38a A&P: Lymphatic System and Immunity

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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: 165-178)
- 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

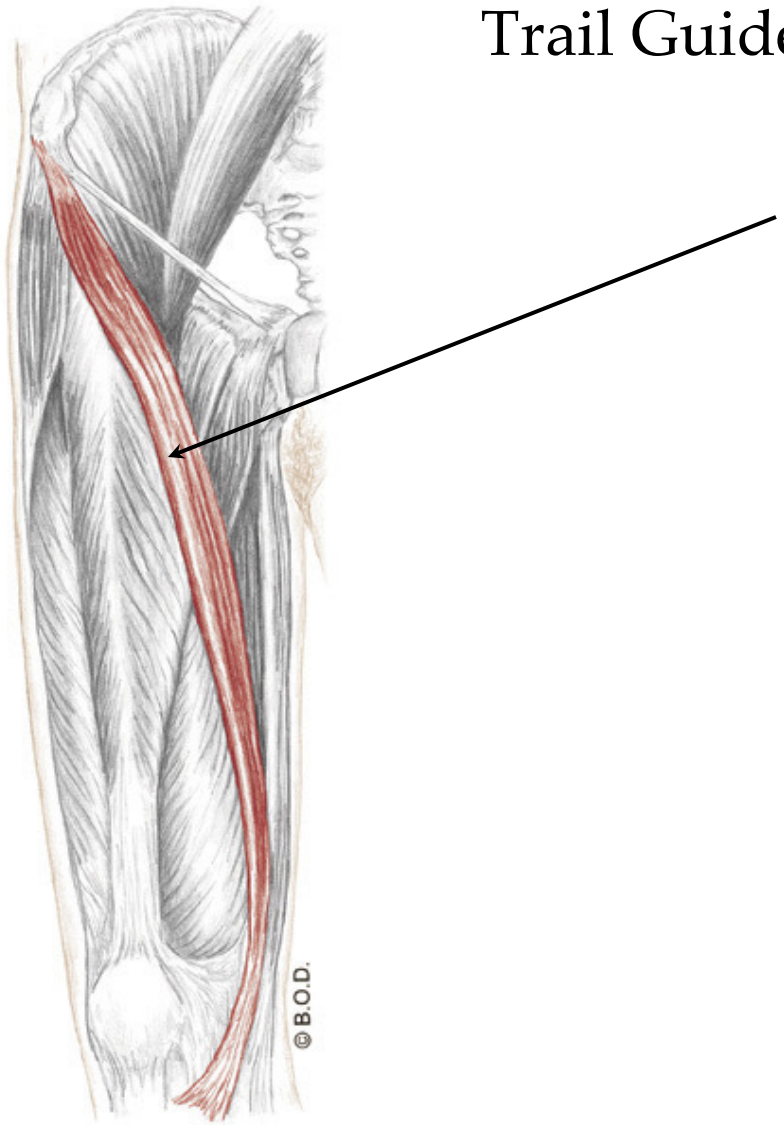
The following are not allowed:

- 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



Anteromedial View

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.

Sartorius, page 326

A Flex the hip (coxal joint)

Laterally rotate the hip (coxal joint)

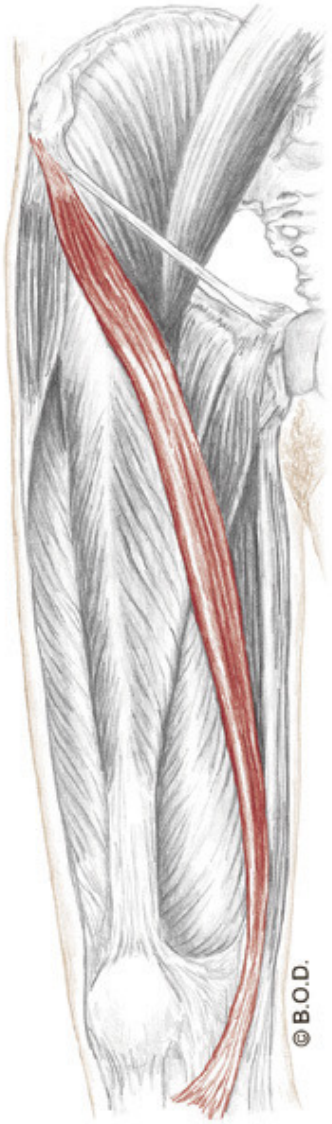
Abduct the hip (coxal joint)

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



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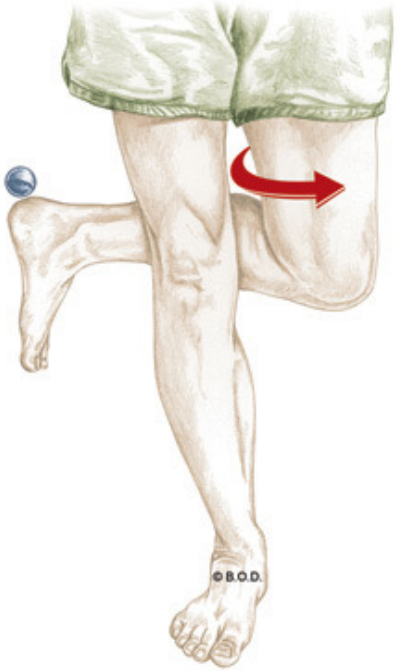

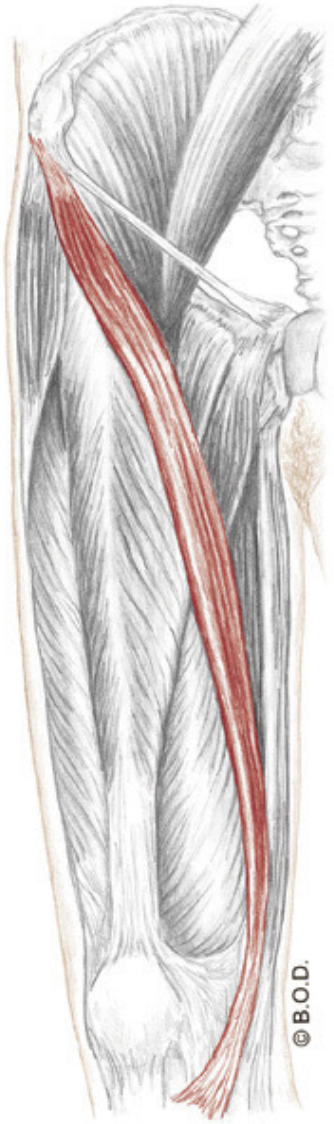

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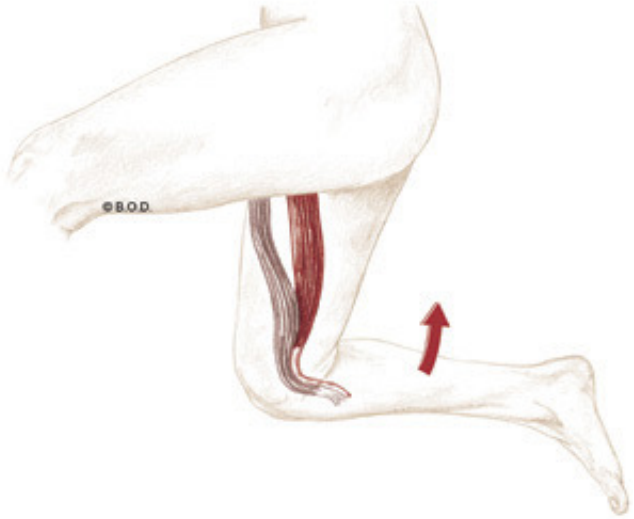

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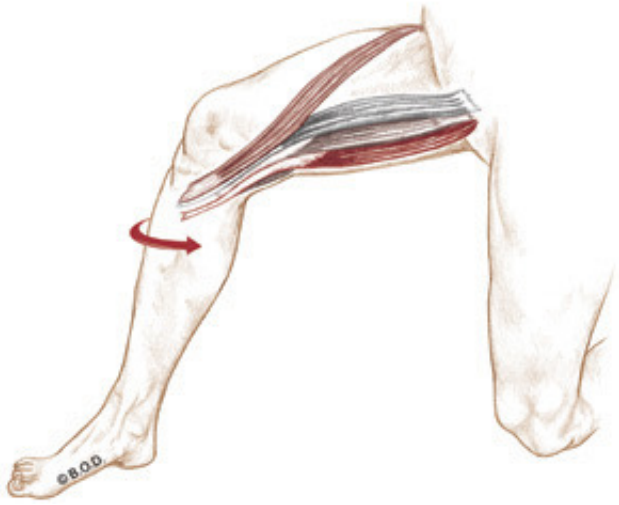

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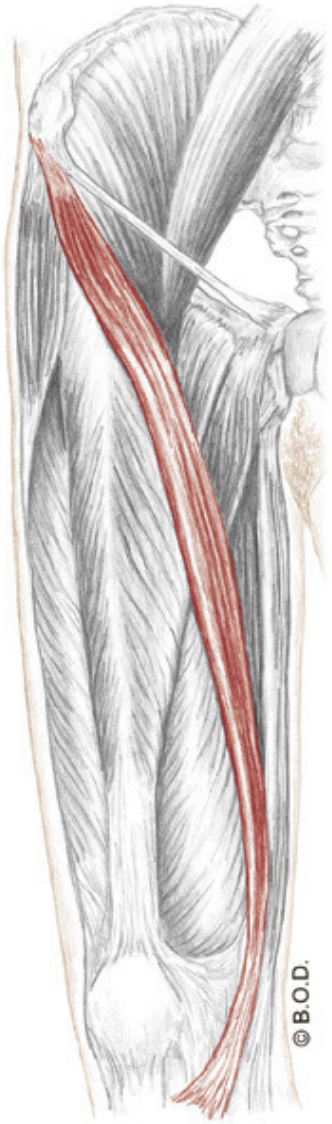

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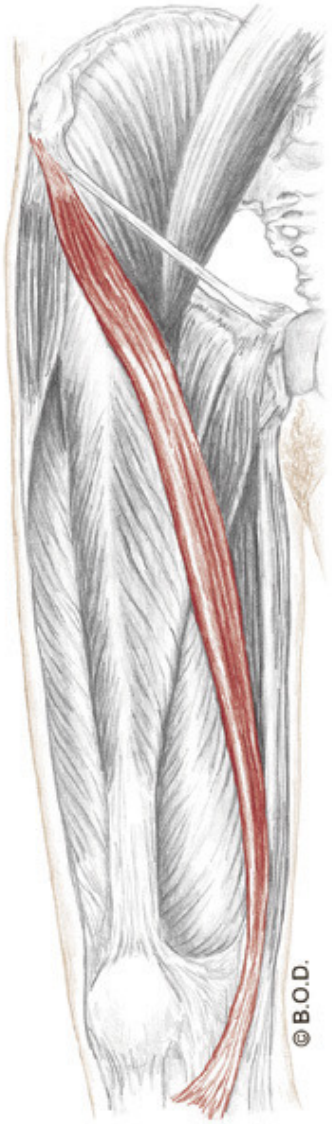
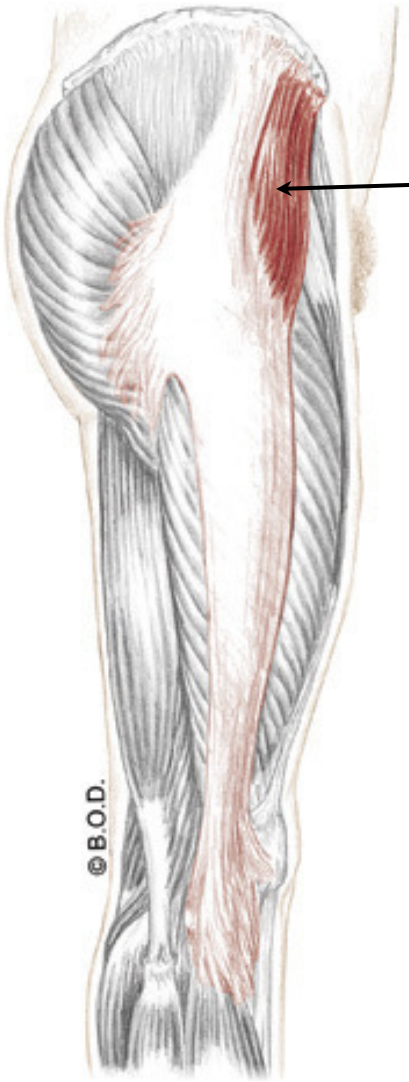


Anteromedial View

Tensor Fasciae Latae

Trail Guide, Page 324



Lateral View

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"

Tensor Fasciae Latae, page 324

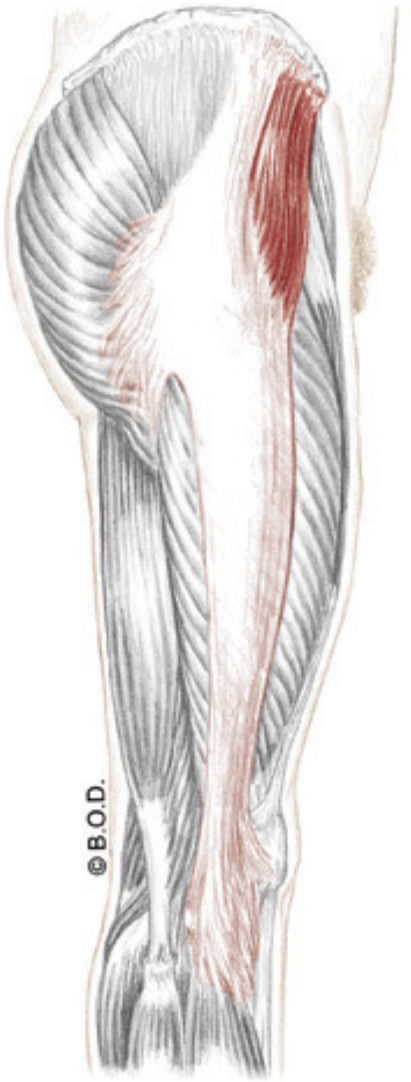
A Flex the hip (coxal joint)

Medially rotate the hip (coxal joint)

Abduct the hip (coxal joint)

O Iliac crest, posterior to the ASIS

I Iliotibial tract



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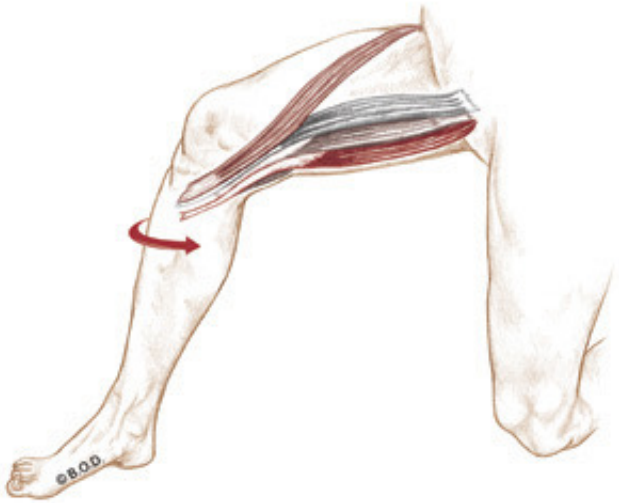

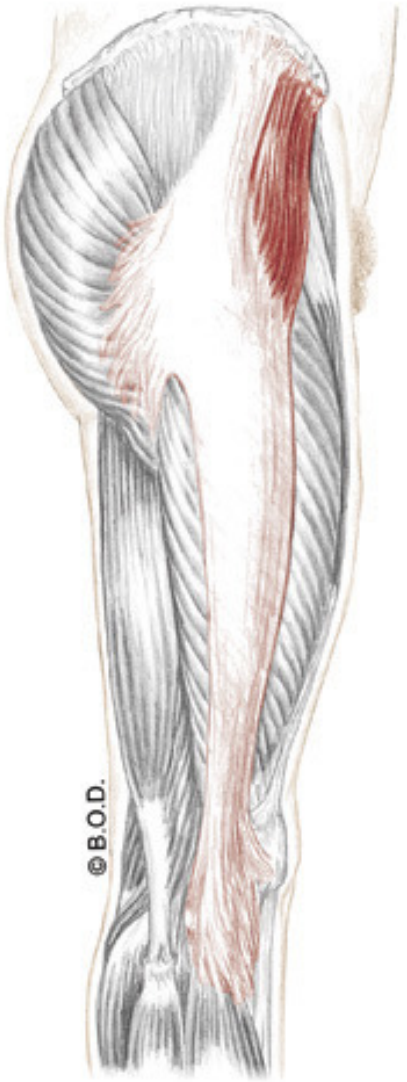

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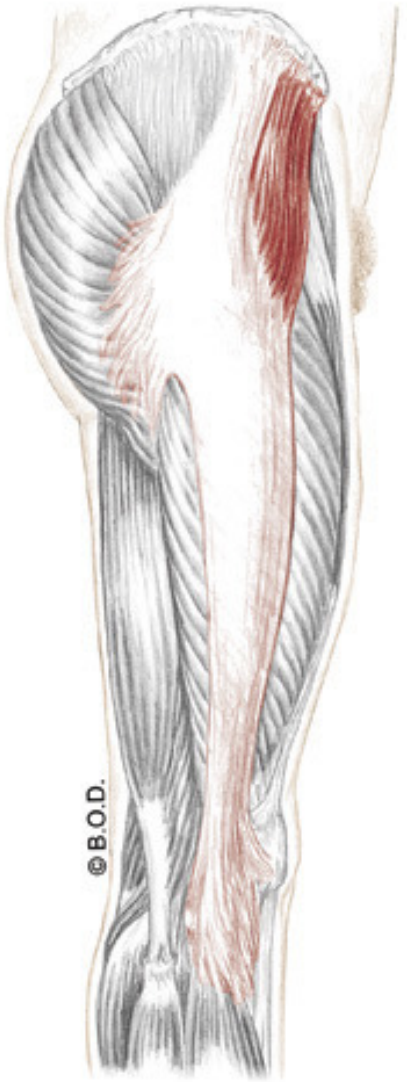

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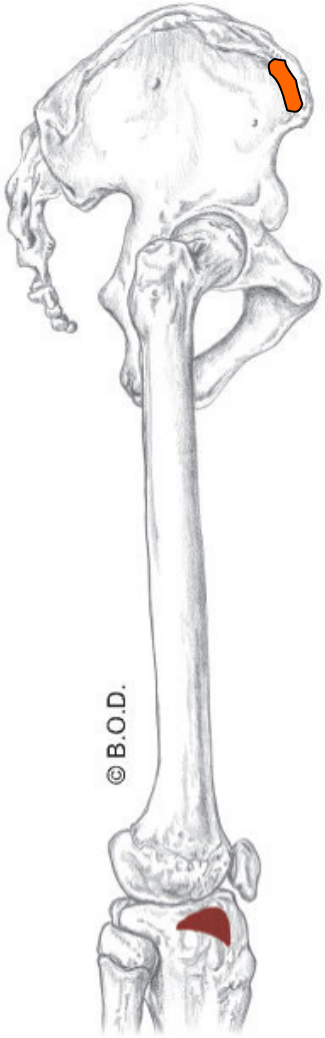

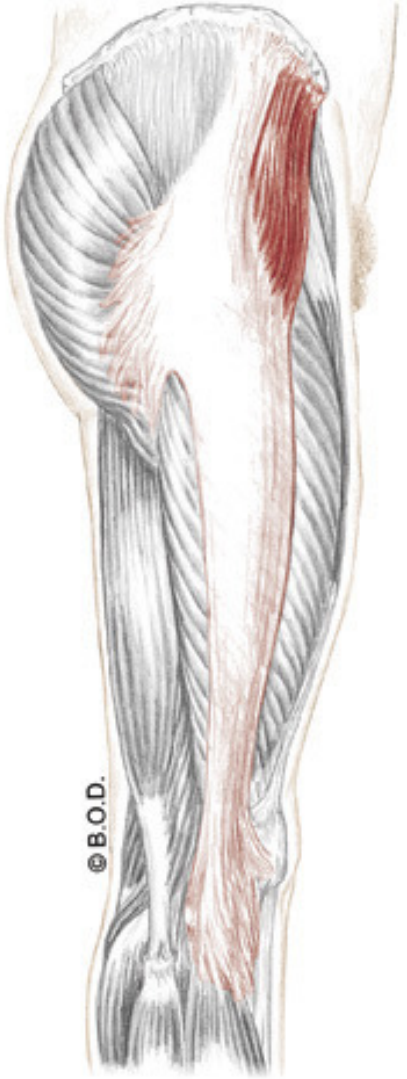

Lateral View

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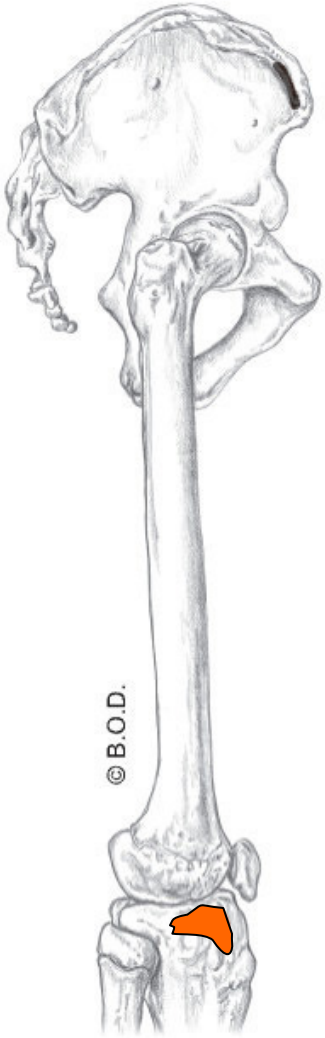
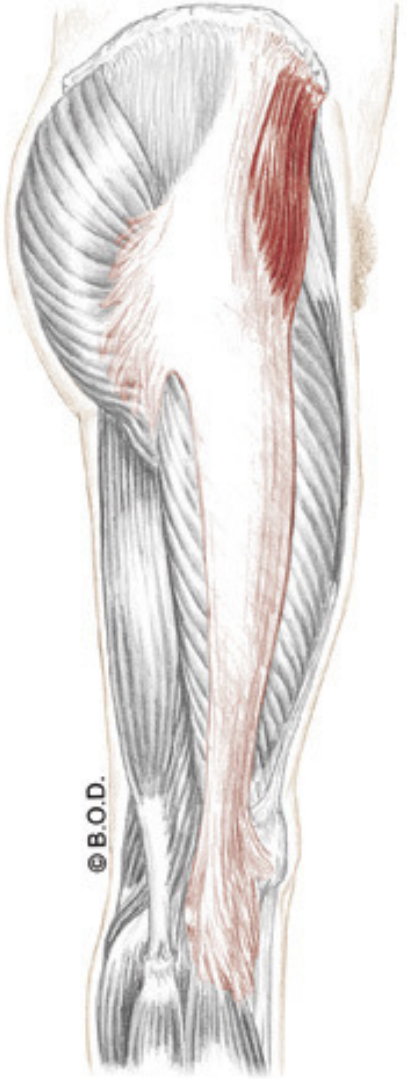
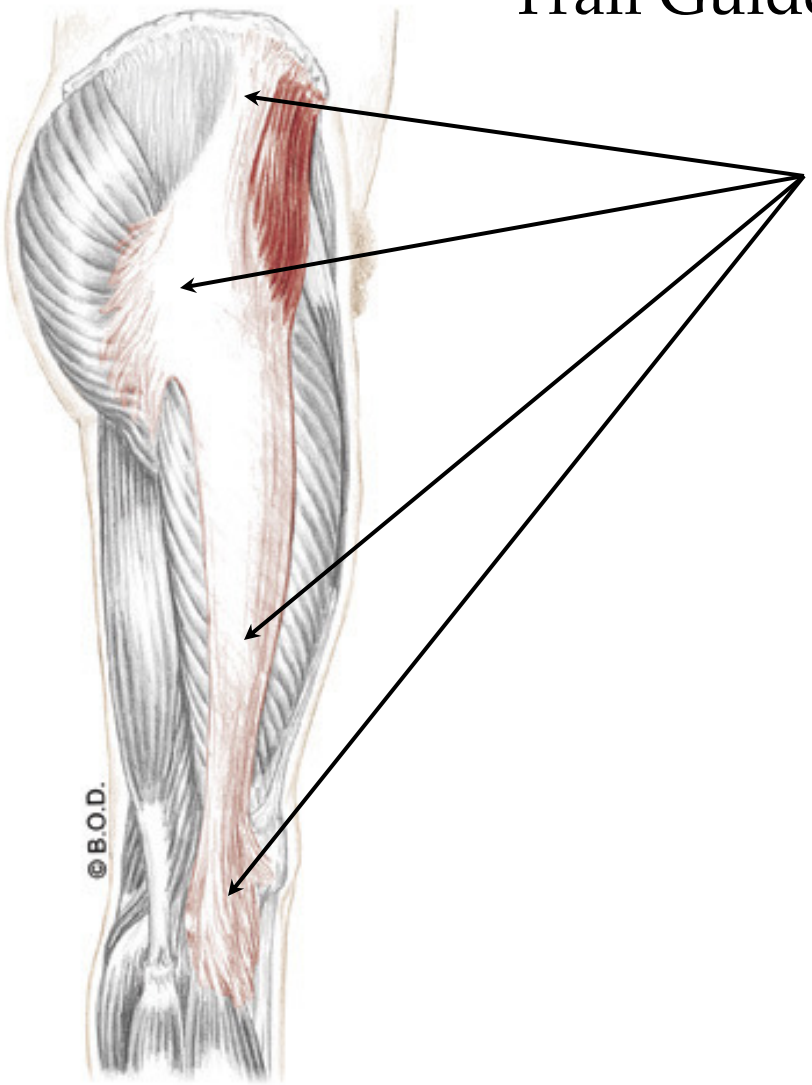




Lateral View

Iliotibial Tract

Trail Guide, Page 324



Lateral View

Iliotibial tract is a superficial sheet of fascia.

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

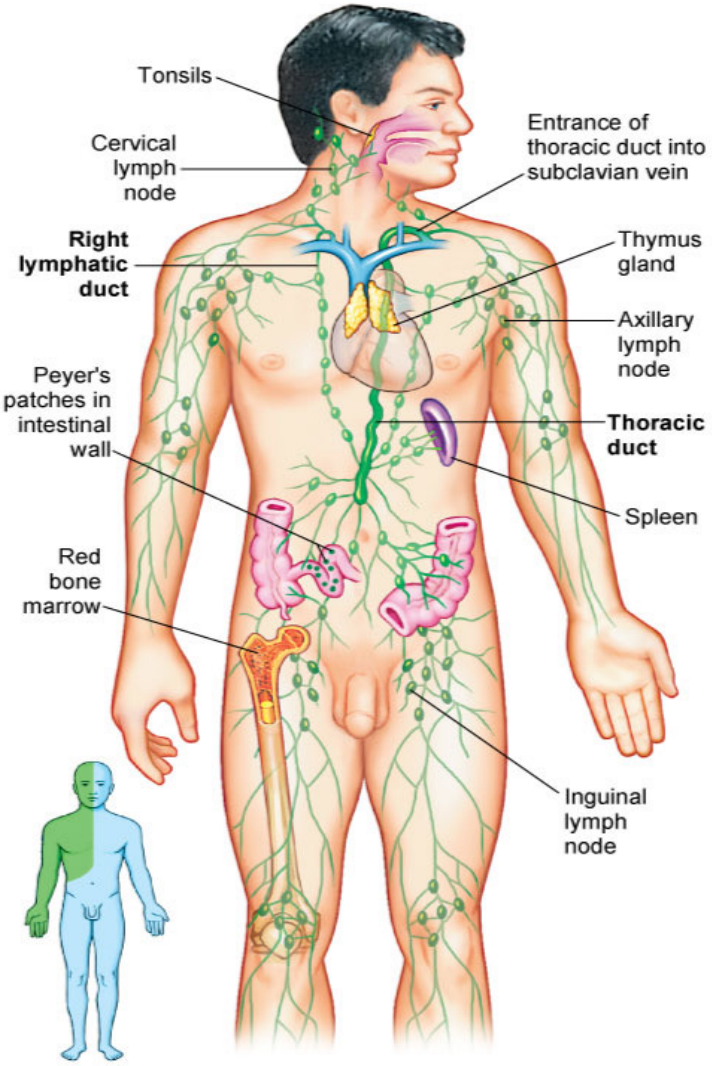
Both TFL and gluteus maximus have insert into the IT tract.

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

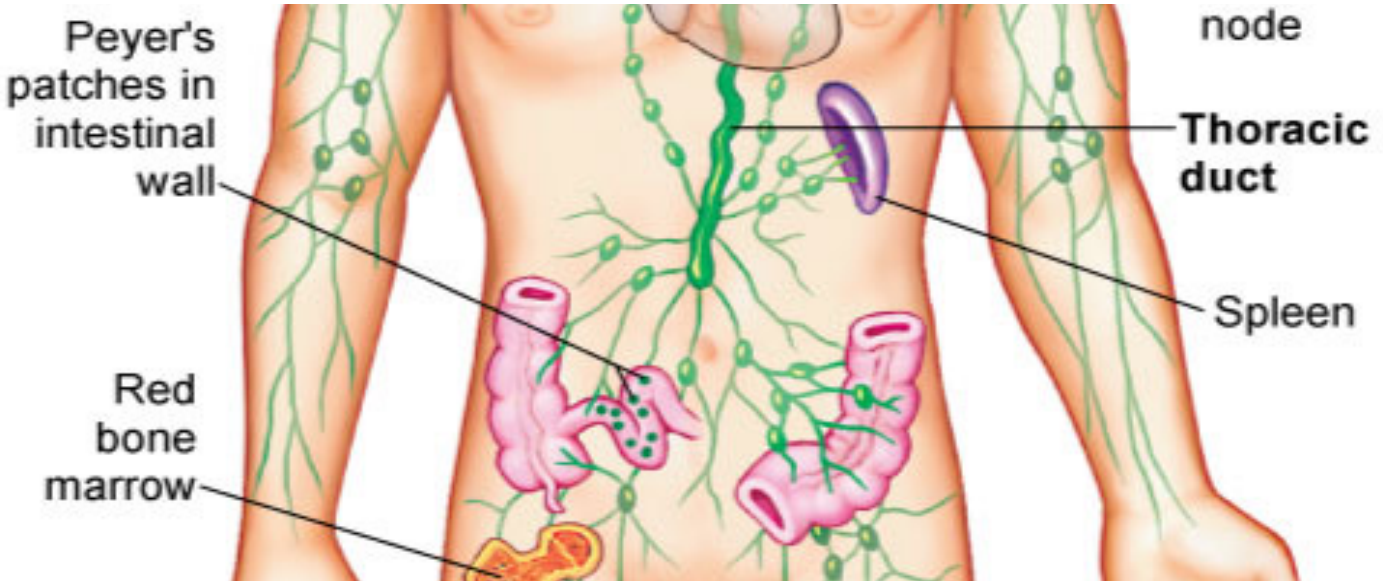


Physiology

Transportation
Immune response
Maintain homeostasis

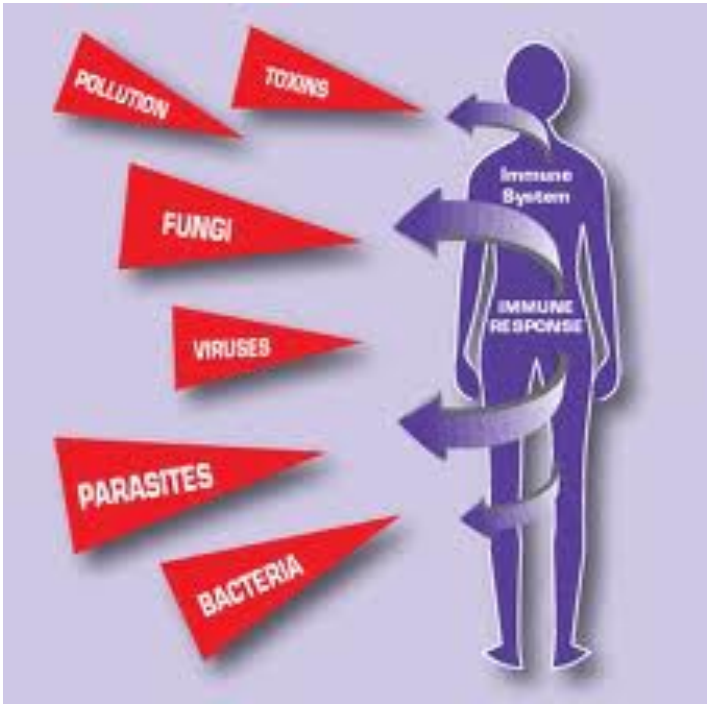
Physiology

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.

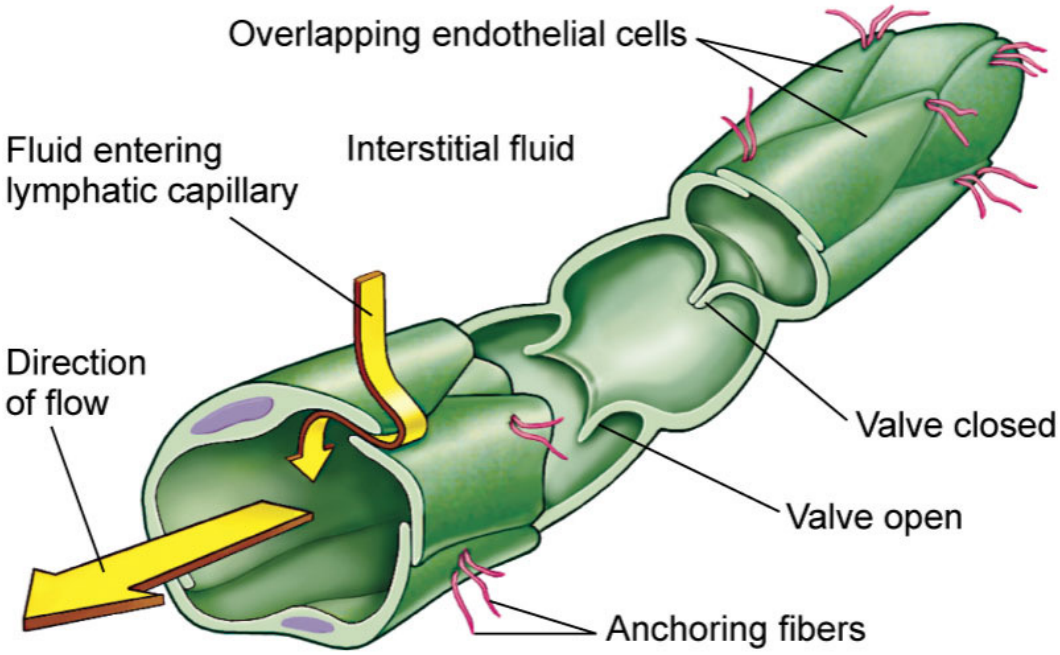


Physiology

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).

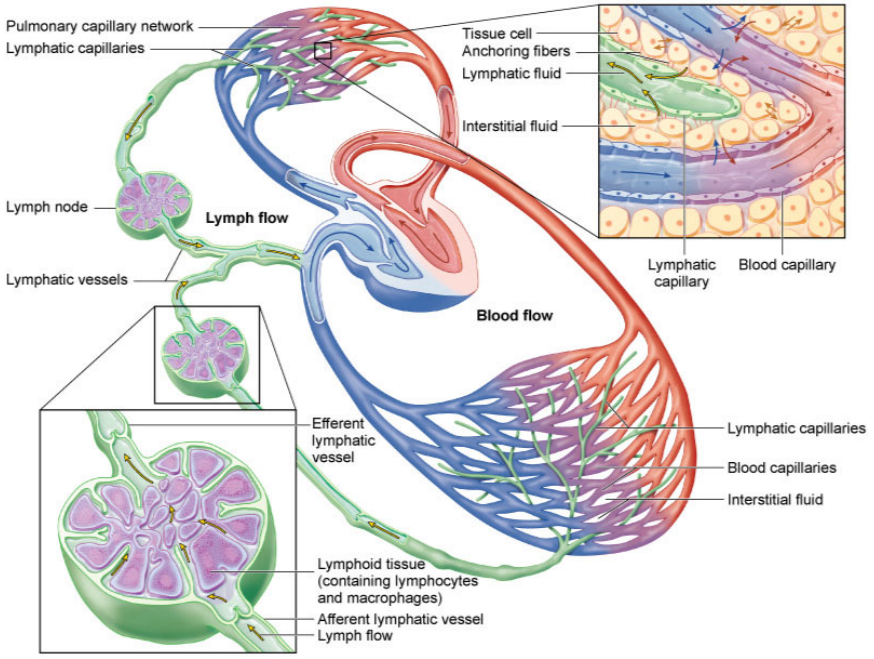
Lymph

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

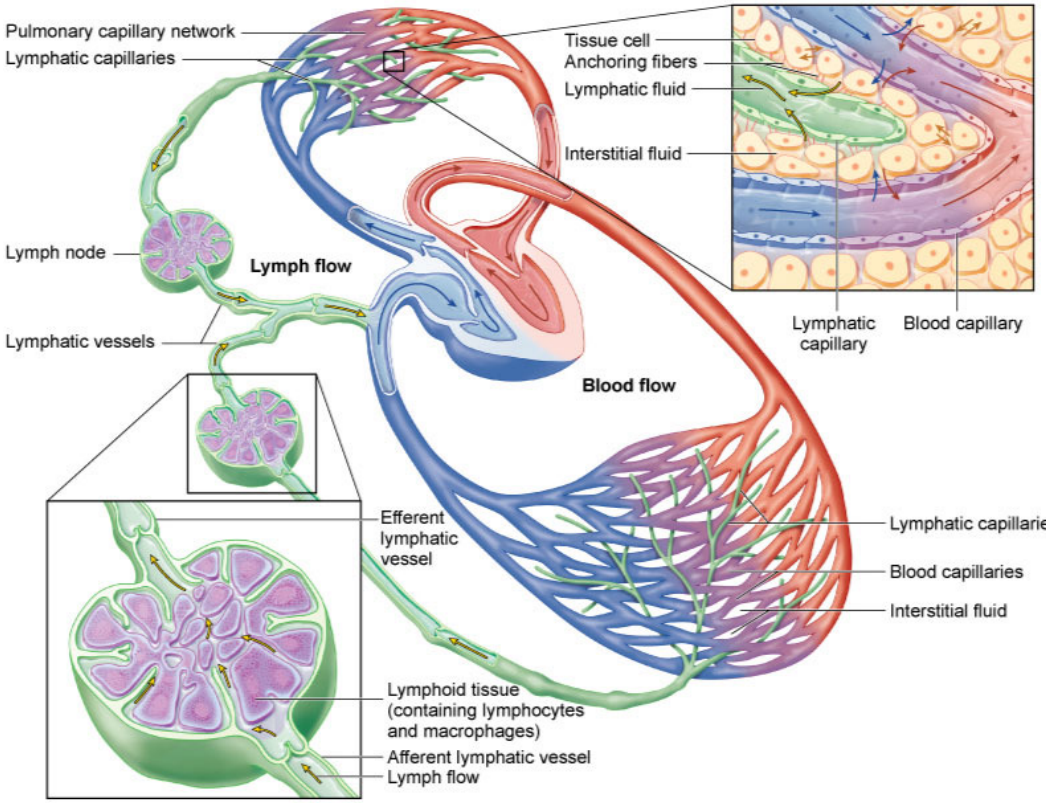


From Patton KT, Thibodeau GA: *Anatomy & physiology,* ed 7, St. Louis, 2010, Mosby.

Fig. 27-2. Flow of lymph.

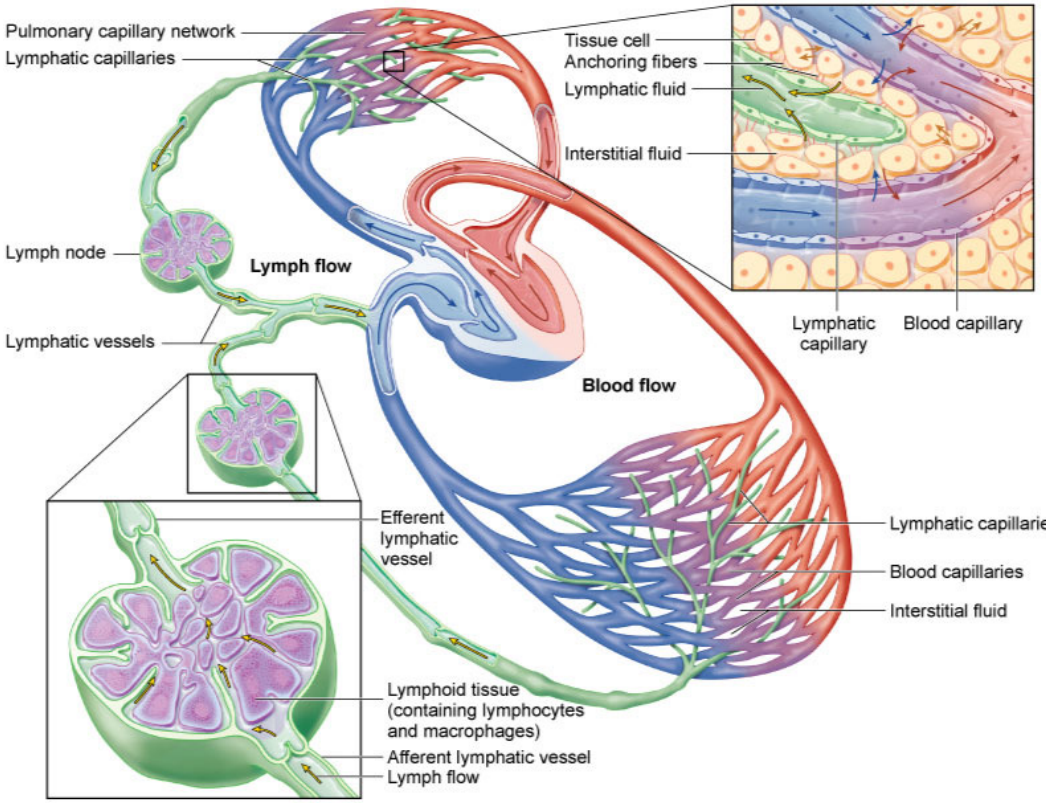
Lymph Vessels

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



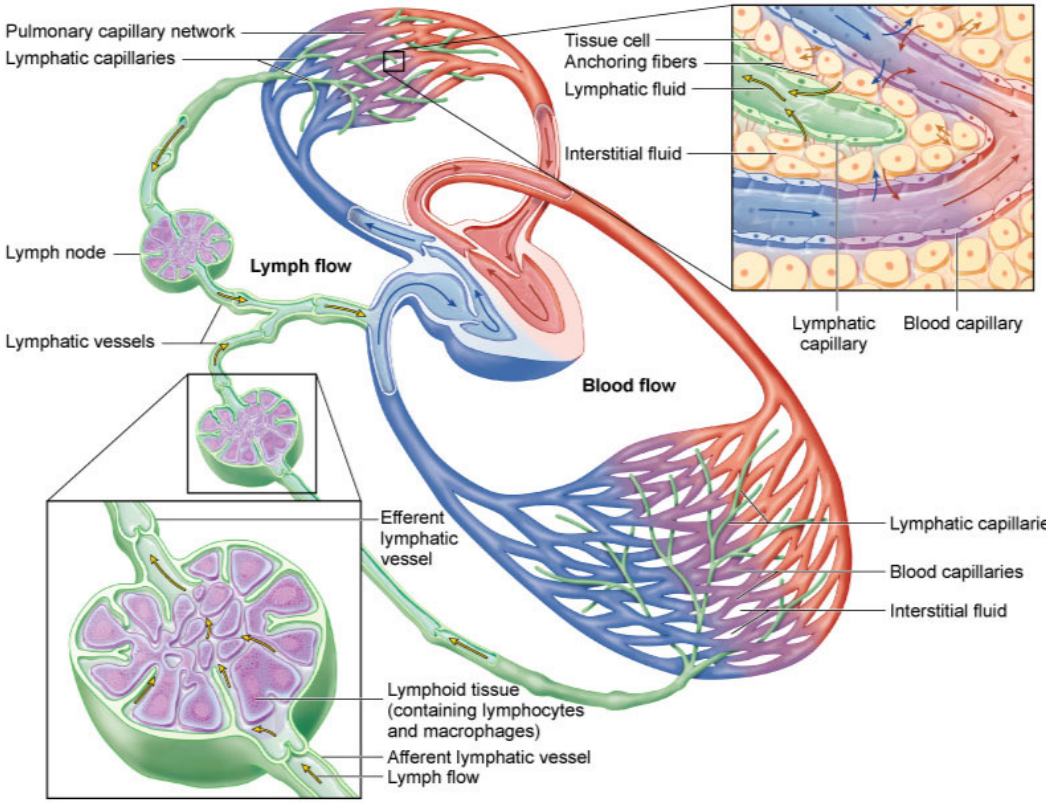
Lymph Vessels

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.

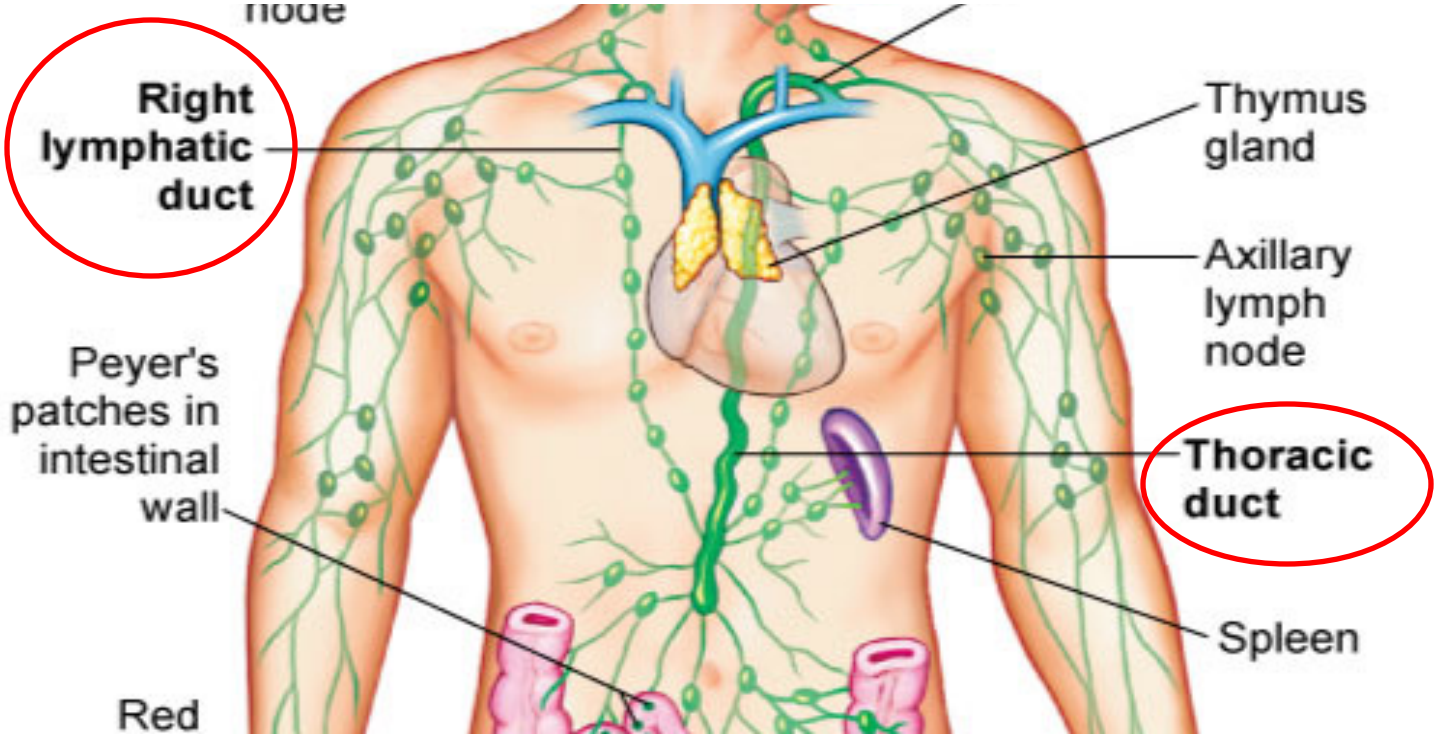


Lymph Vessels

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

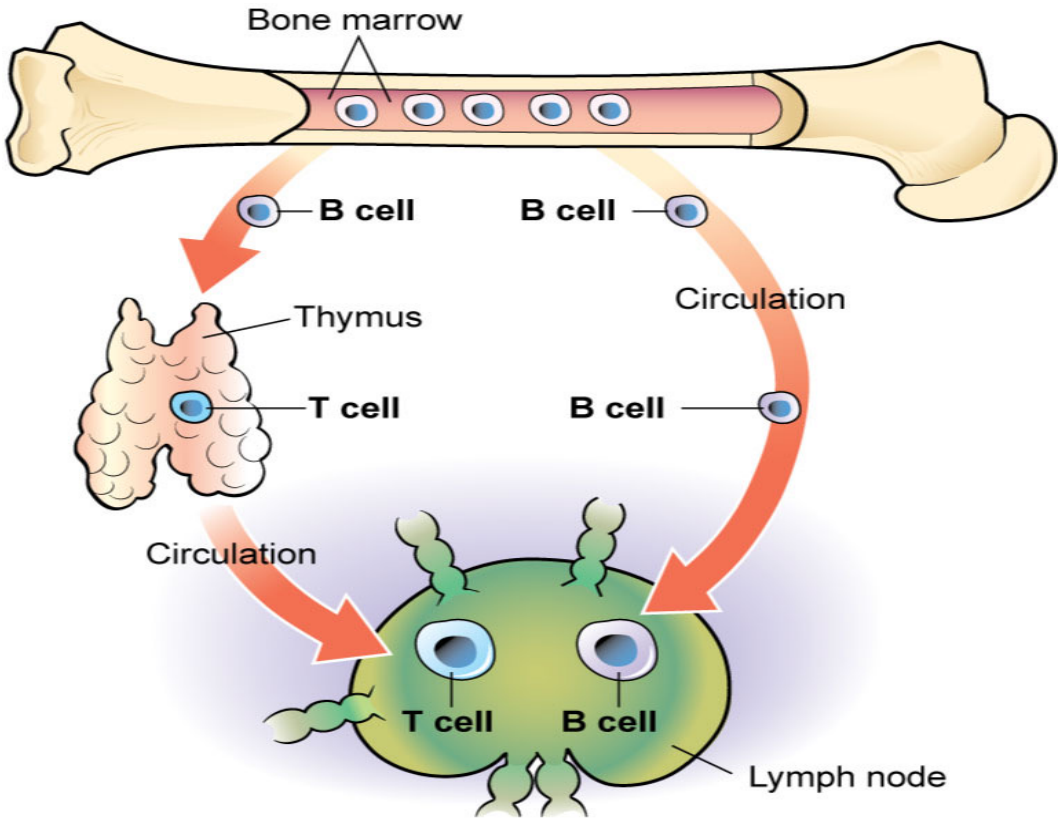


Lymphatic Structures

Red bone marrow
Lymphocyte
Thymus
Spleen
Lymph node
Mucosa-associated lymphoid tissue

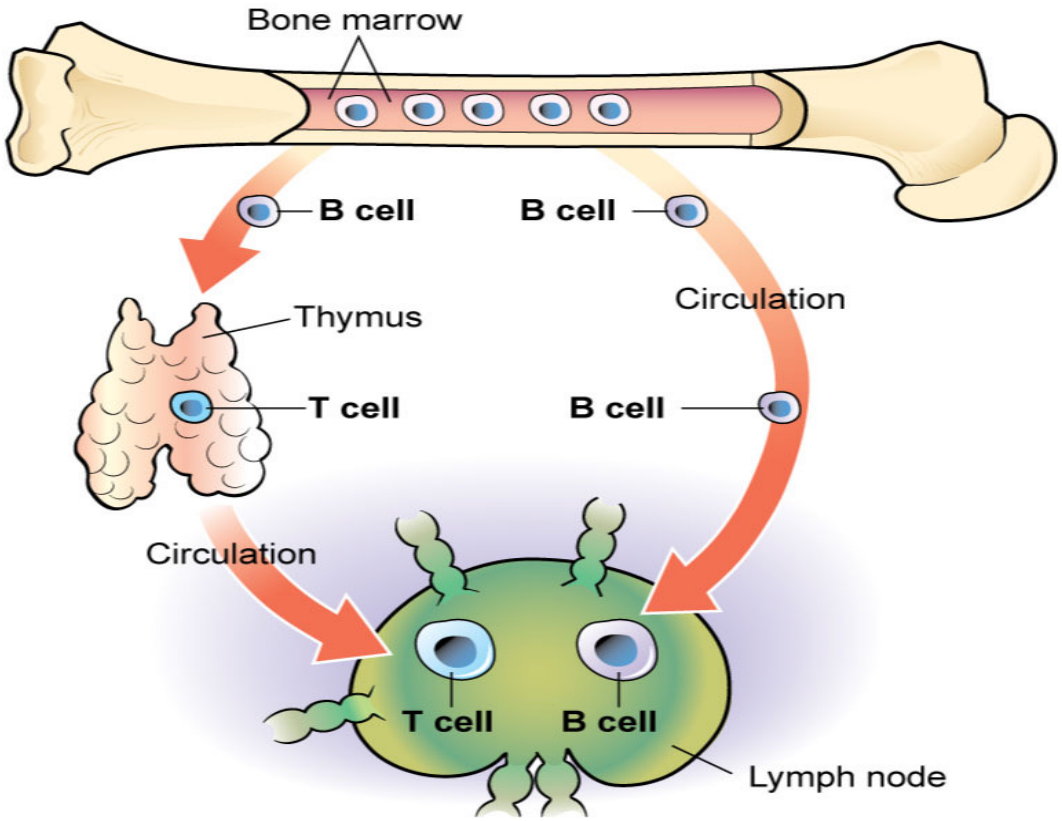
Lymphatic Structures

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).



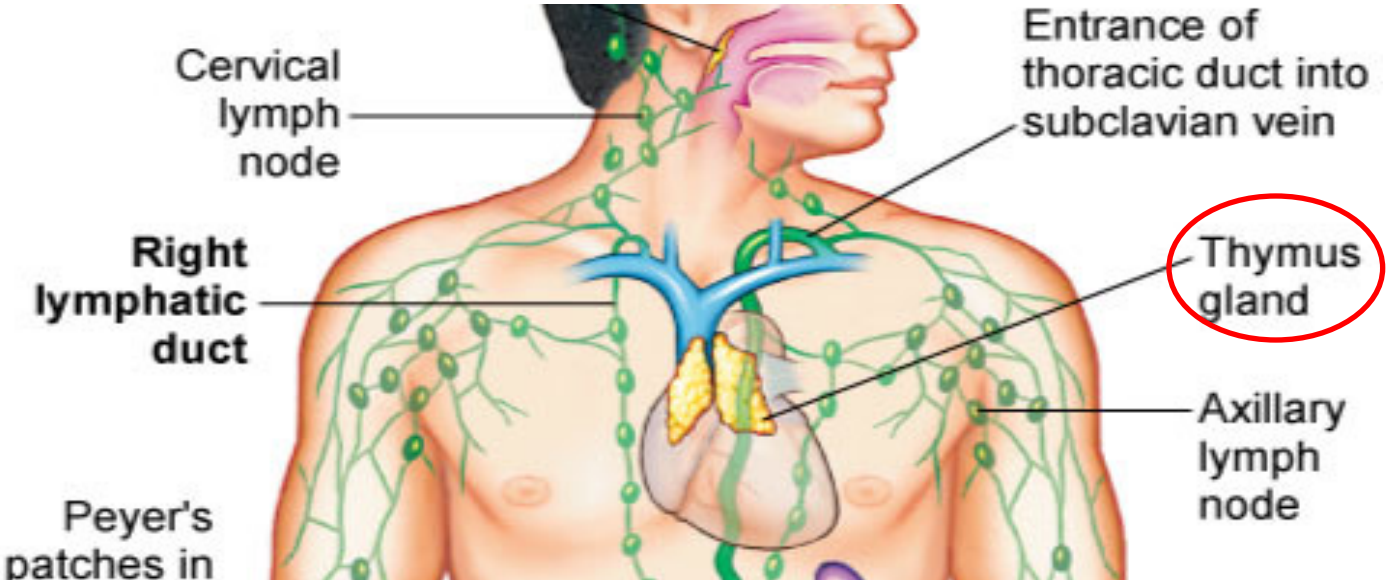
Lymphatic Structures

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



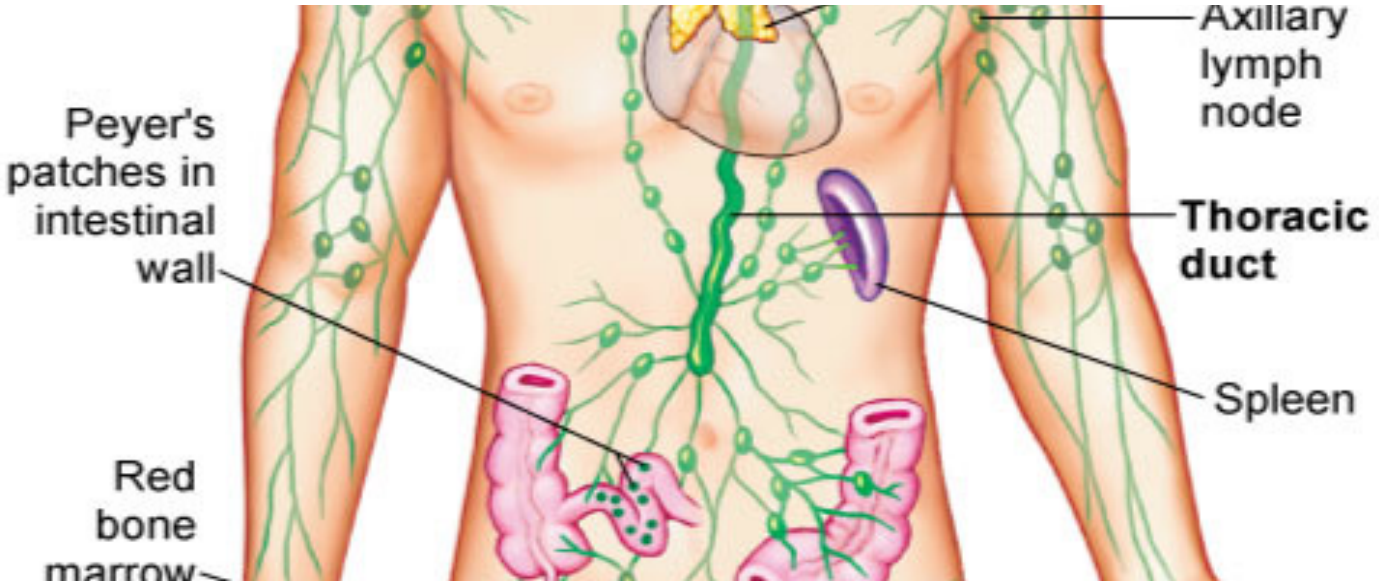
Lymphatic Structures

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



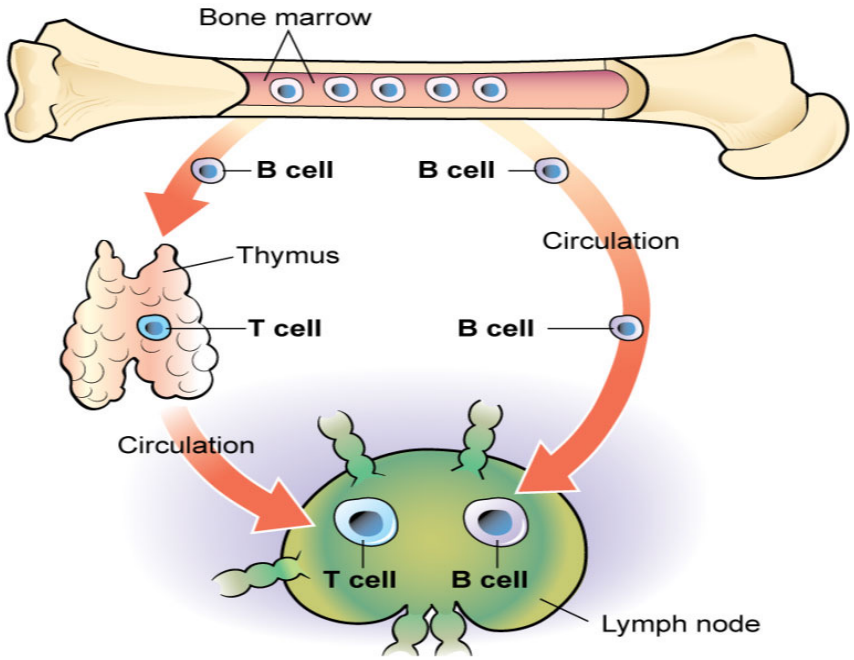
Lymphatic Structures

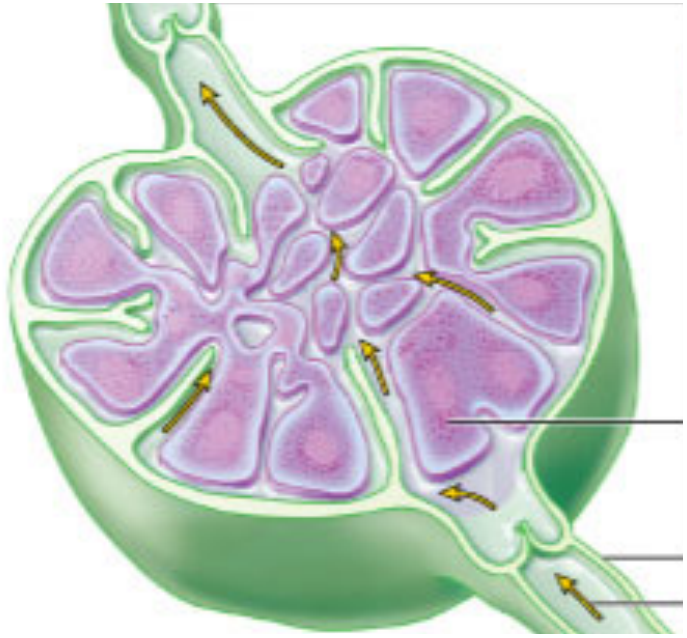
Spleen Largest lymphatic organ. Located within the left lateral rib cage just posterior to the stomach. Stores __lymphocytes__, releasing them during immune responses.



Lymphatic Structures

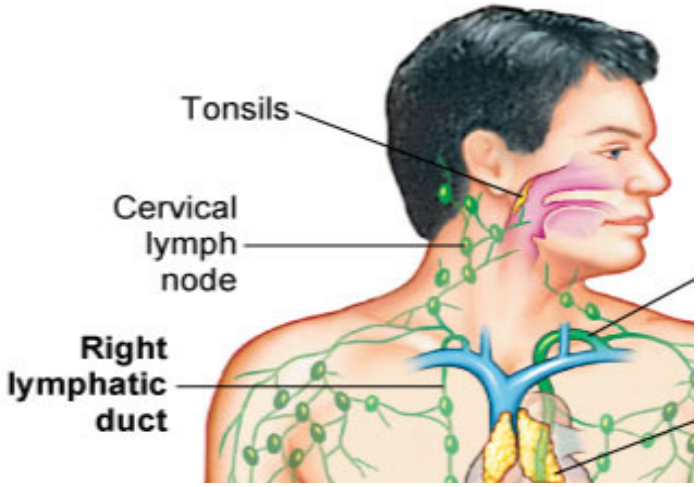
Lymph node Bean-shaped structures located along lymph __vessels__. Filters lymph. Houses phagocytes and lymphocytes that destroy pathogens and other foreign substances in the lymph before it returns to the blood.

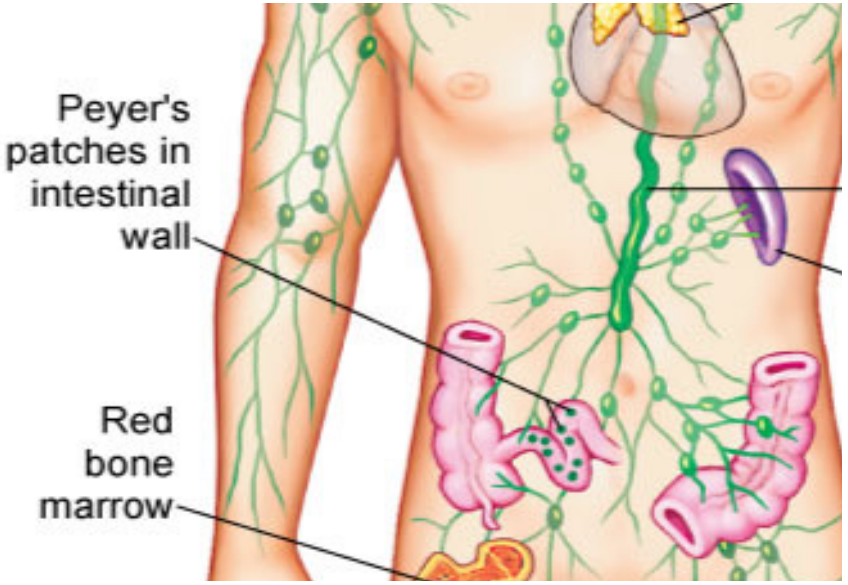




Lymphatic Structures

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



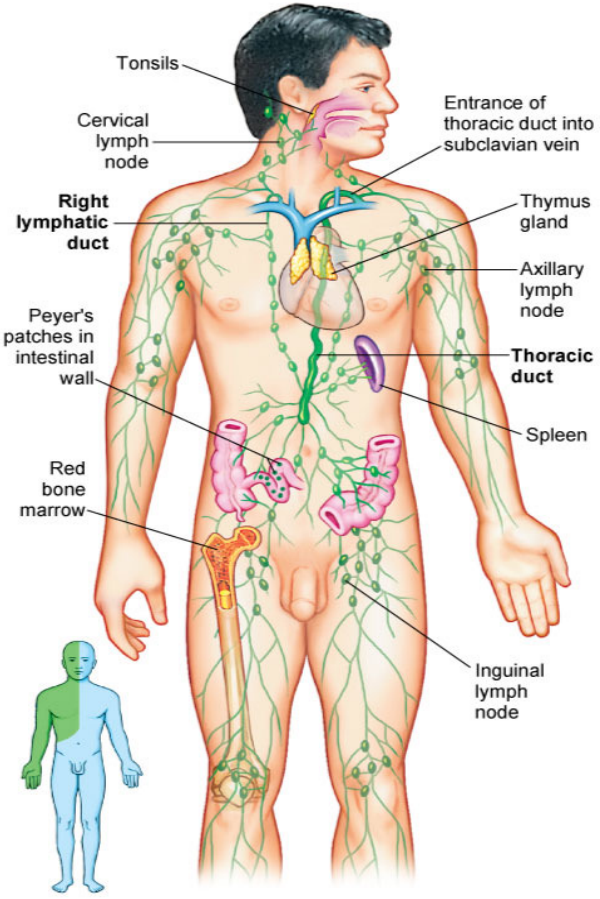


Lymph Flow

Lymphatic drainage
Lymphatic pump

Lymph Flow

Lymphatic drainage The __movement__ of lymph.



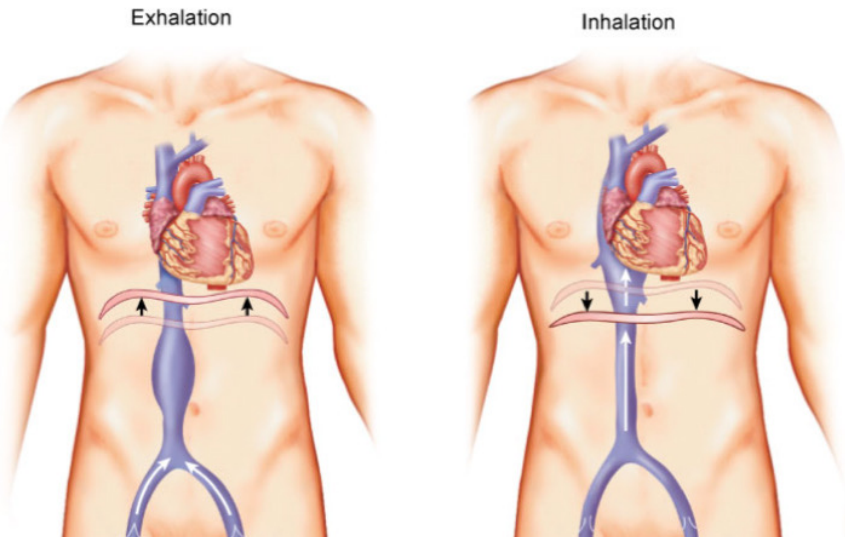
Lymph Flow

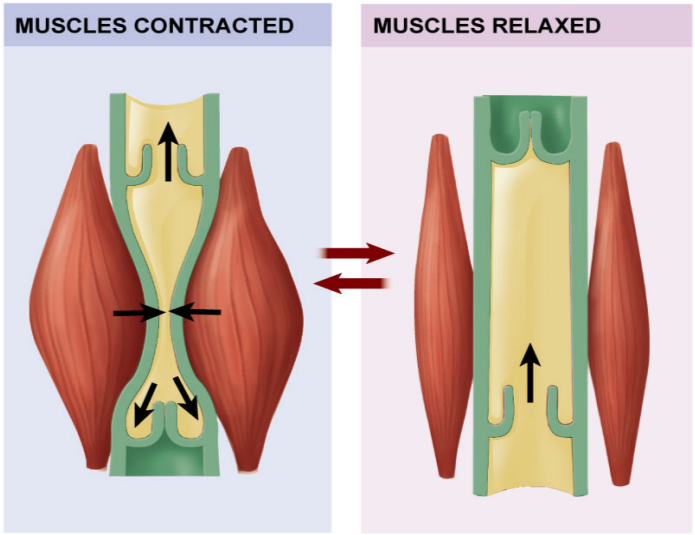
Lymphatic pump The mechanism of lymphatic drainage that uses pressure gradients from external sources exerted on its vessel walls to move lymph.

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

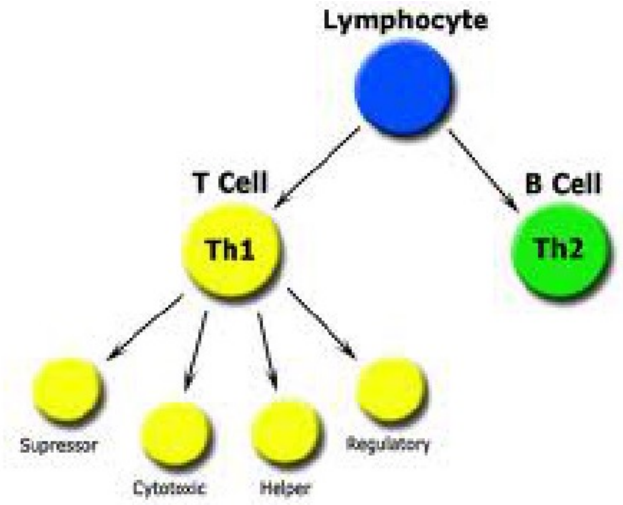
Non-specific immunity (AKA: innate immunity) Non-specific response to invading pathogens. Includes intact skin and mucous membranes, saliva, gastric juices, vomiting, urine flow, certain white blood cells, fever, and inflammation.

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.

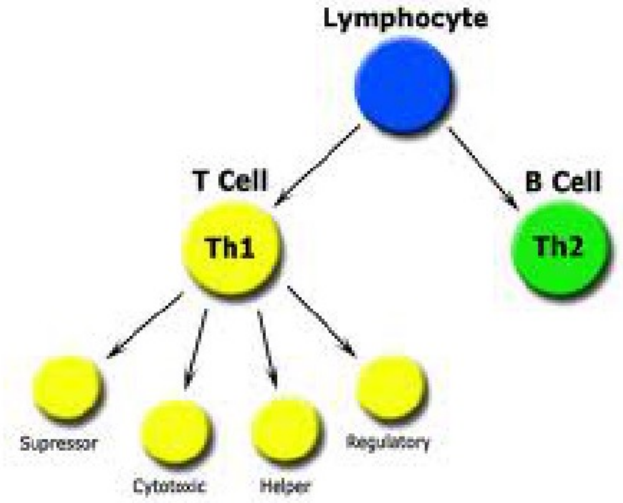
Immunity

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