

VISIBLE  BODY®

The Muscular System: Torso and Abdomen

A muscular system lab activity using Visible Body Suite

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IN-LAB EXERCISES

Use the following modules to guide your exploration of the thoracic and abdominal regions of the muscular system. As you explore the modules, locate the muscles on any charts, models, or specimens available. These muscles are located on the thorax, abdomen, and back, and serve to protect the cavities they enclose as well as provide movement.

These muscle groups will have different jobs depending on where they are located. Those muscles on the chest wall lining the thoracic cavity around the ribs play roles in changing the size of the thoracic cavity for inspirations and expirations. Muscles located along the spine are involved in movement of the back, where muscles lining the abdomen help to protect the organs underneath while also allowing for movement of the trunk.

The long names of some of these muscles can be daunting, but they are often very descriptive. You can find origins, insertions, actions, and/or locations of these muscles simply in the names. When reviewing the action of a muscle, it will be helpful to think about where the muscle is located and where the insertion is. Muscle physiology requires that a muscle will “pull” instead of “push” during contraction, and the insertion is the part that will move. Imagine that the muscle is “pulling” on the bone or tissue it is attached to at the insertion.

Open Visible Body Suite. From the main menu, choose Anatomy & Physiology and select 4. Muscular System. Manipulate the images to see different views and isolate each muscle. Be sure to click the book icon to read information specific to that muscle.

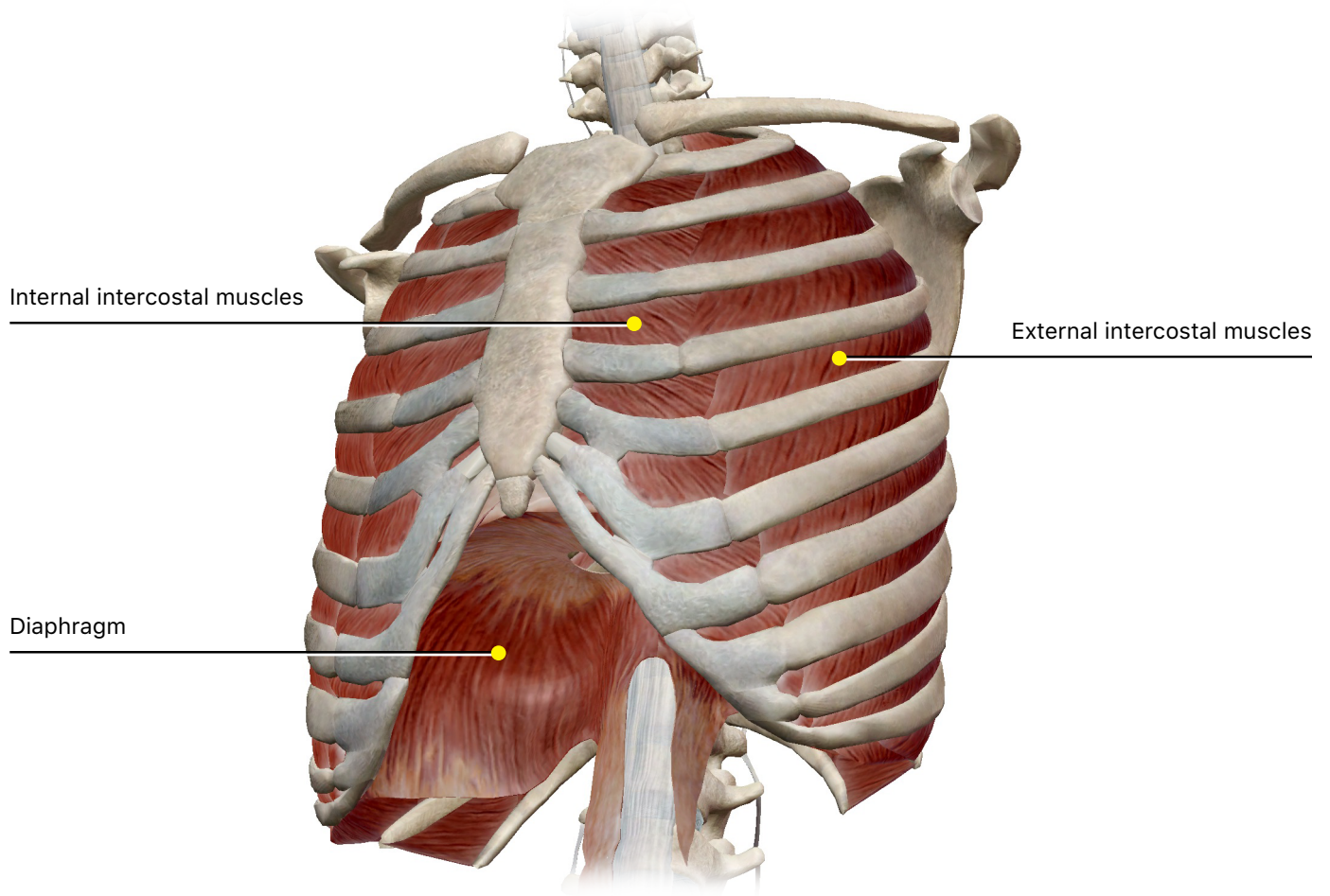
In the modules below, identify the following:

- Muscle location
- Origin(s) and insertion(s)
- Muscle action
- Nerve supply



A. Respiratory Muscles

Scroll down and select 16.30 Thorax: Breathing.



These muscles are responsible for pulmonary ventilation. Although the diaphragm and, to a lesser extent, the external intercostals are primarily responsible for inspiration, additional accessory respiratory muscles can contract to assist in a forceful inspiration. Likewise, while a normal, quiet expiration is due to relaxation of the diaphragm and external intercostal muscles, additional accessory respiratory muscles can be used during a forceful expiration.

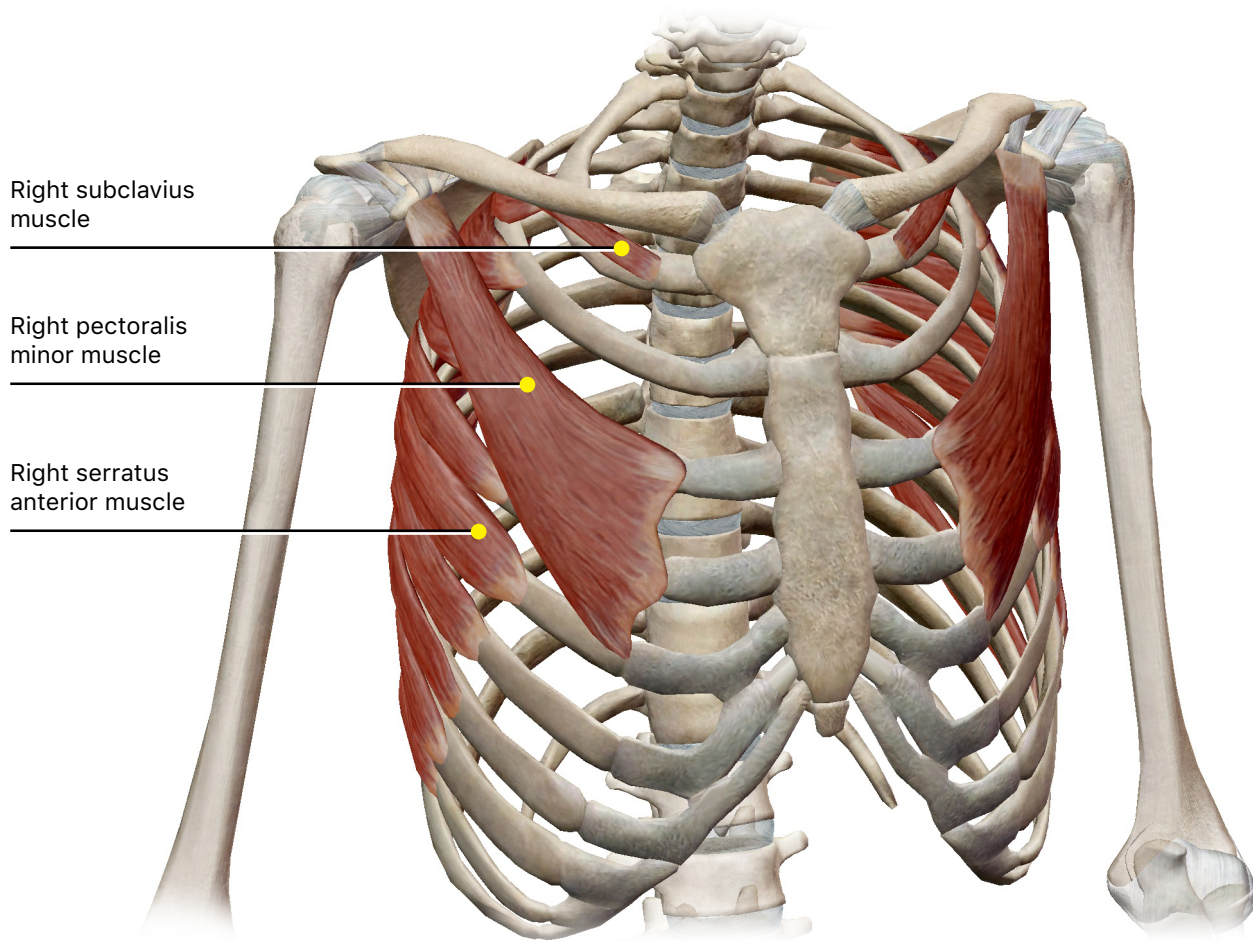
Anatomically, the diaphragm marks the division between the thoracic and abdominal cavities. Observe the openings in the diaphragm that allow the passage of the esophagus and major blood vessels. It can be easy to confuse the external and internal intercostals. The external intercostals are so named because they are superficial to the internal intercostals. It will also be helpful to pay attention to the direction of the fibers in these two muscles because they run in opposite directions.

Respiratory Muscles				
Muscle	Origin	Insertion	Action	Innervation
Diaphragm				
External intercostals				
Internal intercostals				



B. Shoulder Girdle Movements, Anterior

View 16.31 Thorax: Shoulder Girdle Movements, Anterior.

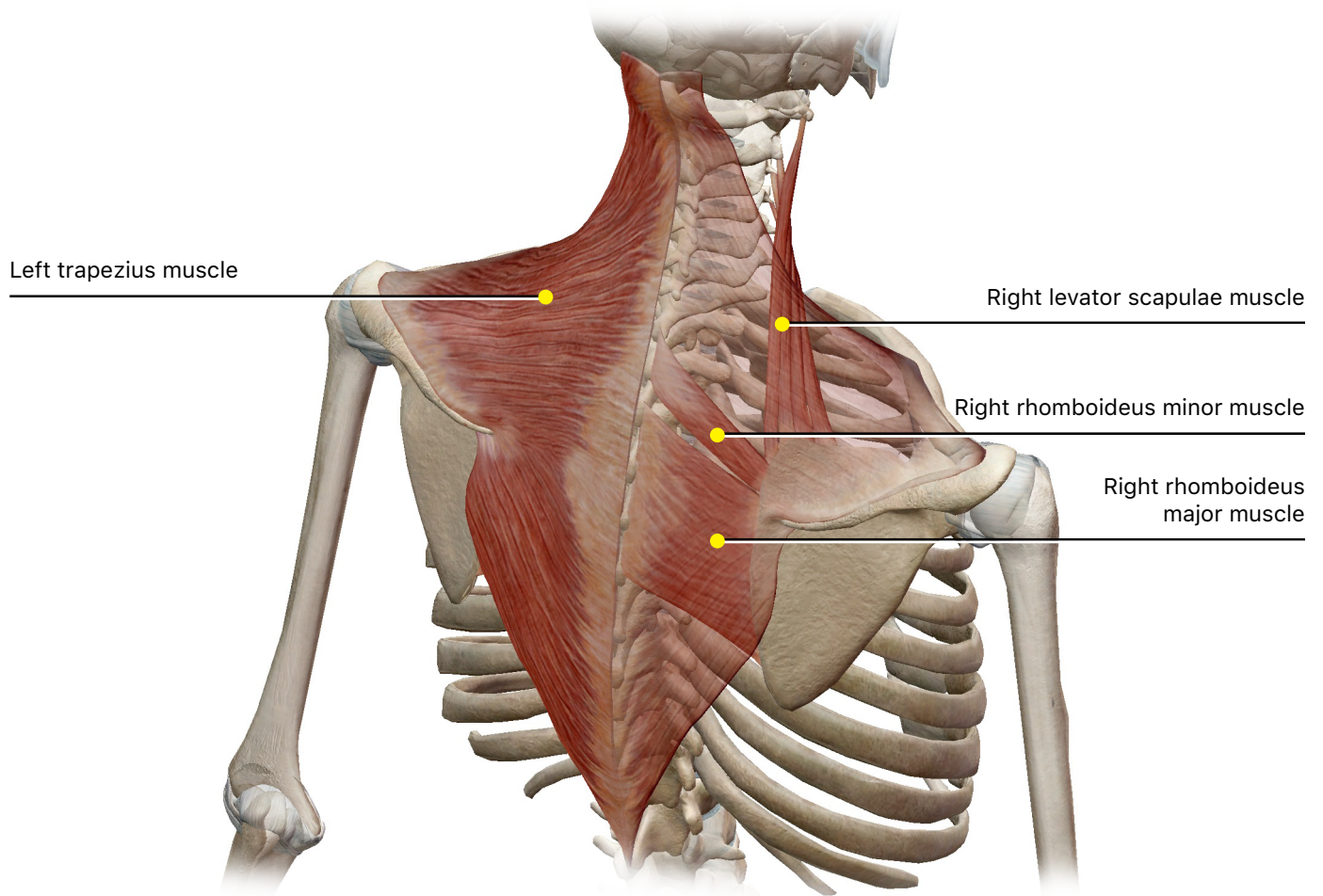


These muscles move and stabilize the shoulder girdle on the anterior side of the body. Some of these muscles can elevate the ribs to assist in a more forceful inspiration.

Shoulder Girdle Movements, Anterior				
Muscle	Origin	Insertion	Action	Innervation
Subclavius				
Pectoralis minor				
Serratus anterior				

C. Shoulder Girdle Movements, Posterior

View 16.32 Thorax: Shoulder Girdle Movements, Posterior.

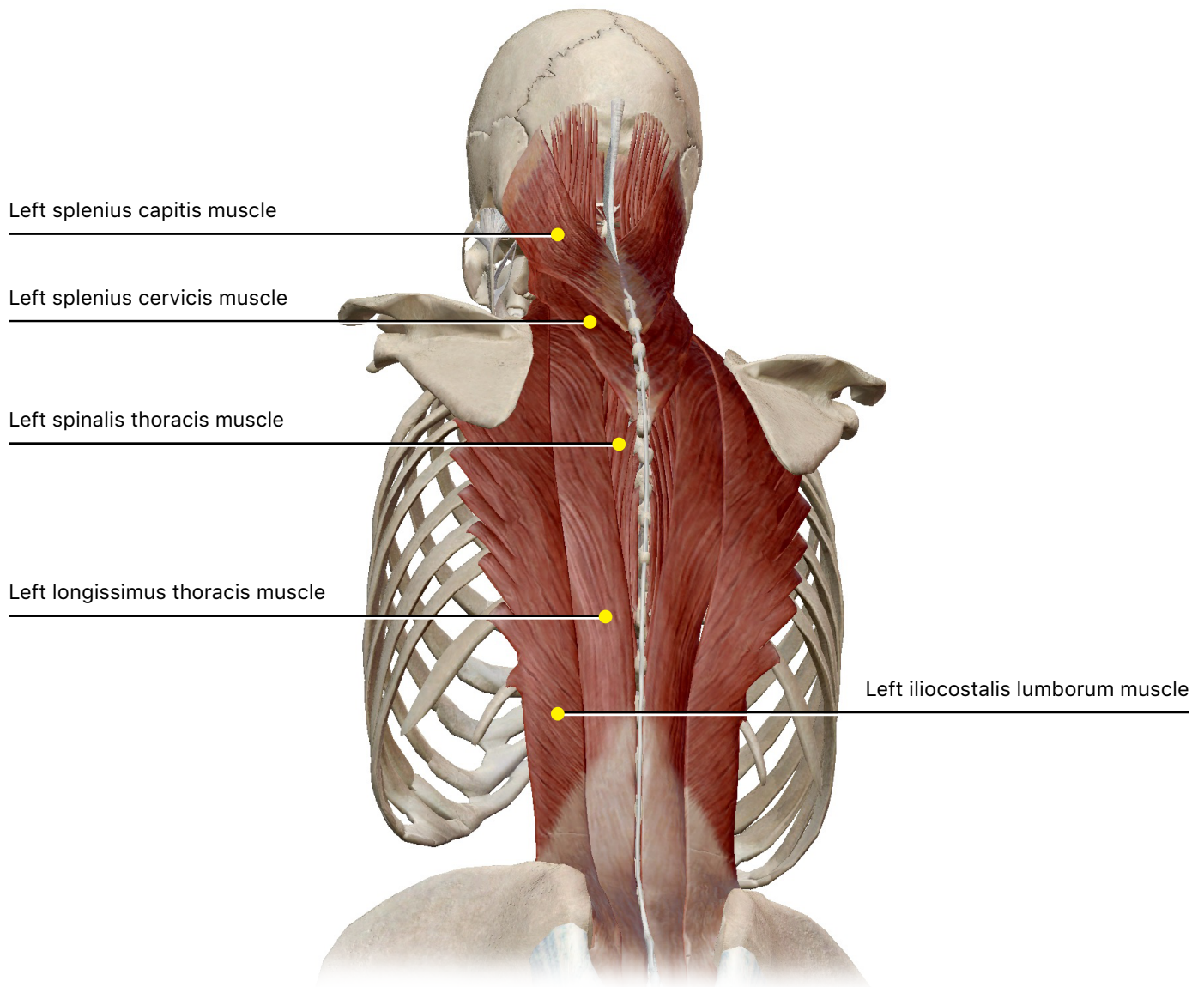


These muscles also serve to stabilize and move the shoulder, but on the posterior side. Note that they all insert on the scapula.

Shoulder Girdle Movements, Posterior				
Muscle	Origin	Insertion	Action	Innervation
Trapezius				
Levator scapulae				
Rhomboideus major				
Rhomboideus minor				

D. Vertebral Column: Splenius and Erector Spinae Groups

View 16.15 Vertebral Column: Splenius, 16.16 Vertebral Column: Erector Spinae, 16.17 Erector Spinae: Spinalis, 16.18 Erector Spinae: Longissimus, and 16.19 Erector Spinae: Iliocostalis.



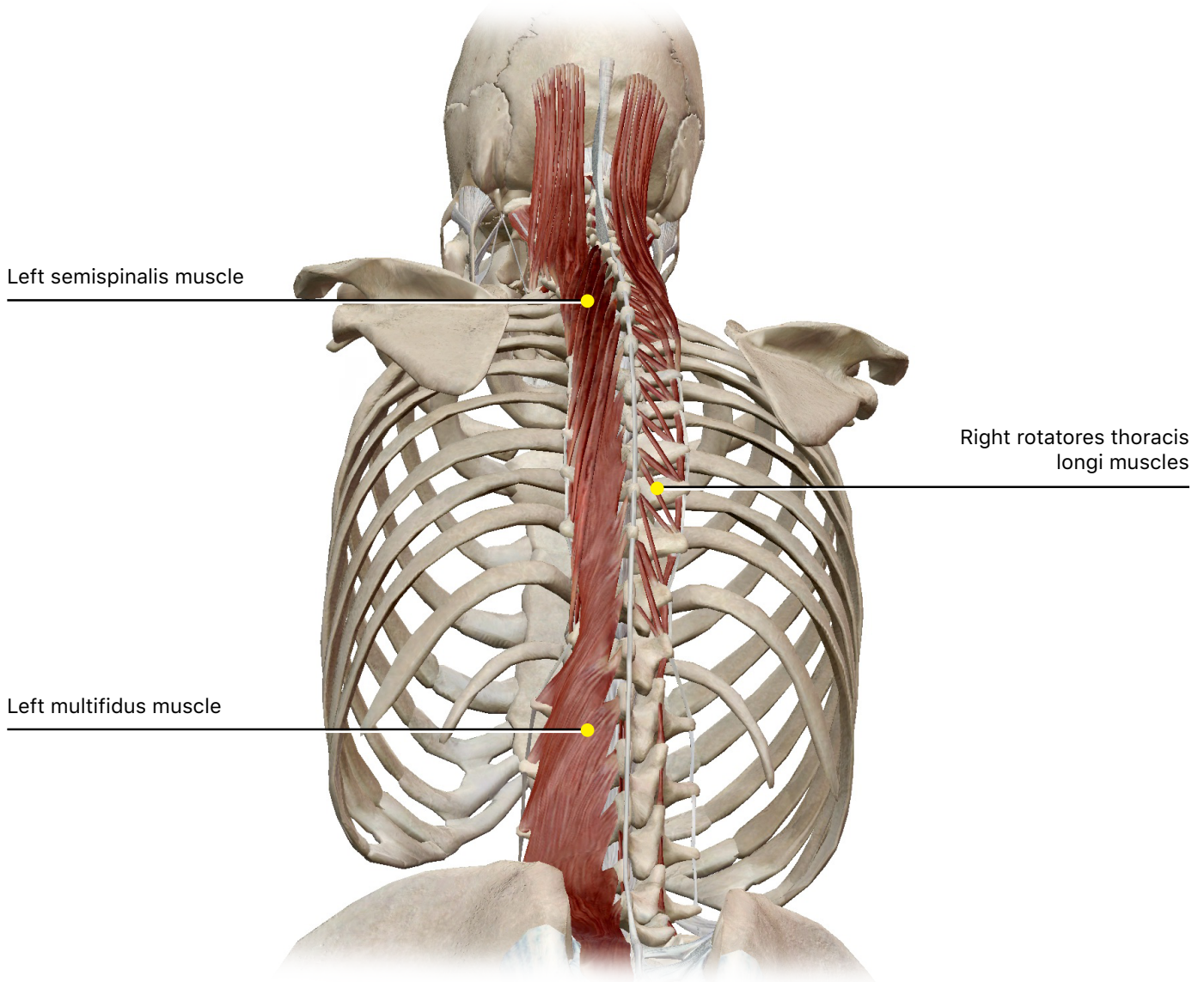
These muscles, located along the vertebral column, function to support and extend the neck and/or back. The spinalis, longissimus, and iliocostalis are part of the erector spinae group, which lies parallel to the spine and extends the back.

Vertebral Column: Splenius and Erector Spinae Groups				
Muscle	Origin	Insertion	Action	Innervation
Splenius capitis				
Splenius cervicis				
Spinalis				
Longissimus				
Iliocostalis				

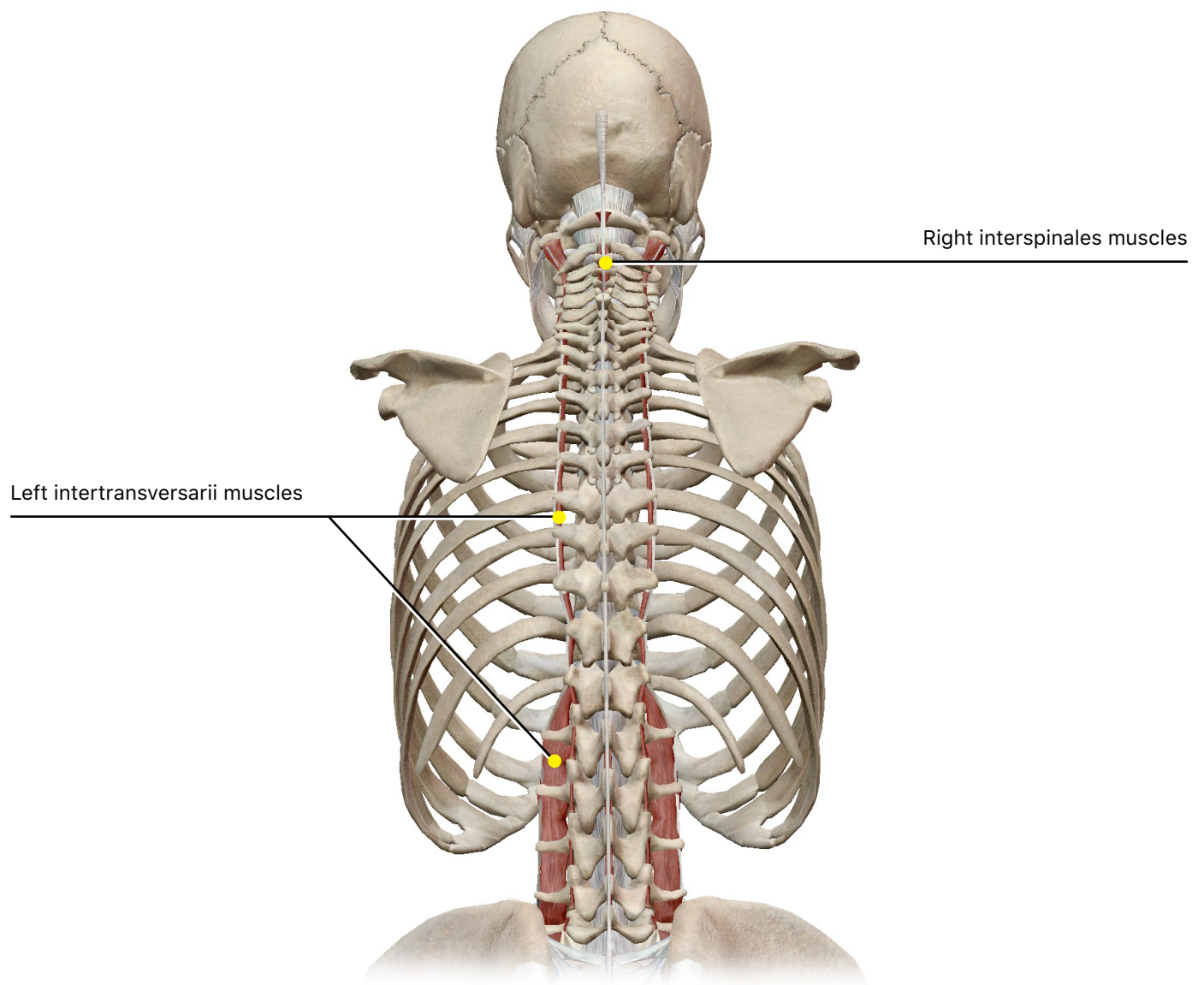
E. Deep Vertebral Column Muscles

View 16.20 Vertebral Column: Transversospinales, 16.21 Transversospinales: Semispinalis, 16.22 Transversospinales: Rotatores, 16.23 Vertebral Column: Segmental, 16.24 Vertebral Column: Scalenes, 16.25 Vertebral Column: Spinal Flexors.

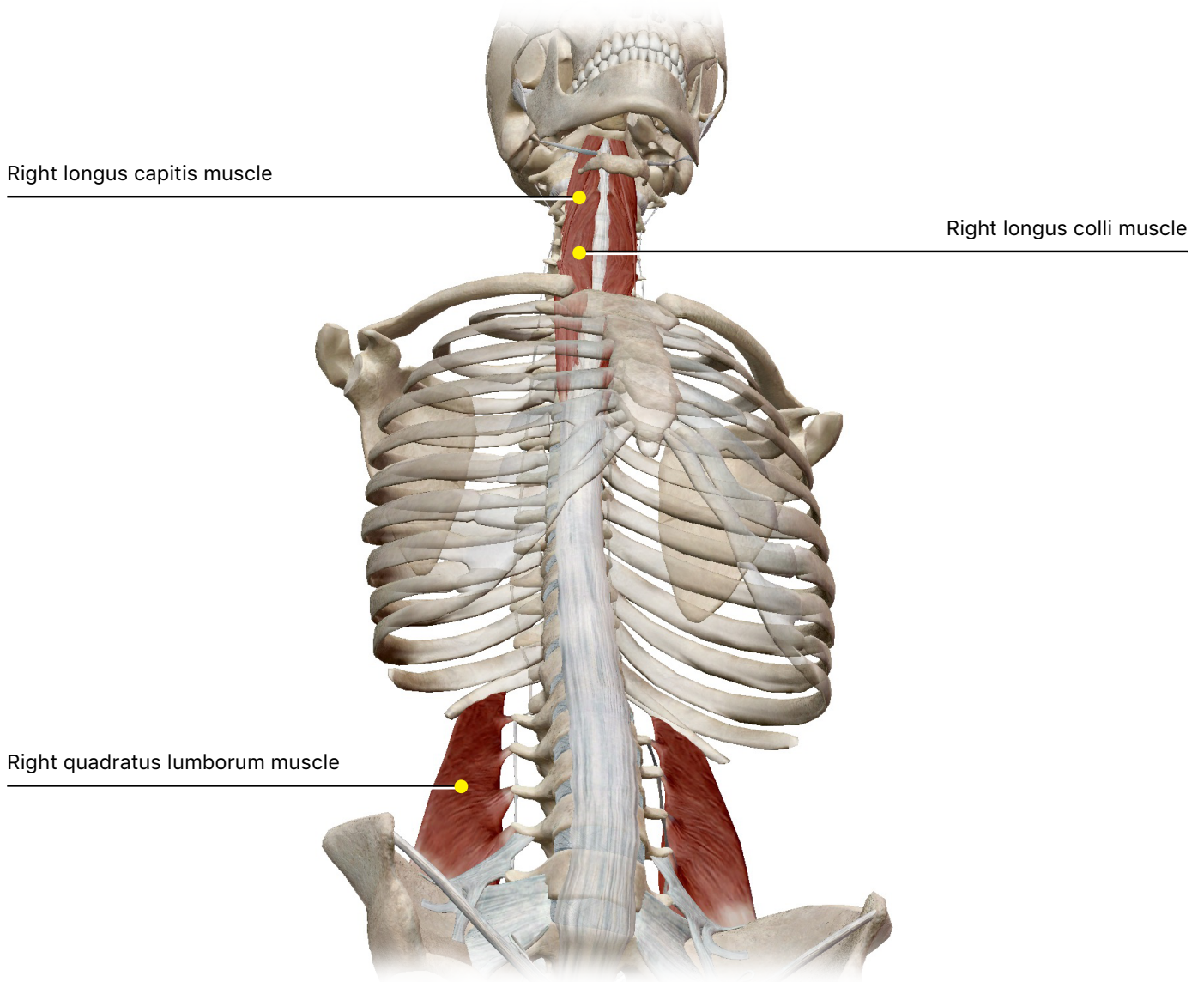
16.20, 16.21, 16.22



16.23



16.25



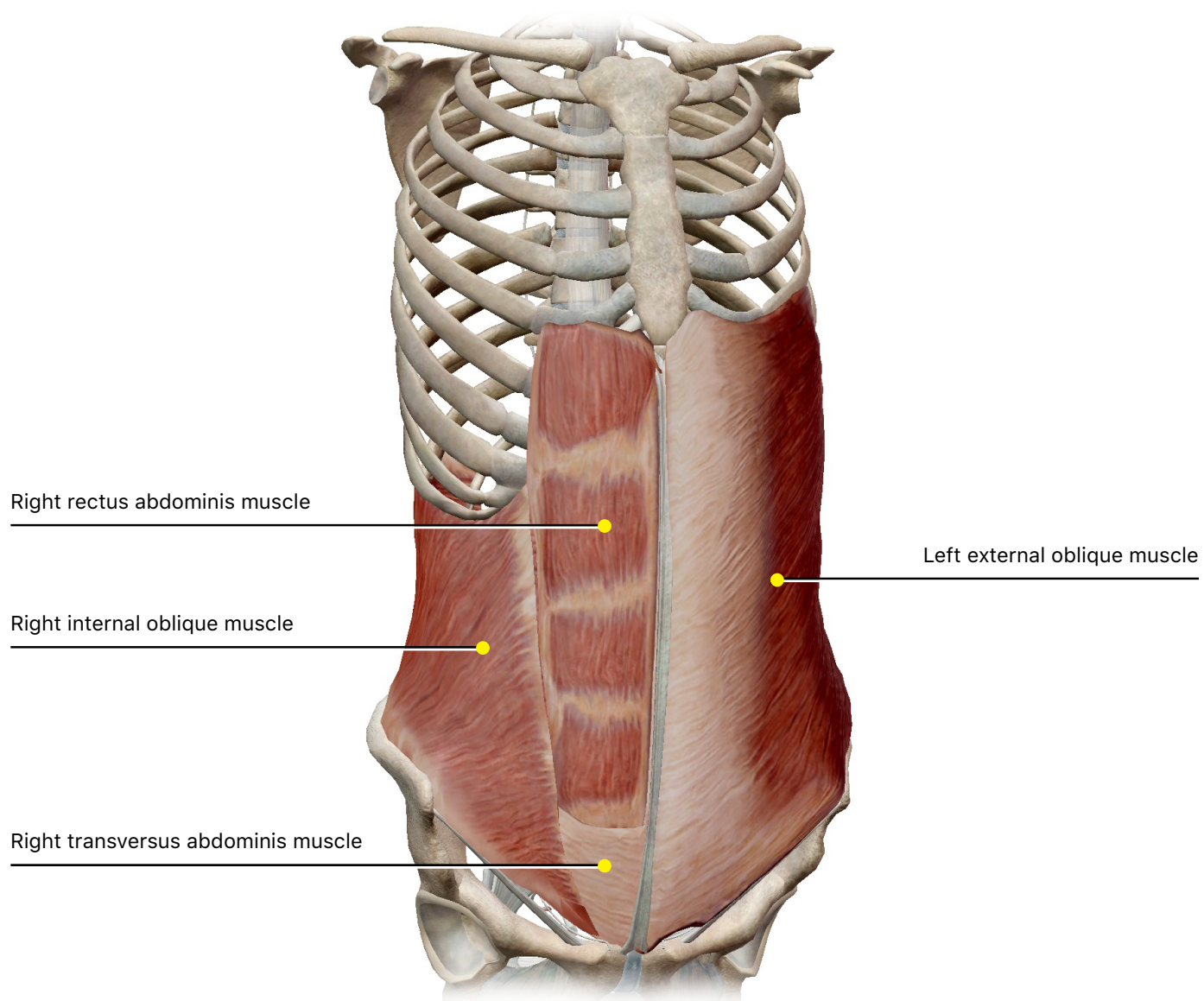
All of these muscles are found deep to other back or neck muscles and provide for movement of the back and/or neck. The transversospinales group, composed of the semispinalis, multifidus, and rotatores muscles, are so named because of their position between the transverse and spinous processes of the vertebrae.

Deep Vertebral Column Muscles				
Muscle	Origin	Insertion	Action	Innervation
Semispinalis				
Multifidus				
Rotatores				
Interspinales				
Intertransversarii				
Scalenes				
Longus capitis				
Longus colli				
Quadratus lumborum				



F. Abdomen

View 16.26 Abdomen.



The abdominal wall is composed of four muscles, the fibers of which run in different directions. These muscle layers protect the underlying organs, assist in forced respirations, and cause rotation of the trunk when contracted unilaterally.

Abdomen				
Muscle	Origin	Insertion	Action	Innervation
Rectus abdominis				
External oblique				
Internal oblique				
Transversus abdominis				

Putting It All Together

1. Based on what you've learned about the muscles in this exercise, what do you think the following terms mean?

a. External -

b. Internal -

c. Oblique -

d. Rectus -

e. Capitis -

f. Spinalis -

2. Which muscles are used when performing the following actions?

a. Rowing a boat

i.

ii.

iii.

iv.

v.

vi

b. Standing erect

i.

ii.

iii.

iv.



c. Twisting your torso (as when swinging a baseball bat)

- i.
- ii.

d. Taking a bow after a performance

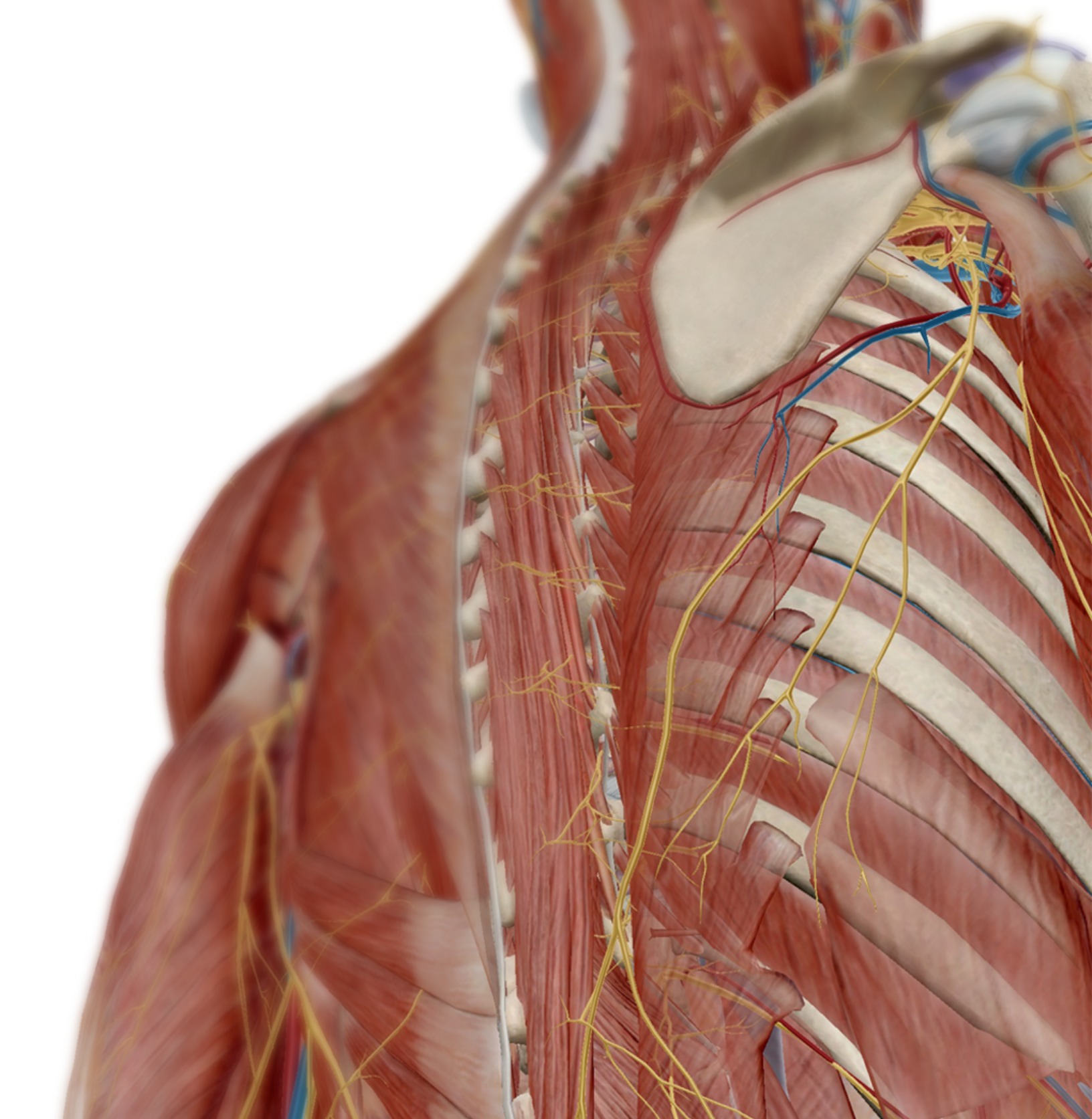
- i.
- ii.
- iii.
- iv.

e. Inhaling deeply

- i.
- ii.
- iii.
- iv.
- v.
- vi.

3. Sometimes acid that regurgitates from the stomach can irritate the phrenic nerve, causing it to fire spontaneously. What effect do you think this would have?



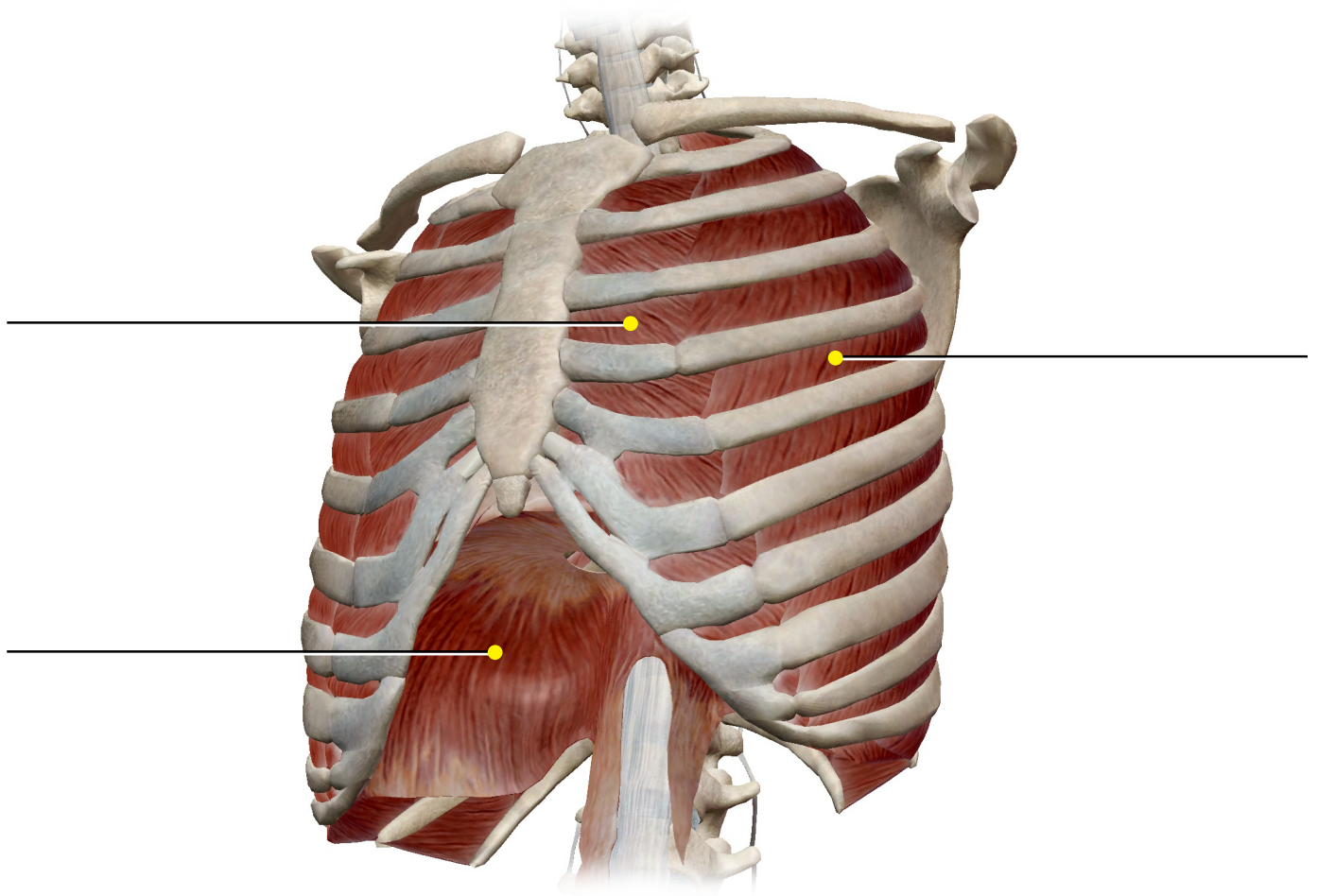


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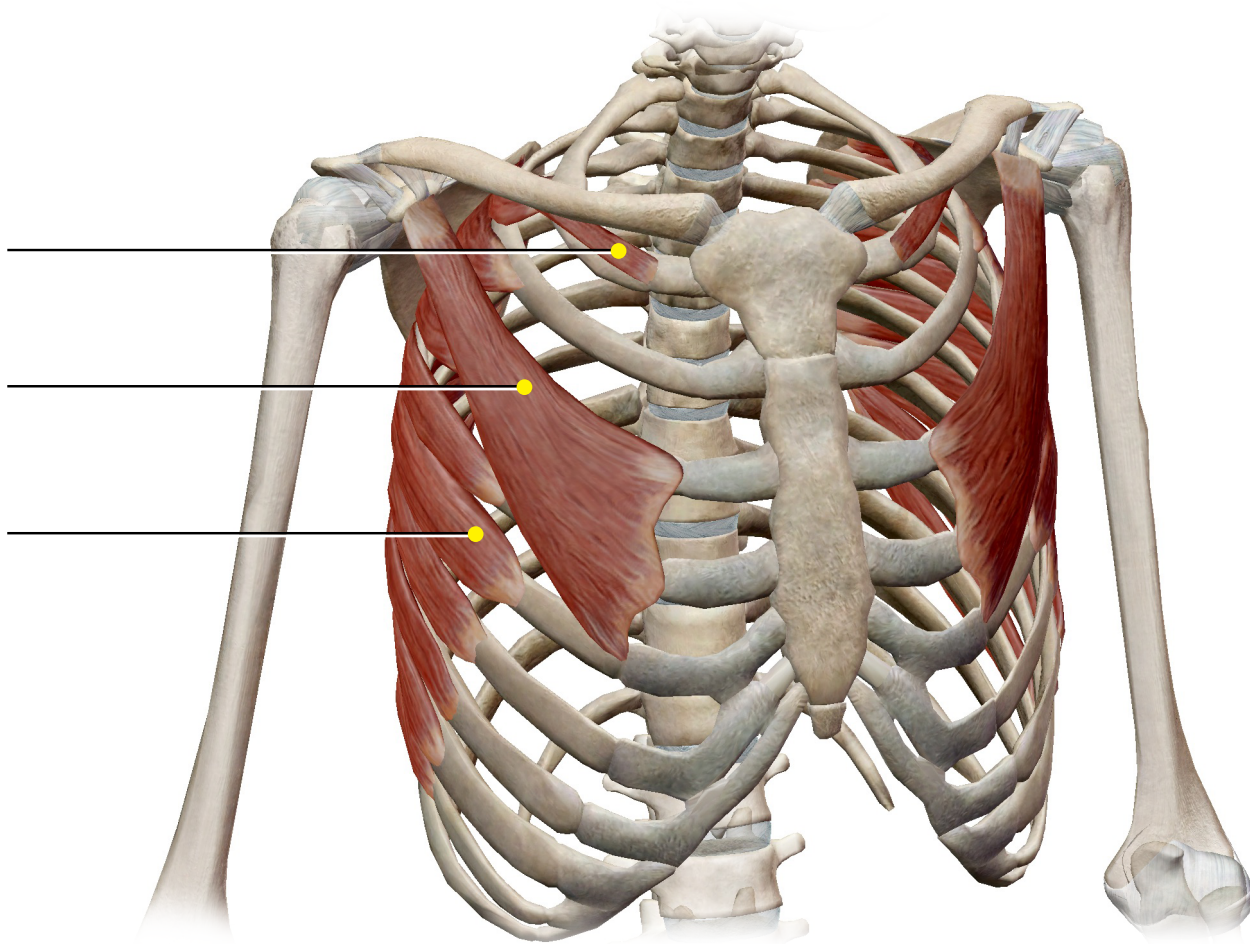
Student Practice

Label all the structures on the following images.

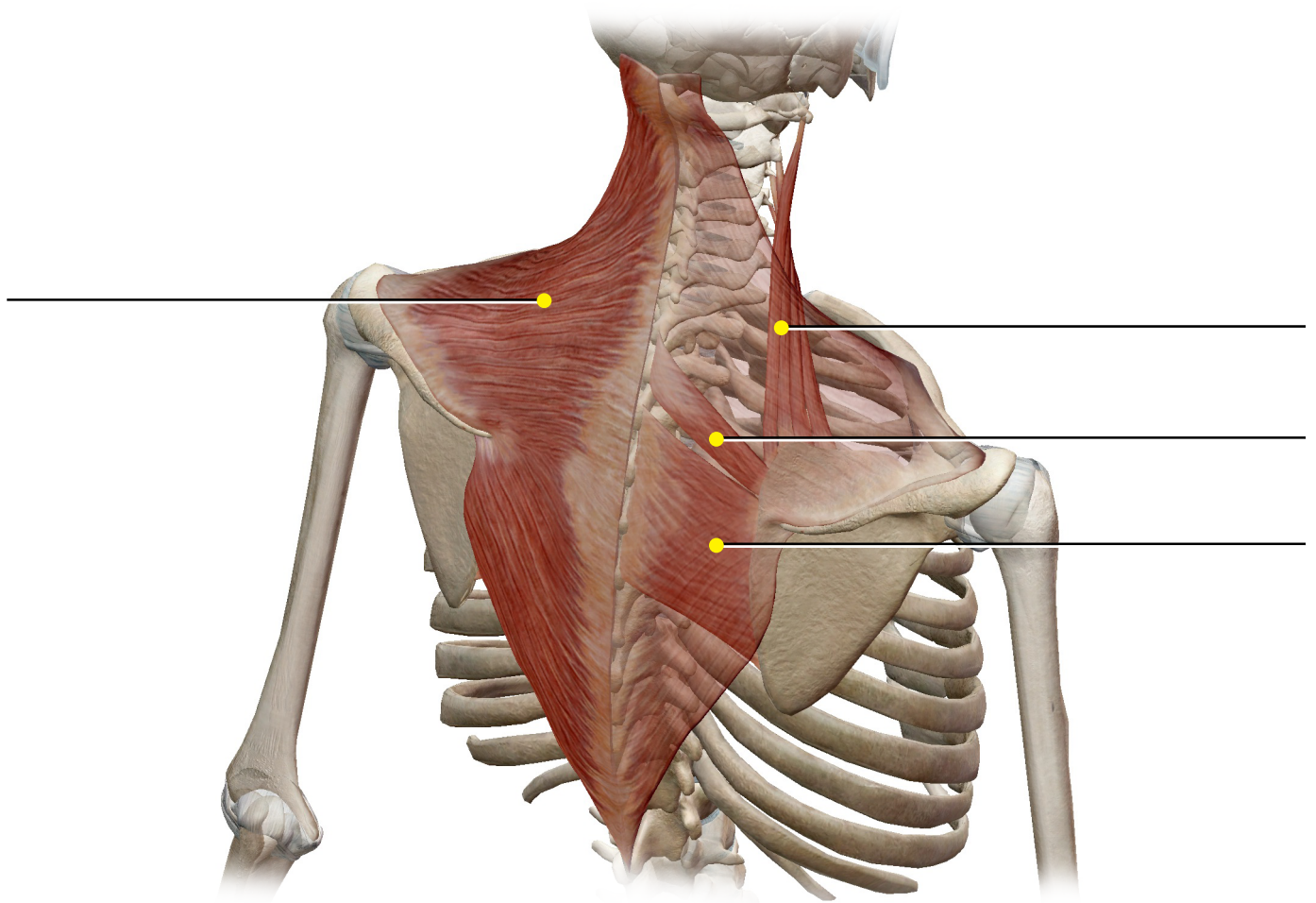
16.30 Thorax: Breathing



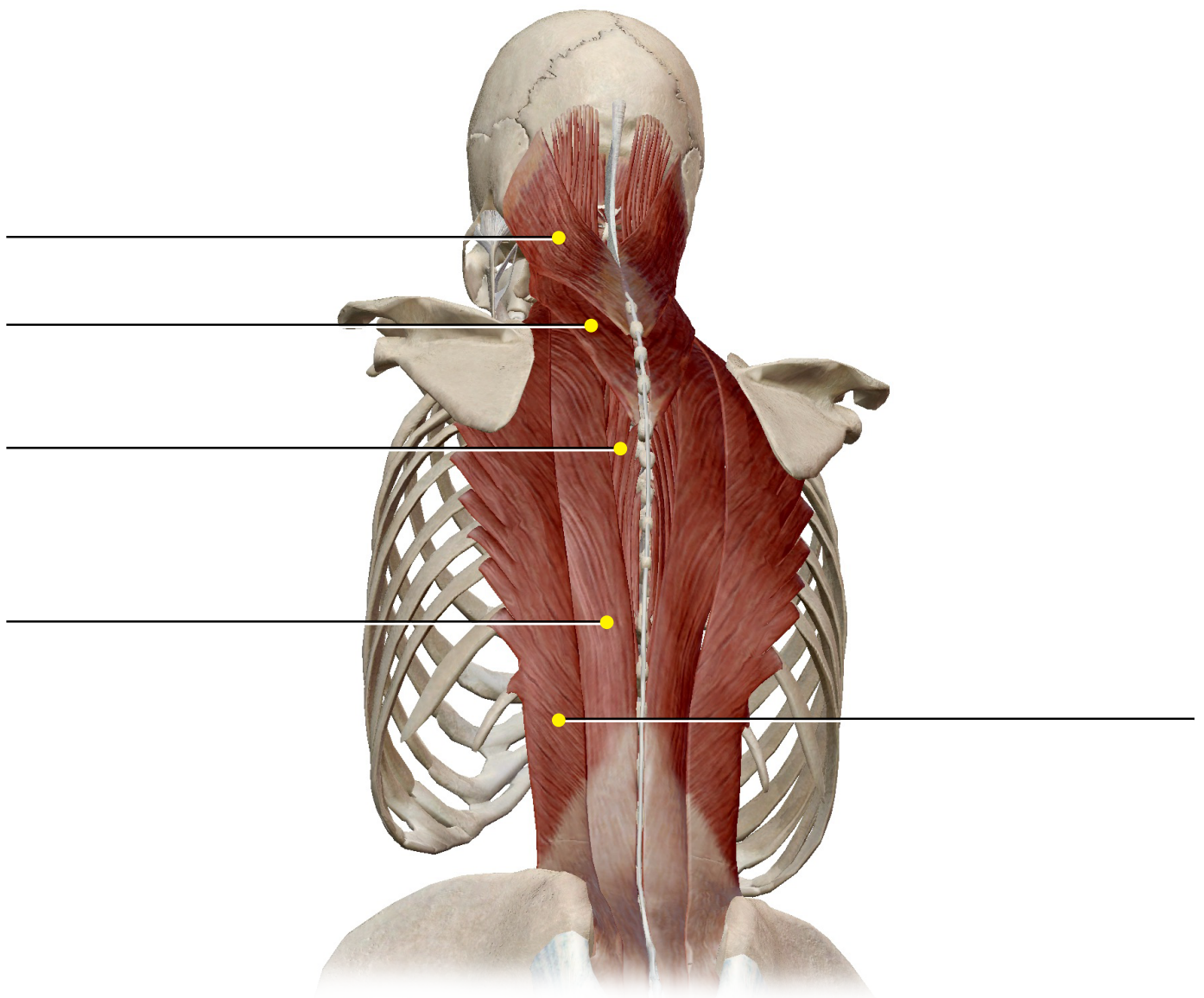
16.31 Thorax: Shoulder Girdle Movements, Anterior



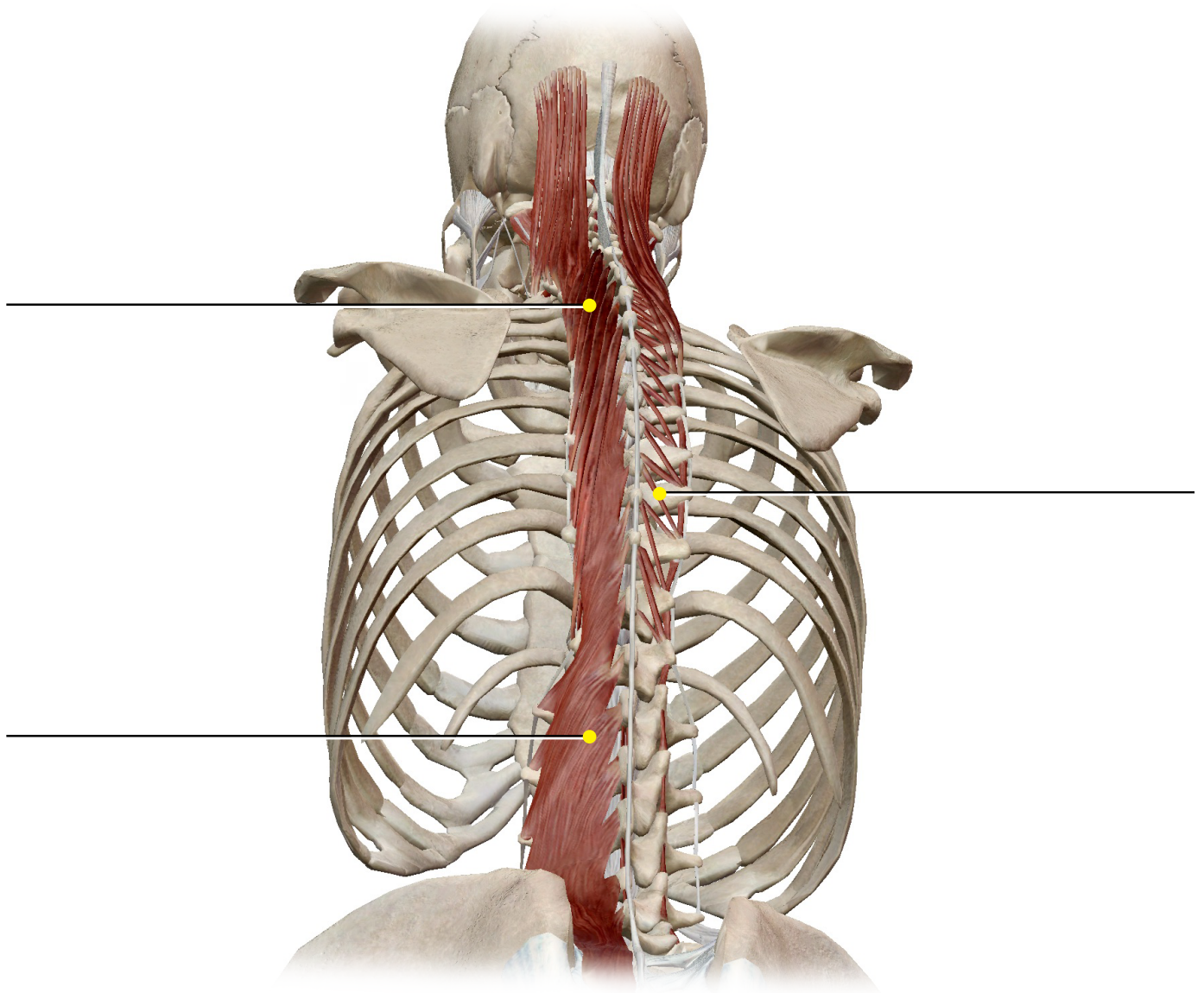
16.32 Thorax: Shoulder Girdle Movements, Posterior



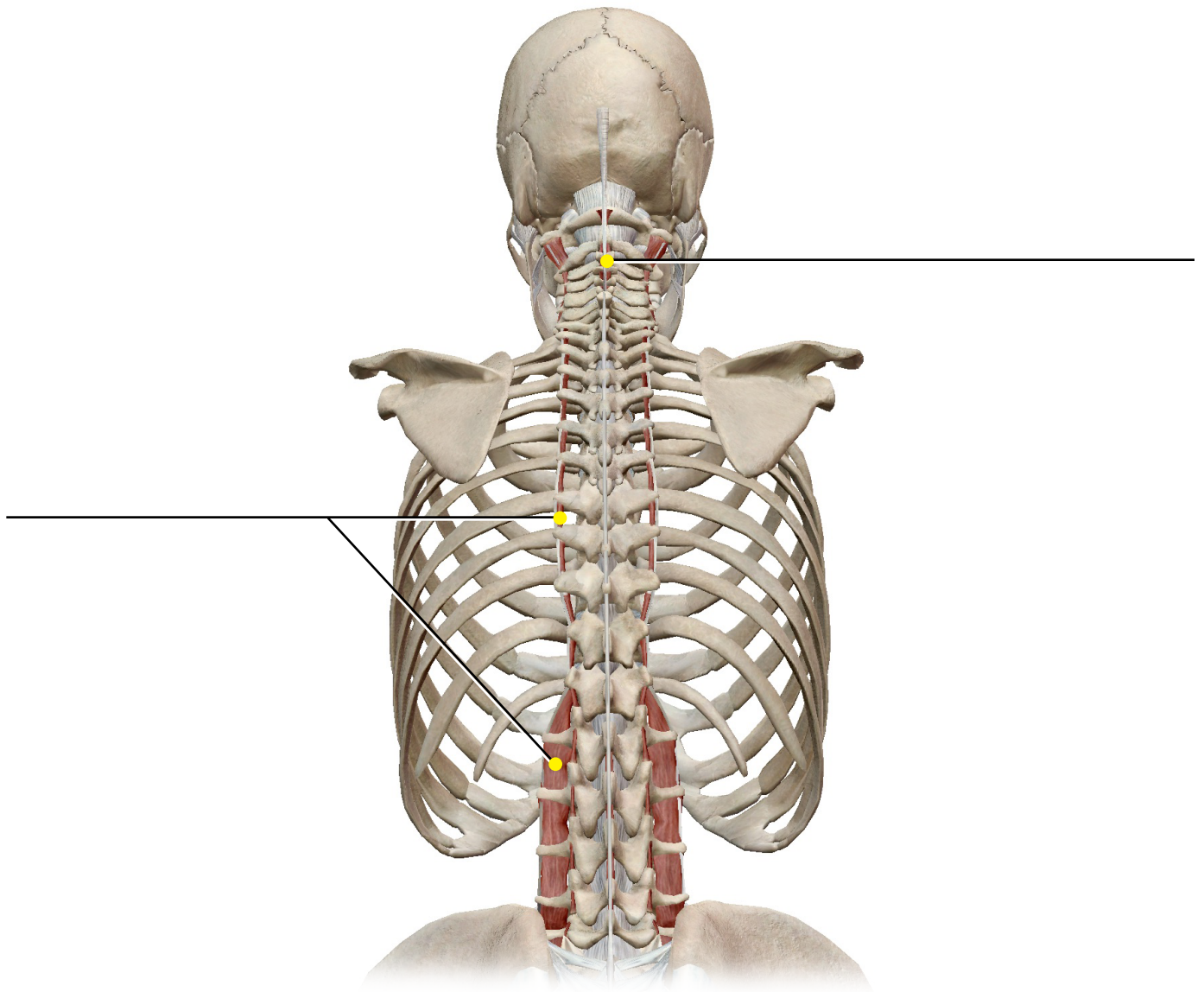
16.15, 16.17, 16.18, and 16.19



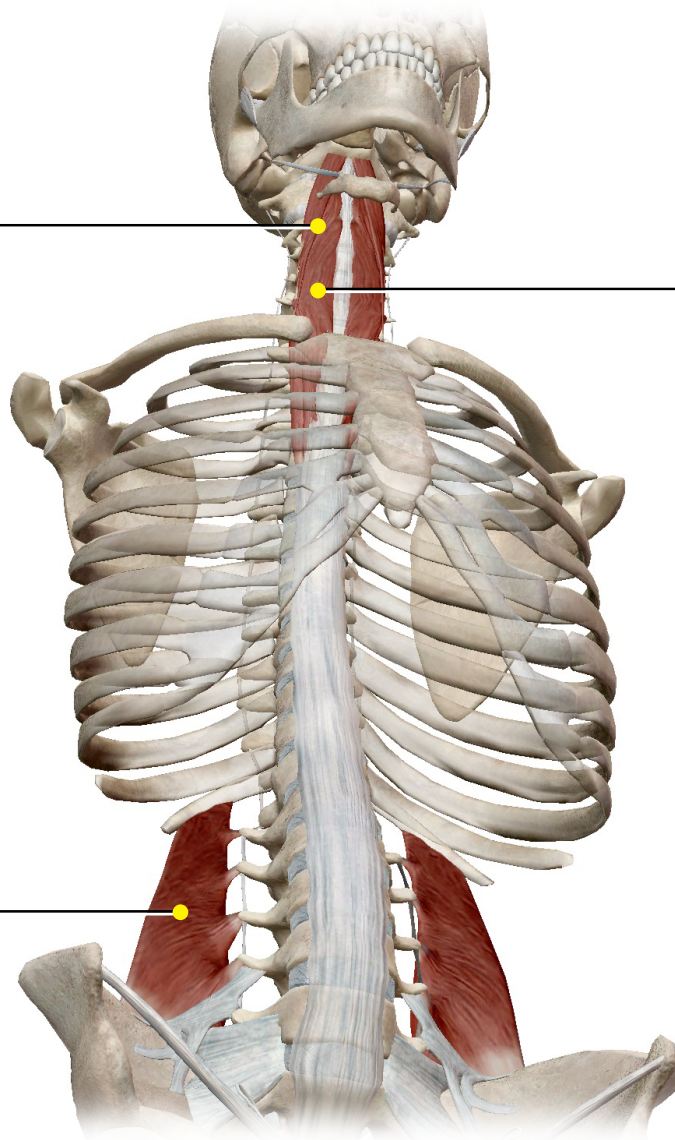
16.20, 16.21, and 16.22



16.23 Vertebral Column: Segmental



16.25 Vertebral Column: Spinal Flexors



16.26 Abdomen

