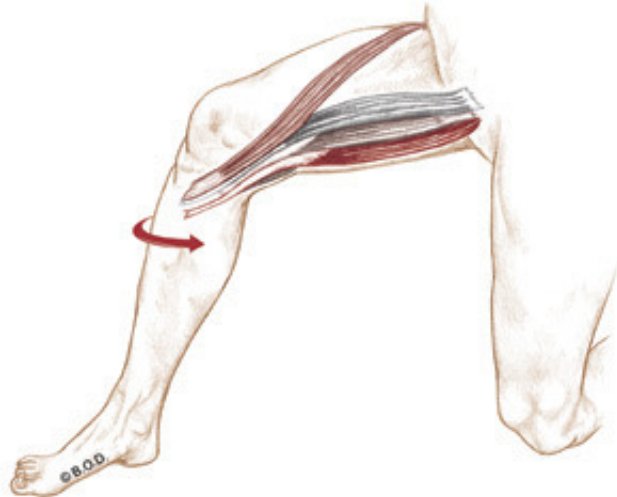
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Lateral View

# Tensor Fasciae Latae, page 324

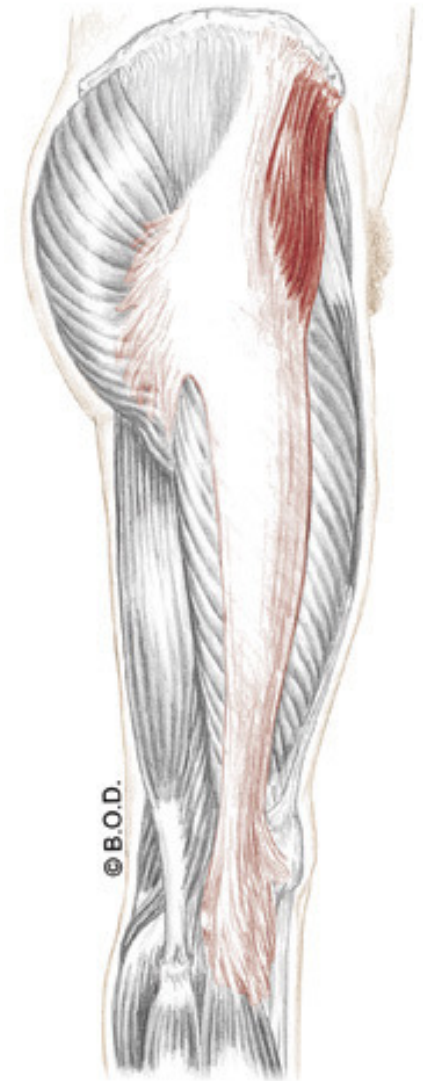
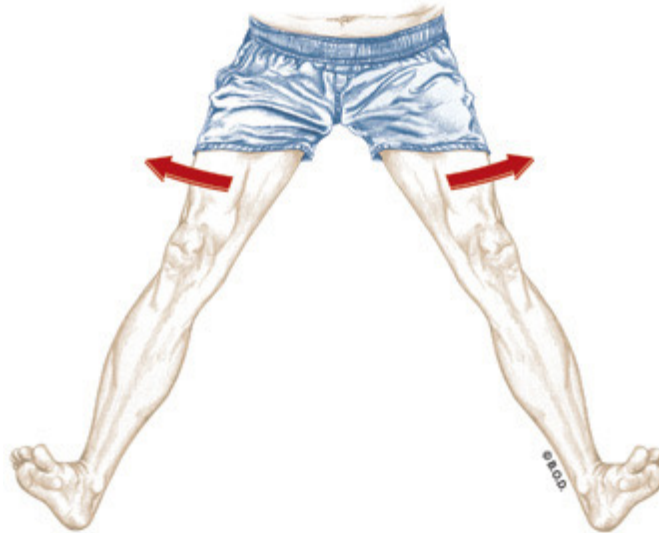
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Lateral View



# Tensor Fasciae Latae, page 324

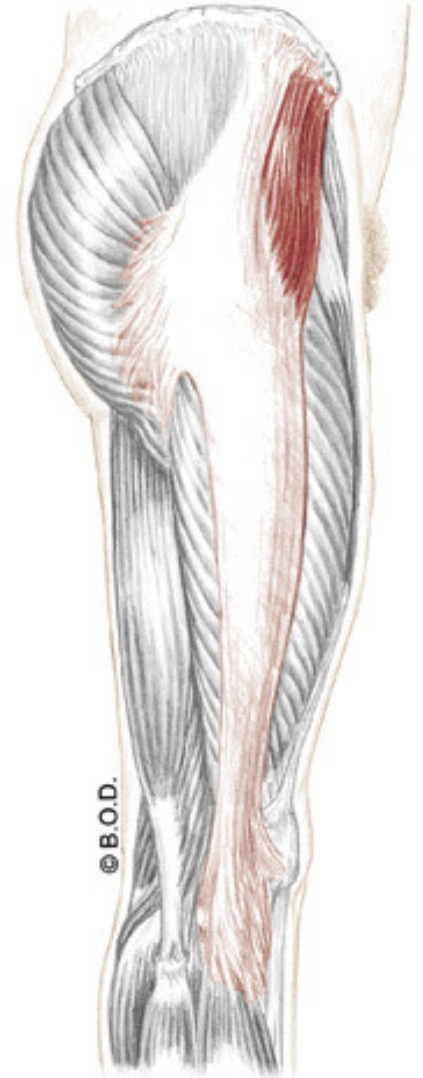
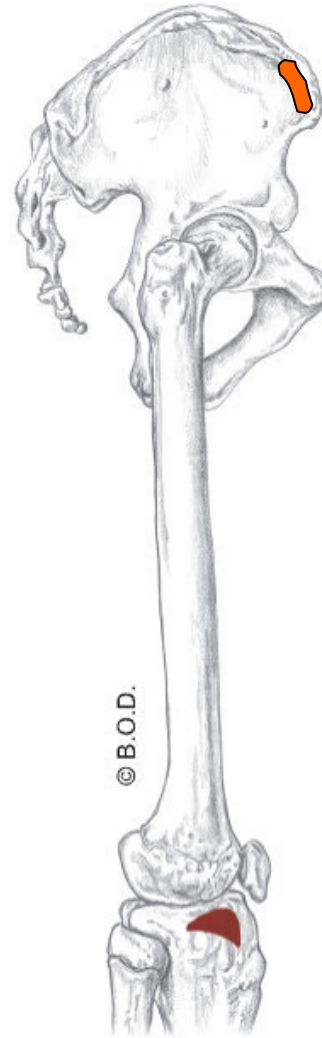
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Lateral View

# Tensor Fasciae Latae, page 324

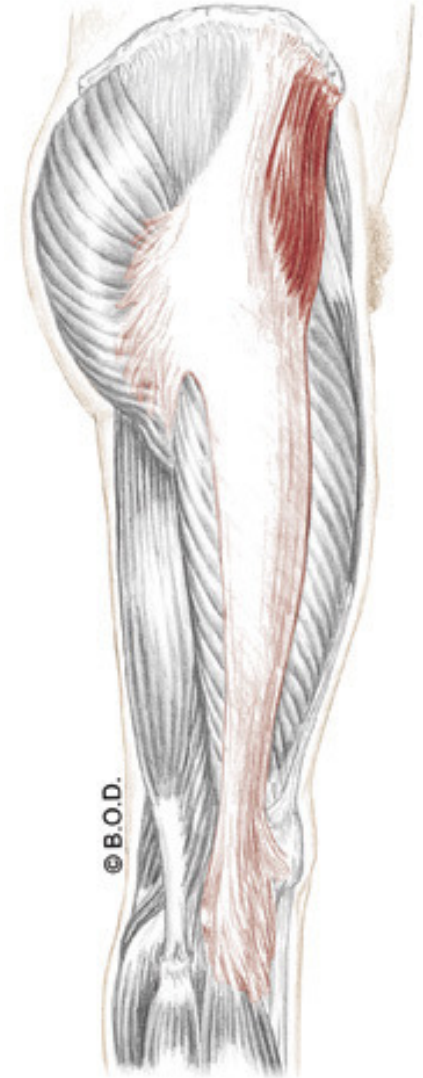
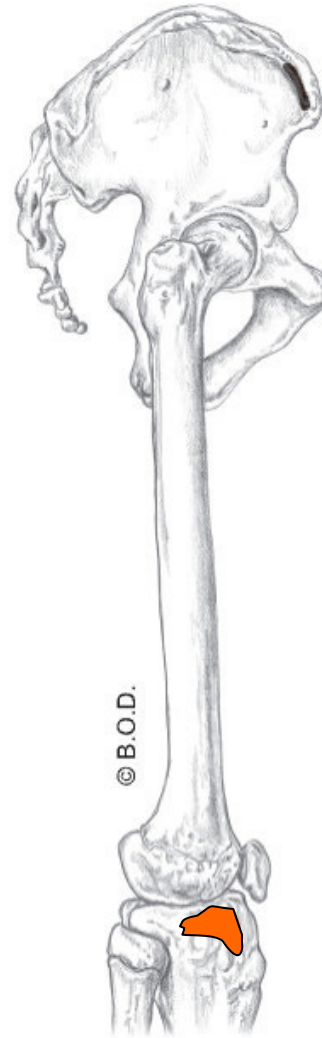
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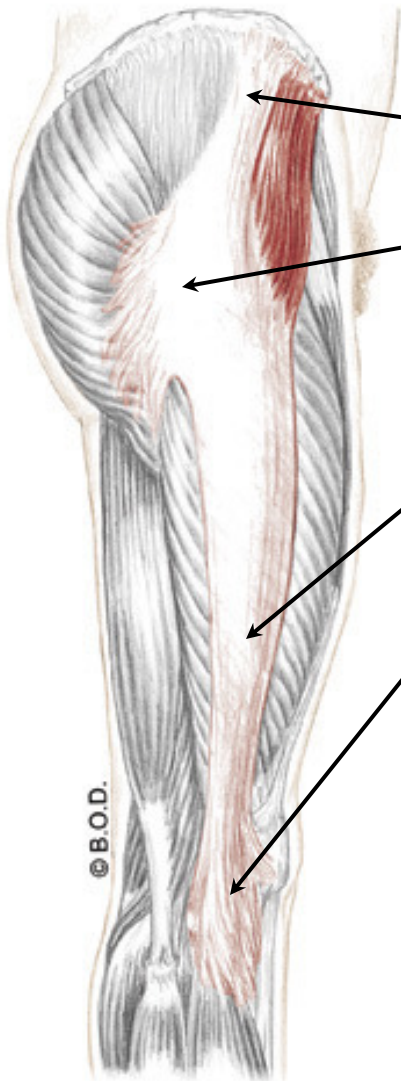
**I** Iliotibial tract



Lateral View

# Iliotibial Tract

## Trail Guide, Page 324



**Iliotibial tract** is a superficial sheet of fascia.

Its vertical fibers stretch between the iliac crest and the tibial tubercle.

Both TFL and gluteus maximus have insert into the IT tract.

Lateral View



## 38a A&P: Lymphatic System and Immunity

E - 75

# Anatomy

Lymph

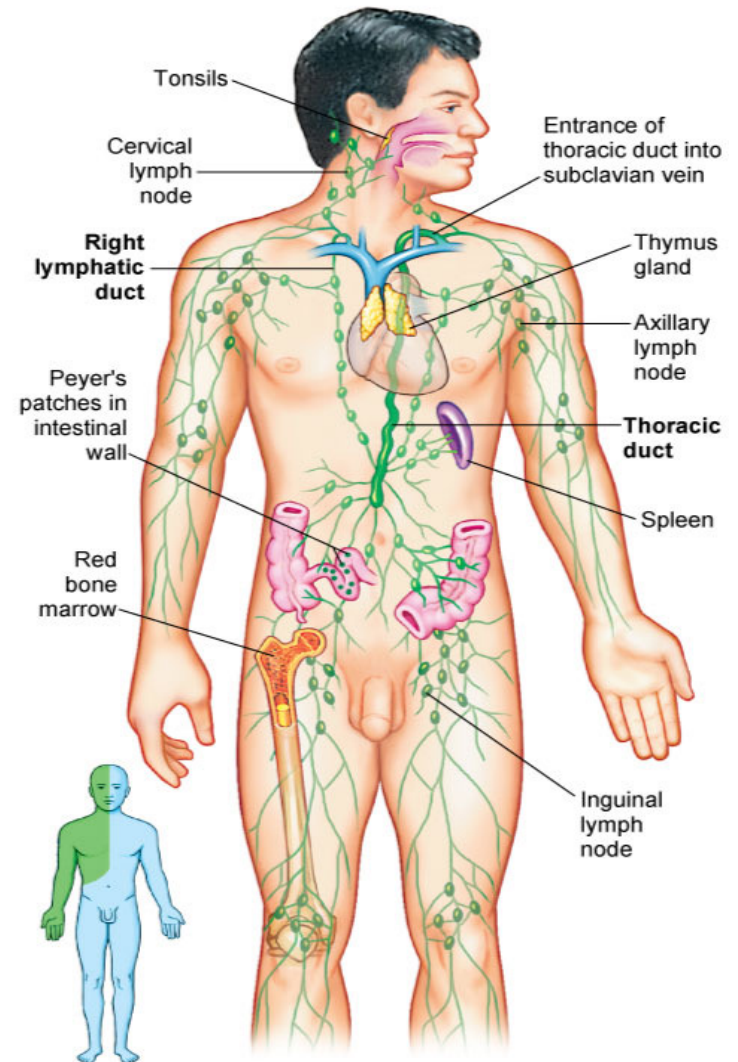
Lymph vessels

Lymph glands, such as the thymus .

Lymphatic organs, such as the spleen .

Lymph nodes

Lymphocytes





# Physiology

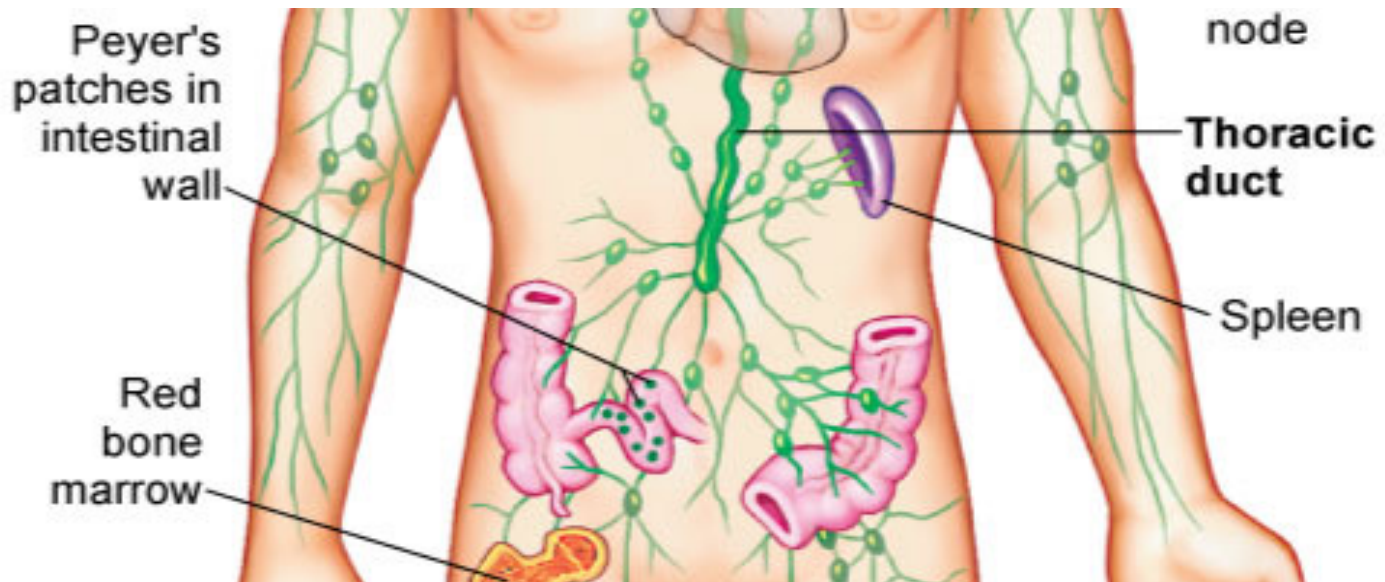
Transportation

Immune response

Maintain homeostasis

# Physiology

**Transportation** The process of transporting dietary proteins, lipids, and lipid-soluble vitamins such as A, D, E, and K from the digestive tract to the blood.



# Physiology

**Immune response** The process of active immune defense.





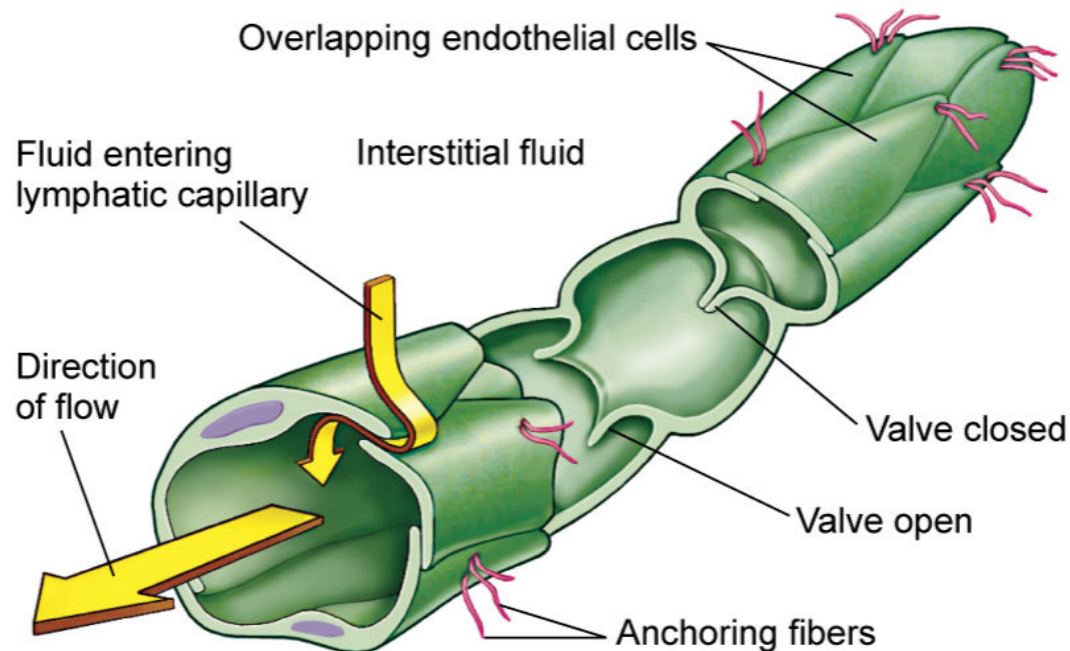


# Physiology

**Maintains homeostasis** The process of collecting accumulated tissue fluid and returning it to blood circulation. This maintains blood volume, blood pressure, and prevents edema (swelling).

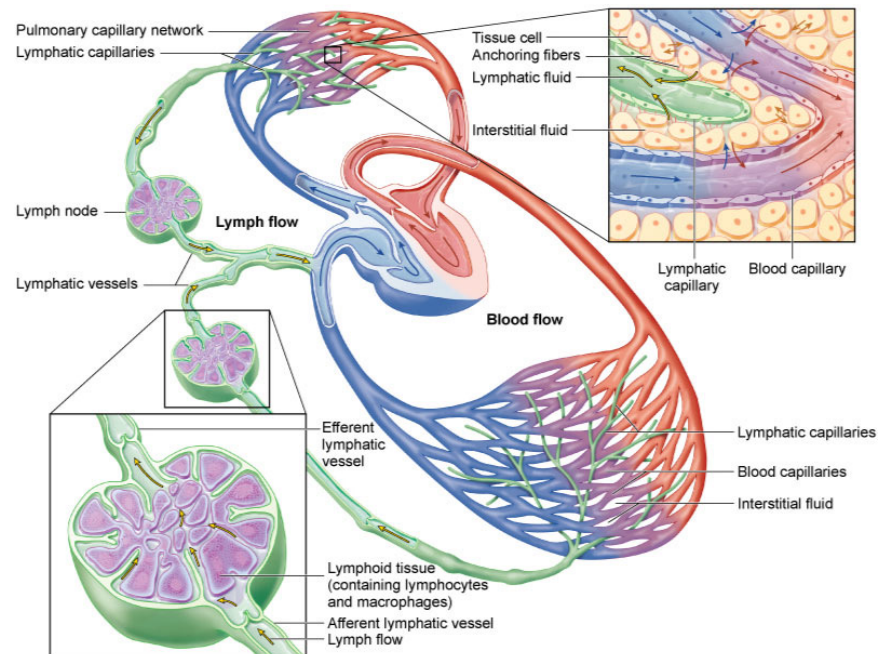
# Lymph

**Lymph** Liquid connective tissue that is part of the lymphatic system. Nearly colorless fluid. Chemically it is very similar to blood plasma.  
Contains white blood cells, proteins, and fats.



# Lymph Vessels

Lymph capillary  
Lymph vessel  
Lymphatic trunk  
Lymphatic duct

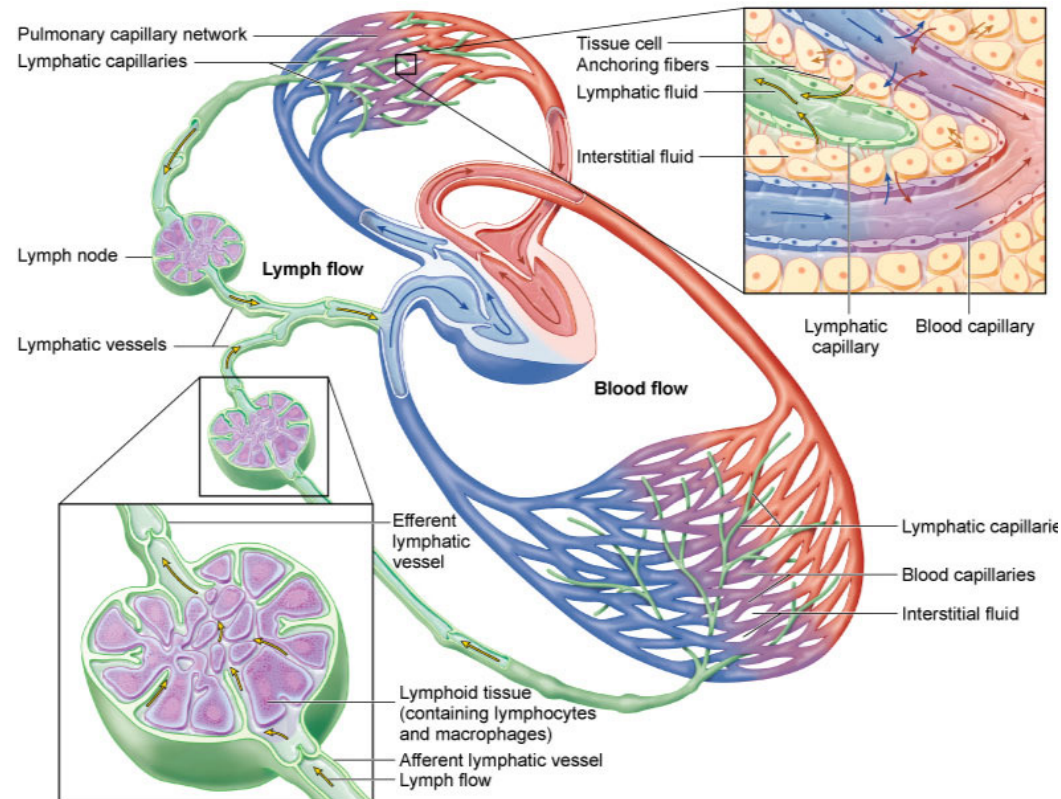


From Patton KT, Thibodeau GA: *Anatomy & physiology*, ed 7, St. Louis, 2010, Mosby.

Fig. 27-2. Flow of lymph.

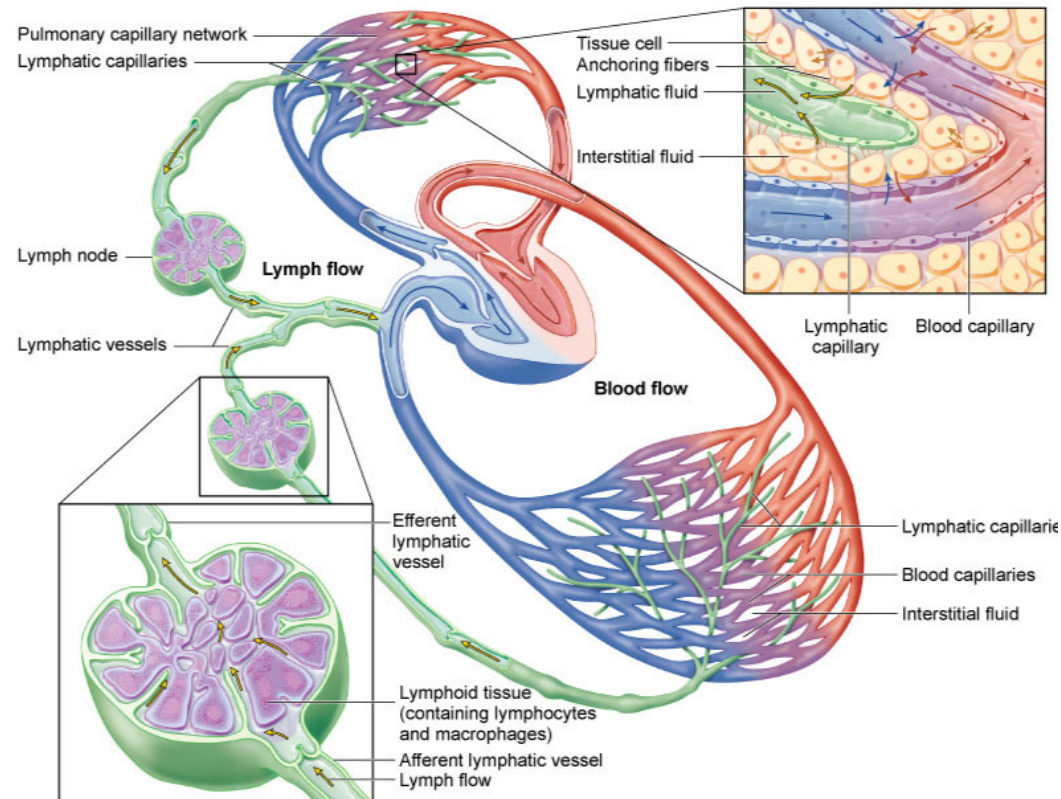
# Lymph Vessels

**Lymph capillary** Tiny, open -ended channel located in tissue space throughout most of the body.



# Lymph Vessels

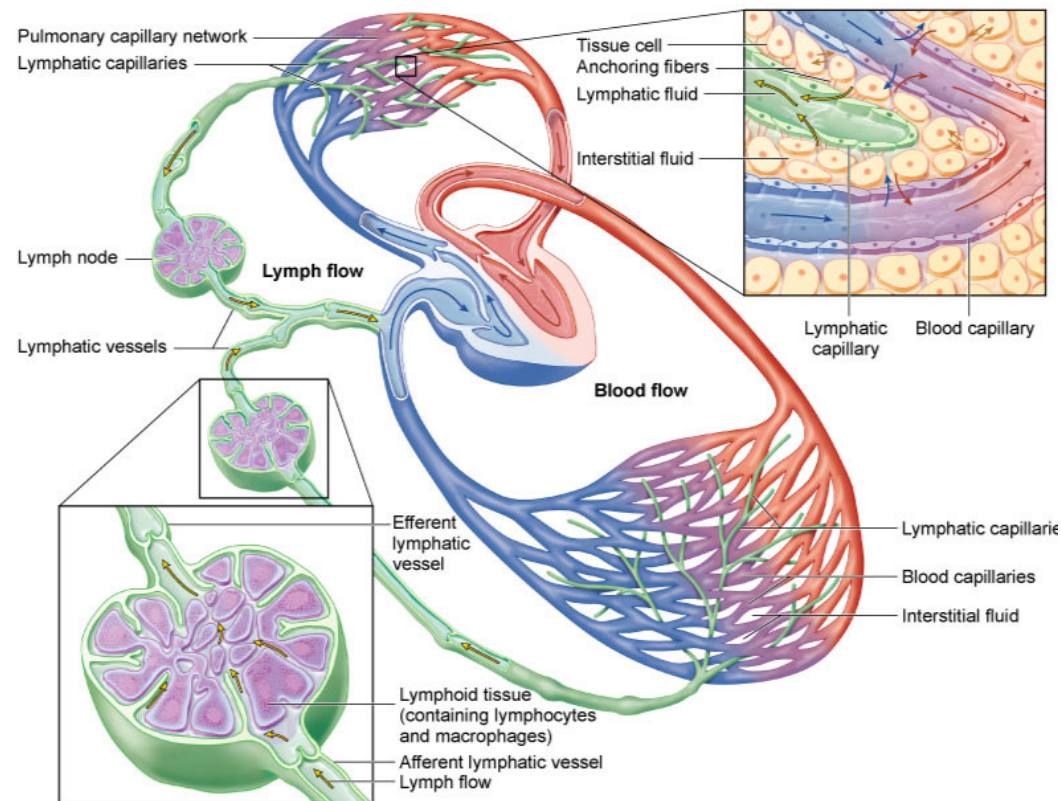
**Lymph vessel** Larger vessels than a lymph capillary. Has thinner walls and more valves than veins. Has lymph nodes situated along them.





# Lymph Vessels

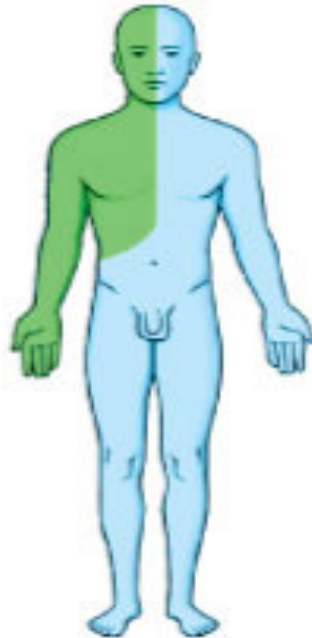
**Lymphatic trunk** Made up of large vessels into which lymph is drained from the lymph vessels.



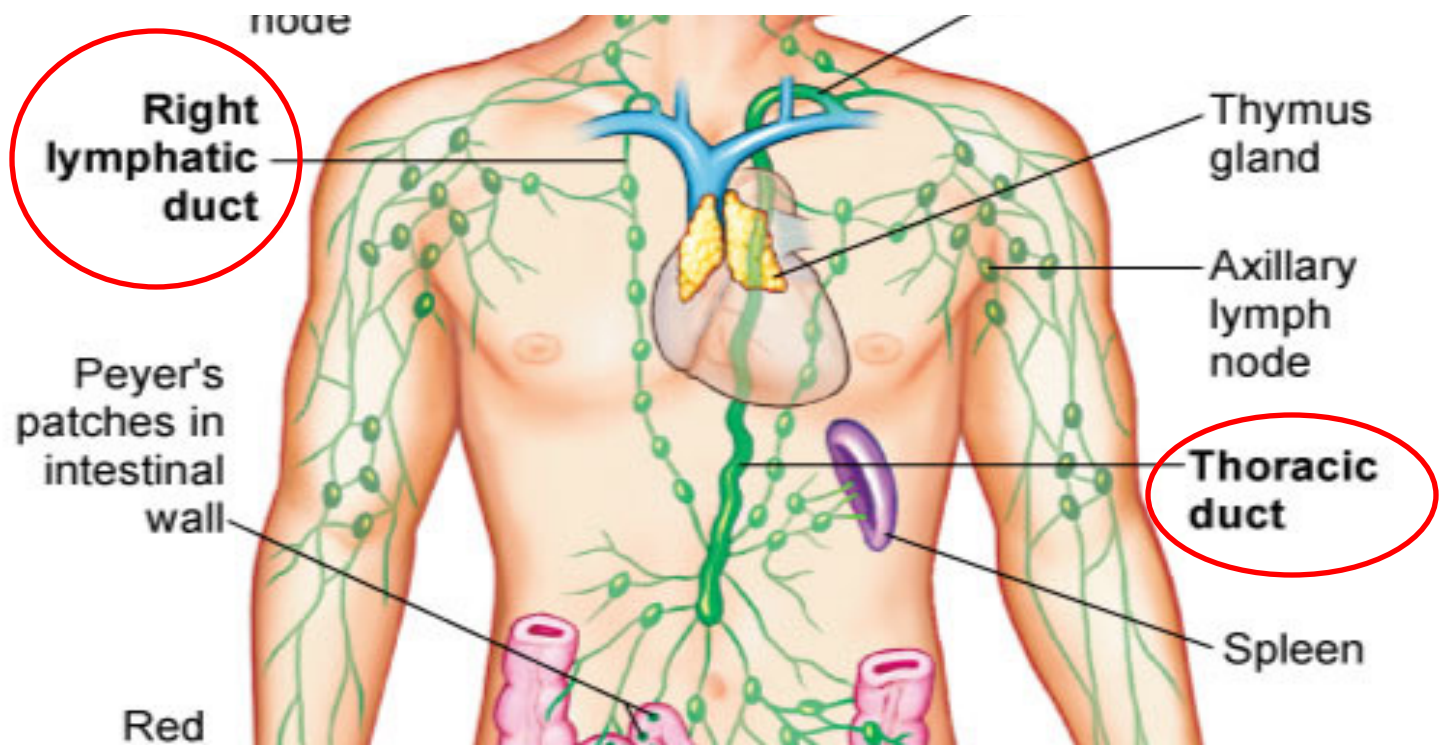
# Lymph Vessels

**Lymphatic duct** The joining of lymphatic trunks. Examples:

- Right lymphatic duct drains the right side of the head, right arm, and right torso (in green)
- Thoracic duct drains the rest of the body.



# Lymph Vessels







# Lymphatic Structures

Red bone marrow

Lymphocyte

Thymus

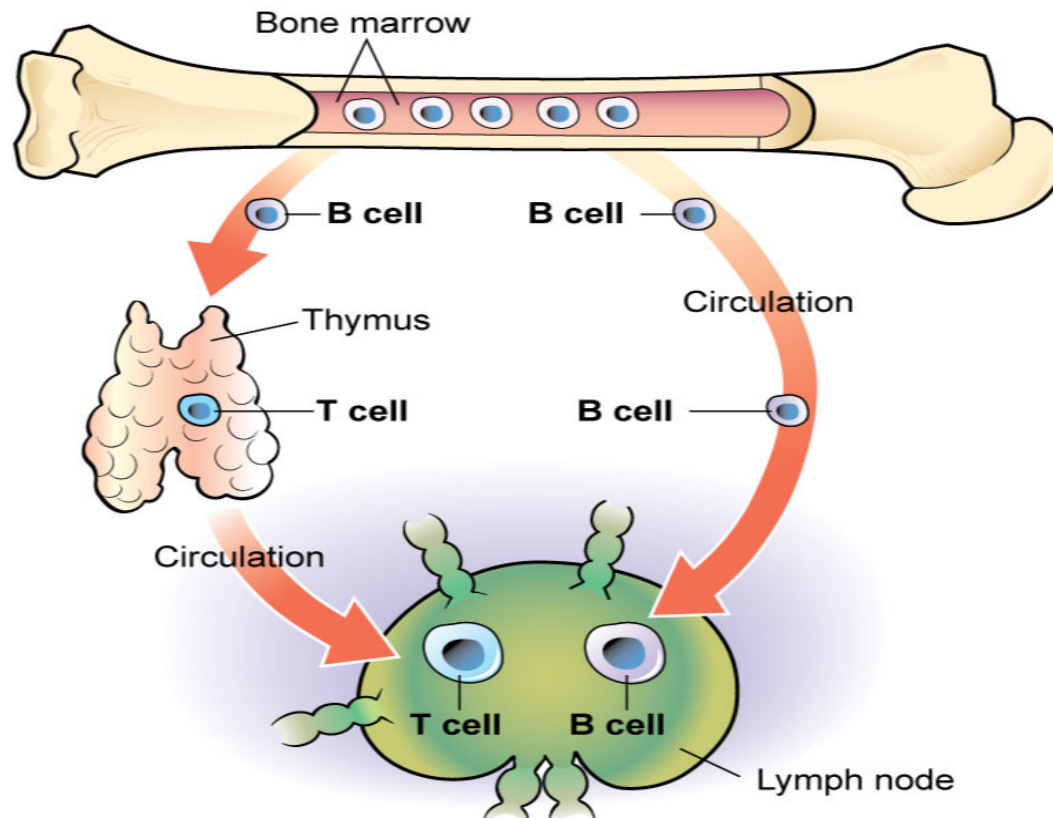
Spleen

Lymph node

Mucosa-associated lymphoid tissue

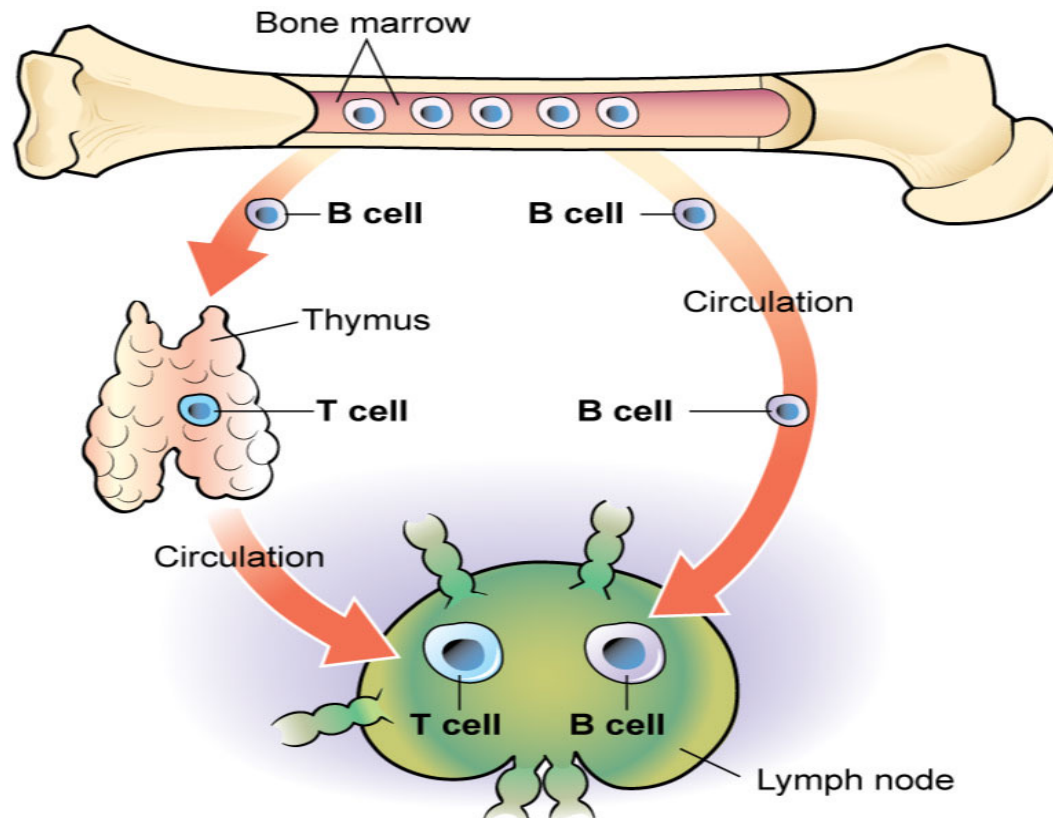
# Lymphatic Structures

**Red bone marrow** Blood forming cells found in flat and long bones. Produce red blood cells, platelets, and white blood cells (specifically lymphocytes called B cells).



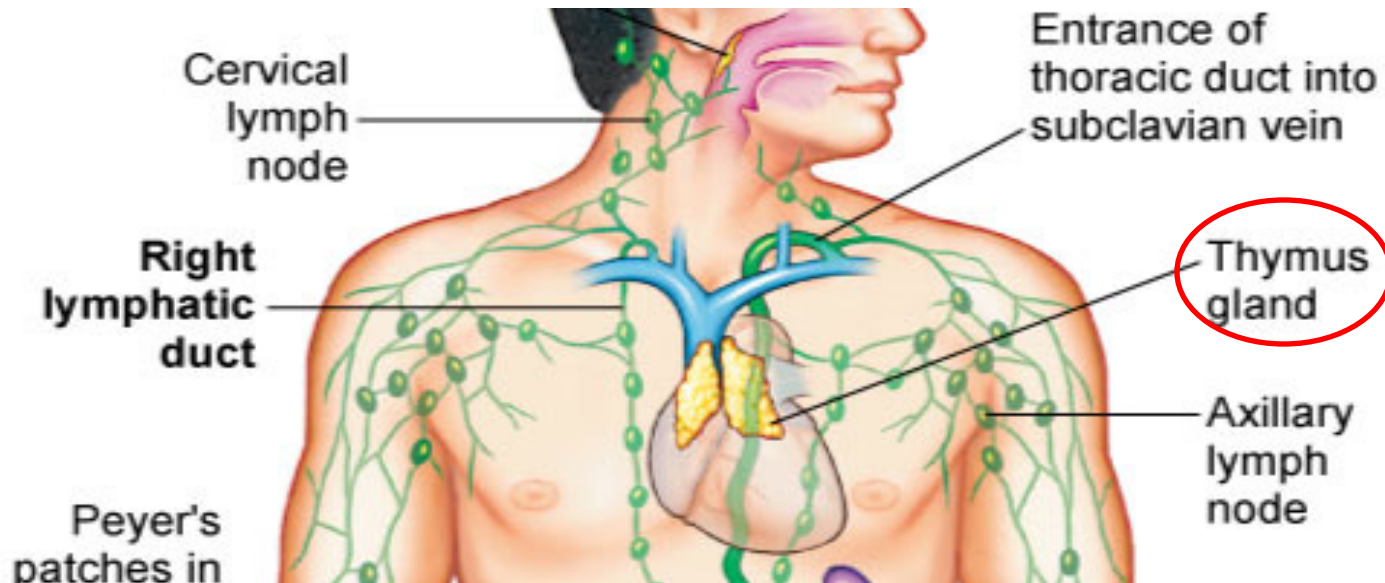
# Lymphatic Structures

**Lymphocyte** Type of white blood cell. Examples: B cell, T cell, macrophage



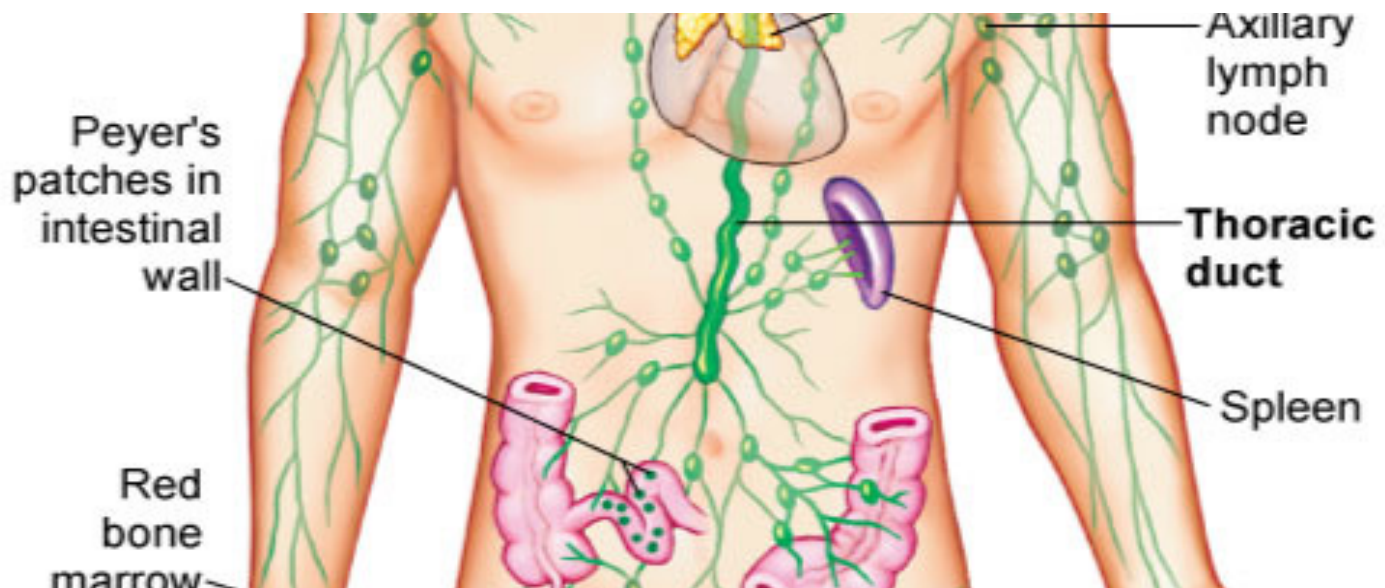
# Lymphatic Structures

**Thymus** Bi-lobed gland posterior to the sternum. Secretes thymosin and thymopoietin, which stimulate the production and activation of T cells.



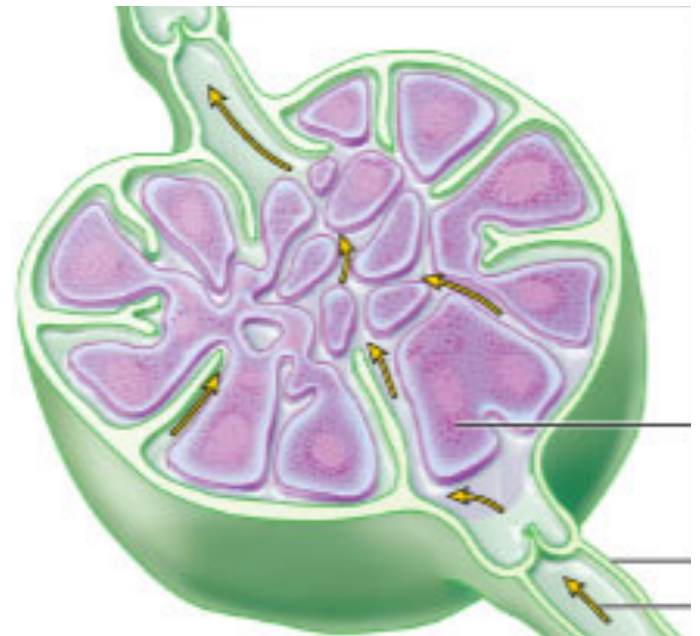
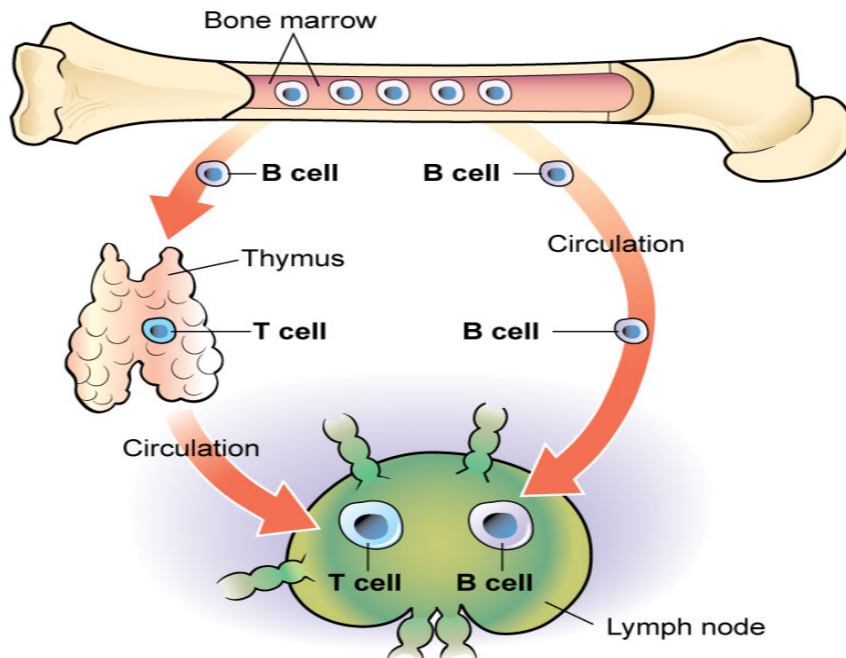
# Lymphatic Structures

**Spleen** Largest lymphatic organ. Located within the left lateral rib cage just posterior to the stomach. Stores lymphocytes, releasing them during immune responses.



# Lymphatic Structures

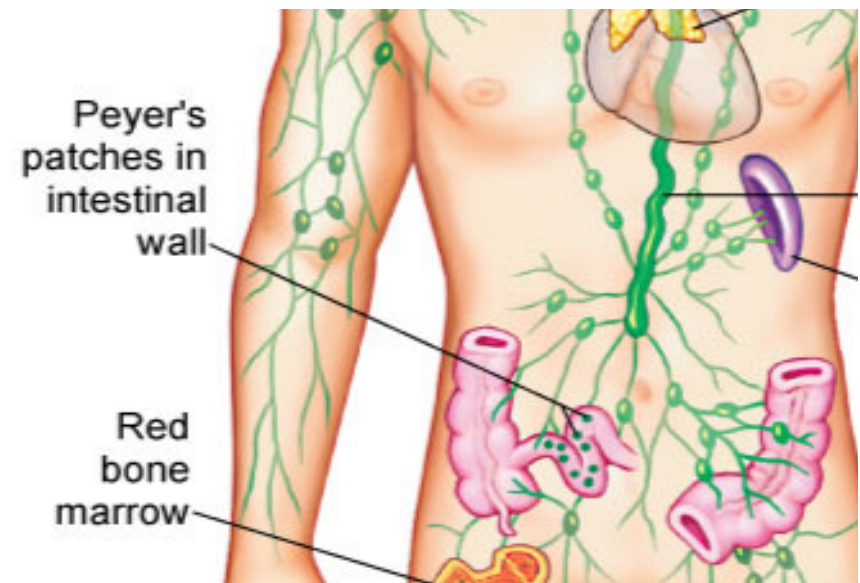
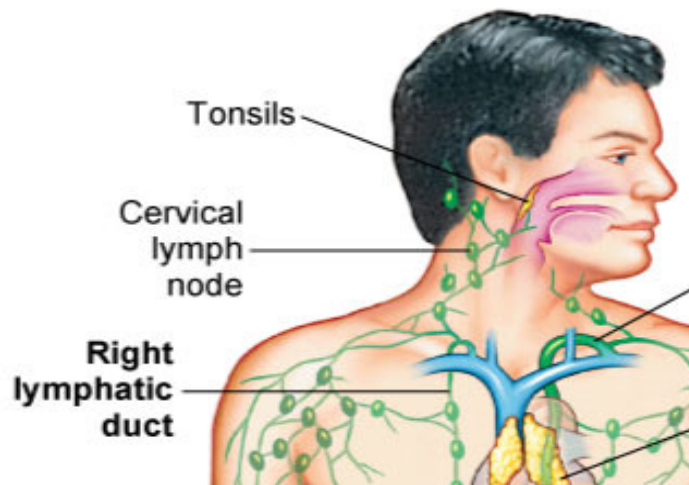
**Lymph node** Bean-shaped structures located along lymph vessels. Filters lymph. Houses phagocytes and lymphocytes that destroy pathogens and other foreign substances in the lymph before it returns to the blood.





# Lymphatic Structures

**Mucosa-associated lymphoid tissue (AKA: MALT)** Small masses of lymph tissue in respiratory and digestive tracts. Examples: tonsils, Peyer patches, and vermiform appendix.





# Lymph Flow

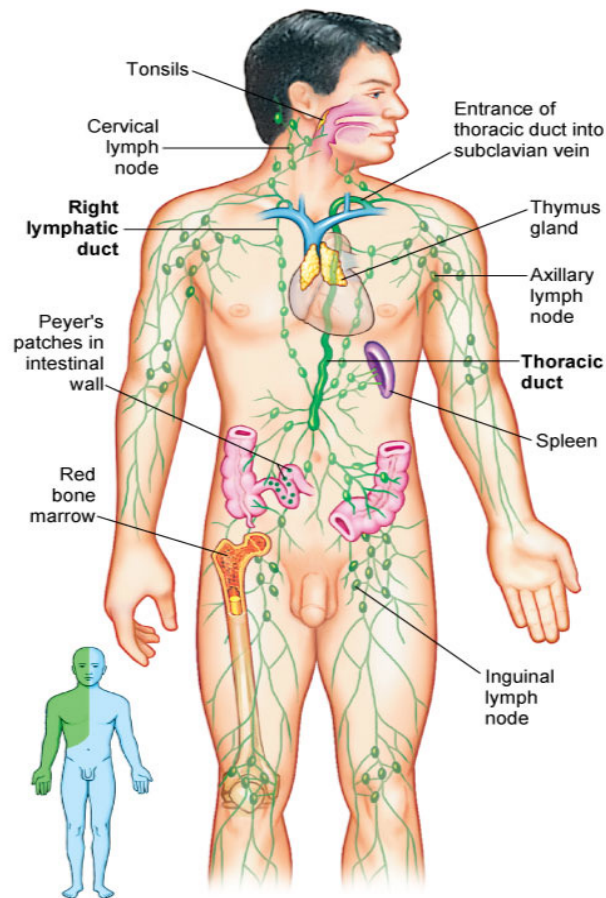
Lymphatic drainage

Lymphatic pump



# Lymph Flow

**Lymphatic drainage** The movement of lymph.





# Lymph Flow

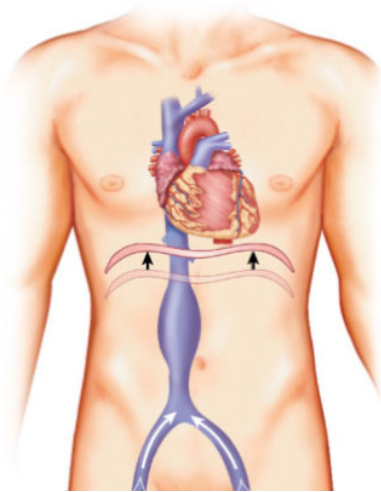
**Lymphatic pump** The mechanism of lymphatic drainage that uses pressure gradients from external sources exerted on its vessel walls to move lymph.

Examples:

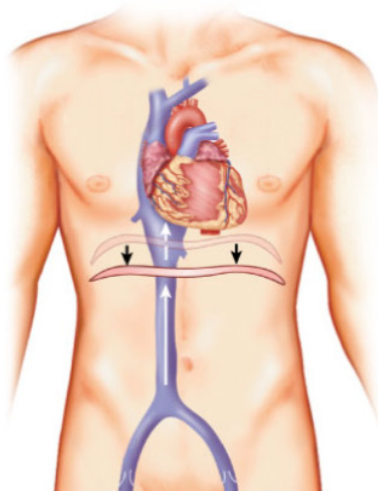
- Skeletal muscle contractions against vessel walls
- Pressure changes in the thorax and abdomen during breathing.
- Pulling of the skin and fascia during movement.
- Contraction of smooth muscle in the walls of lymphatic vessels
- Rhythmic pumping of walking and grasping.

# Lymph Flow

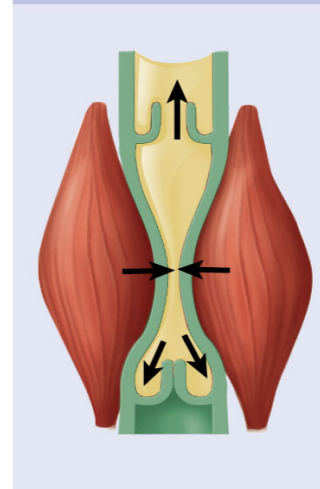
Exhalation



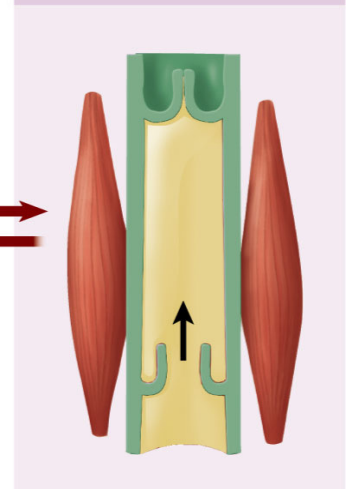
Inhalation



MUSCLES CONTRACTED



MUSCLES RELAXED





# Immunity

Non-specific immunity  
Infection  
Inflammation

Specific immunity  
T cells  
B cells

# Immunity

**Immunity** Reaction that involves all body systems as they join together to destroy and eliminate pathogens, foreign substances, or toxic materials.





# Immunity

**Non-specific immunity (AKA: innate immunity)** Non-specific response to invading pathogens. Includes intact skin and mucous membranes, saliva, gastric juices, vomiting, urine flow, certain white blood cells, fever, and inflammation.



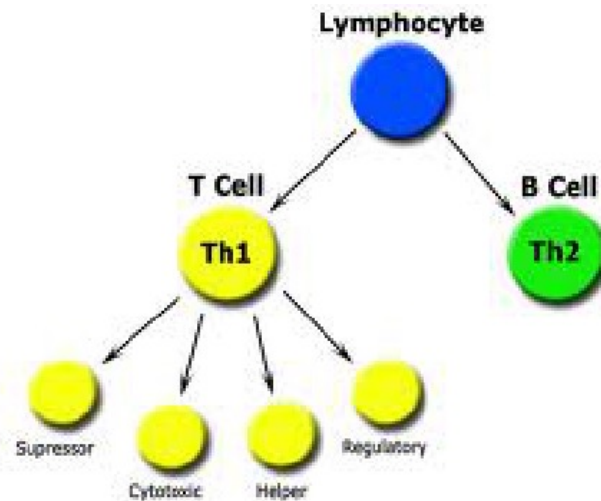


# Immunity

**Specific immunity (AKA: adaptive immunity)** Body's response to invaders. T cells and B cells become activated for a specific pathogen after they come into contact with it and then destroy it.

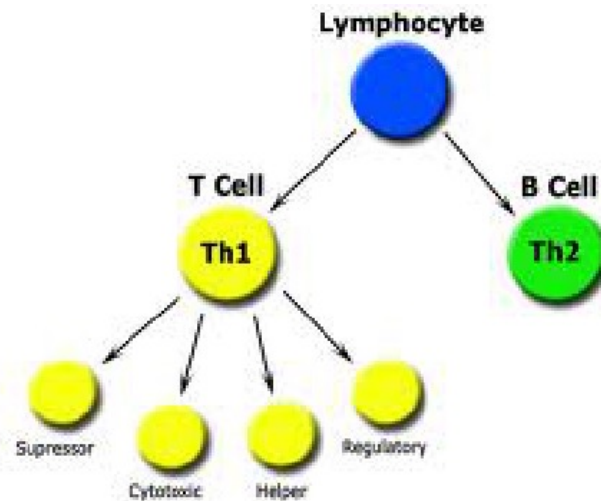
# Immunity

**T cells** Lymphocytes that begin as B cells that migrate from bone marrow to the thymus where they fully mature. They recognize pathogens and respond by releasing inflammatory and toxic substances.



# Immunity

**B cells** Lymphocytes that grow and mature in the bone marrow. Produce antibodies which circulate in body fluids such as blood and lymph. Their antibodies inactivate pathogens as they come across them.





## 38a Lymphatic System and Immunity