35a Cardiovascular System: Blood Cells, Tissues, and the Heart

#### 35a Cardiovascular System: Blood Cells, Tissues, and the Heart <sub>Class Outline</sub>

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

#### 35a Cardiovascular System: Blood Cells, Tissues, and the Heart <sub>Class Reminders</sub>

#### In Class 35b:

Full SOAP notes with date and first and last names. Signatures and date on intake form

#### **Assignments**:

- 36b State Law Review Questions (Packet A: 159-164)
- 41a Review Questions (Packet A: 165-178)
- 43a Swedish: Outside Massages (Packet A: 57-62)

#### Quizzes:

- 42a Quiz (35a, 36a, 37a, 38a, 39a, 40a, and 41a)
- 42b Kinesiology Quiz
  - (adductor magnus, gracilis, iliopsoas, sartorius, TFL, piriformis, quadratus femoris)
- 44a Quiz (33b, 37b, 41b, 42b, and 43a)

#### Preparation for upcoming classes:

- 36a A&P: Cardiovascular System Blood Vessels and Paths of Circulation
  - Trail Guide: iliopsoas
  - Packet E: 69-72
  - RQ Packet A-168
  - 36b Business: Professional Ethics

#### **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.

## Adductor Group Trail Guide, Page 319



The five adductors are located along the medial thigh between the hamstrings and quadriceps.

Anterior View

# Adductor Group

pectineus, adductor brevis, adductor longus, adductor magnus, gracilis Trail Guide, Page 320



Anterior View

Anterior View

Anterior View

## Adductor Group Trail Guide, Page 321





All fibers: Adduct the hip (coxal joint)

Medially rotate the hip (coxal joint)

Assist to **flex** the hip (coxal joint)

Posterior fibers: Extend the hip (coxal joint)

Inferior ramus of the pubis

Ramus of the ischium

Ischial tuberosity



Adductor tubercle







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Medially rotate the hip (coxal joint)

Assist to flex the hip (coxal joint)

**Posterior fibers: Extend** the hip (coxal joint)

Inferior ramus of the pubis

Ramus of the ischium

Ischial tuberosity

Medial lip of linea aspera

Adductor tubercle





#### Time to shift gears



#### From adductor magnus to gracilis . . .



All fibers: Adduct the hip (coxal joint)

Medially rotate the hip (coxal joint)

Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)

Inferior ramus of the pubis

Proximal, medial shaft of tibia at pes anserinus tendon





Anterior View

Anterior View



All fibers: Adduct the hip (coxal joint)

Medially rotate the hip (coxal joint)

Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)

Inferior ramus of the pubis

Proximal, medial shaft of tibia at pes anserinus tendon





Anterior View

Anterior View



All fibers: Adduct the hip (coxal joint)

Medially rotate the hip (coxal joint)

Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)

Inferior ramus of the pubis

Proximal, medial shaft of tibia at pes anserinus tendon





Anterior View



All fibers: Adduct the hip (coxal joint)

Medially rotate the hip (coxal joint)

Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)

Inferior ramus of the pubis

Proximal, medial shaft of tibia at pes anserinus tendon





Anterior View

Anterolateral View

AA

All fibers: Adduct the hip (coxal joint)

Medially rotate the hip (coxal joint)

Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)

Inferior ramus of the pubis

Proximal, medial shaft of tibia at pes anserinus tendon





Anterior View

Anterior View



All fibers: Adduct the hip (coxal joint)

Medially rotate the hip (coxal joint)

Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)



Inferior ramus of the pubis

Proximal, medial shaft of tibia at pes anserinus tendon





Anterior View

Posterior View

#### SGT- Same actions at the knee and same insertion

**S**artorius (hacky-sack muscle!)

Gracilis (adductor)

semiTendinosis (medial hamstring)

A: Flex the knee (tibiofemoral joint)

Medially rotate the knee (tibiofemoral joint)

I: Proximal, medial shaft of tibia at pes anserinus tendon (pictured)



35a Cardiovascular System -Blood Cells, Tissues, and the Heart

## E - 65



#### Anatomy

Blood Blood vessels such as arteries, <u>veins</u>, and capillaries Heart





Transportation Protection Combat hemorrhage





**Transportation** The process of transporting respiratory gases, nutrients from the digestive tract, antibodies, waste <u>materials</u>, and hormones from the endocrine glands, heat from active muscles to the skin.





**Protection** The process of protecting the body through disease-fighting white blood cells and the removal of <u>impurities</u> and pathogens.





**Combat hemorrhage** The process of preventing the loss of body fluids from damaged vessels through <u>clotting</u> mechanisms.









#### Blood

Formed elements (blood cells) Plasma (liquid portion)



#### Blood

**Blood** Liquid connective tissue composed of plasma, erythrocytes, leukocytes, and thrombocytes.





**Erythrocyte** <u>Red</u> blood cell. Transports oxygen and carbon dioxide.





#### Hemoglobin

- Iron-based protein
- Gives blood its color
- Allows gases to combine with it temporarily so that oxygen or carbon dioxide can be transported and released throughout the body.





Leukocyte <u>White</u> blood cell. Serves as a part of the body's immune system.





**Thrombocyte** Platelet. Prevents blood loss through clotting mechanisms.





#### Blood

Thrombus Stationary blood clot.

**Embolus** Floating mass of broken thrombus flowing through the blood stream.

**Embolism** Blockage of a blood vessel with an embolus.





#### Blood

Plasma Liquid portion of blood.



#### **Response Moment**



Transport oxygen and carbon dioxide

Leukocytes or White blood cells

Fight pathogens



Thrombocytes or Platelets

#### Combat hemorrhage


#### Heart

Wall Chambers Valves Blood flow





PERI-cardium EPI-cardium MYO-cardium ENDO-cardium





**Pericardium** Tissue that surrounds the <u>heart</u> and secretes a lubricating fluid that prevents friction.





**Epicardium** Thin <u>outer</u> connective tissue layer. Possesses adipose tissue and coronary vessels.





**Myocardium** Thick <u>muscular</u> layer that makes up the bulk of the heart wall. Its contraction forces blood out of the ventricles.





**Endocardium** Thin, <u>inner</u> lining of the heart. Continuous with the endothelial lining of the heart chambers and blood vessels, as well as the valves of the heart.





#### Heart Chambers

Atrium Ventricle





#### Heart Chambers

Atrium (p. atria) <u>Superior</u> heart chamber.





#### Heart Chambers

Ventricle <u>Inferior</u> heart chamber.





Atrioventricular (A-V valve) Semilunar







#### Mitral valve (AKA: bicuspid valve, left A-V valve) Valve

located between the <u>left</u> atrium and <u>left</u> ventricle.





# **Tricuspid valve (AKA: right A-V valve)** Valve located between the <u>right</u> atrium and <u>right</u> ventricle.





Aortic

#### Semilunar Valves Pulmonary Carotid and subclavian arteries Superior vena cava Aortic arch Pulmonary arteries Pulmonary arteries (to lungs) (to lungs) Pulmonary veins (from lungs) Pulmonary veins (from lungs) Left atrium Pulmonary trunk Mitral/bicuspid valve Right atrium Left ventricle d Tricuspid valve Aortic valve Inferior vena cava Right ventricle Pulmonary valve Aorta Interventricular septum



# Pulmonary valve (AKA: right semilunar valve) Valve between

the <u>right</u> ventricle and the pulmonary trunk.





#### Aortic valve (AKA: left semilunar valve) Valve between the

<u>left</u> ventricle and the aorta.





#### Coronary vessels

**Coronary vessels** Arteries and veins that circulate blood to and from the myocardium.





Blood arrives at the heart Blood goes to the lungs and comes back Blood leaves the heart



Stage 1 Oxygen-depleted blood enters the superior and inferior vena cava and flows into the right atrium. When the <u>right</u> atrium is full, it empties through the tricuspid valve into the <u>right</u> ventricle.
Occurs at the same time as Stage 3.

**Stage 2** The <u>right</u> ventricle contracts and pushes blood through the pulmonary valve into the pulmonary trunk. The pulmonary trunk then divides into left and right pulmonary arteries which take blood to each lung. Four pulmonary veins leave the lungs and carry oxygen-rich blood back to the <u>left</u> atrium.

**Stage 3** Blood leaves the <u>left</u> atrium and passes through the left ventricle through the mitral valve. The left ventricle contracts and pushes blood through the aortic valve into the aorta and descending aorta and to all parts of the body except the lungs. Occurs at the same time as Stage 1.

## Stage 1: End of Systemic Circuit, Blood fills the right side of the heart



#### Stage 2: Pulmonary Circuit, Heart pumps blood to lungs and back to the heart



#### Stage 3: Beginning of Systemic Circuit, Heart pumps blood out to the entire body


































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