

VISIBLE  BODY®

The Muscular System: Torso and Abdomen

A muscular system lab activity using Visible Body Suite

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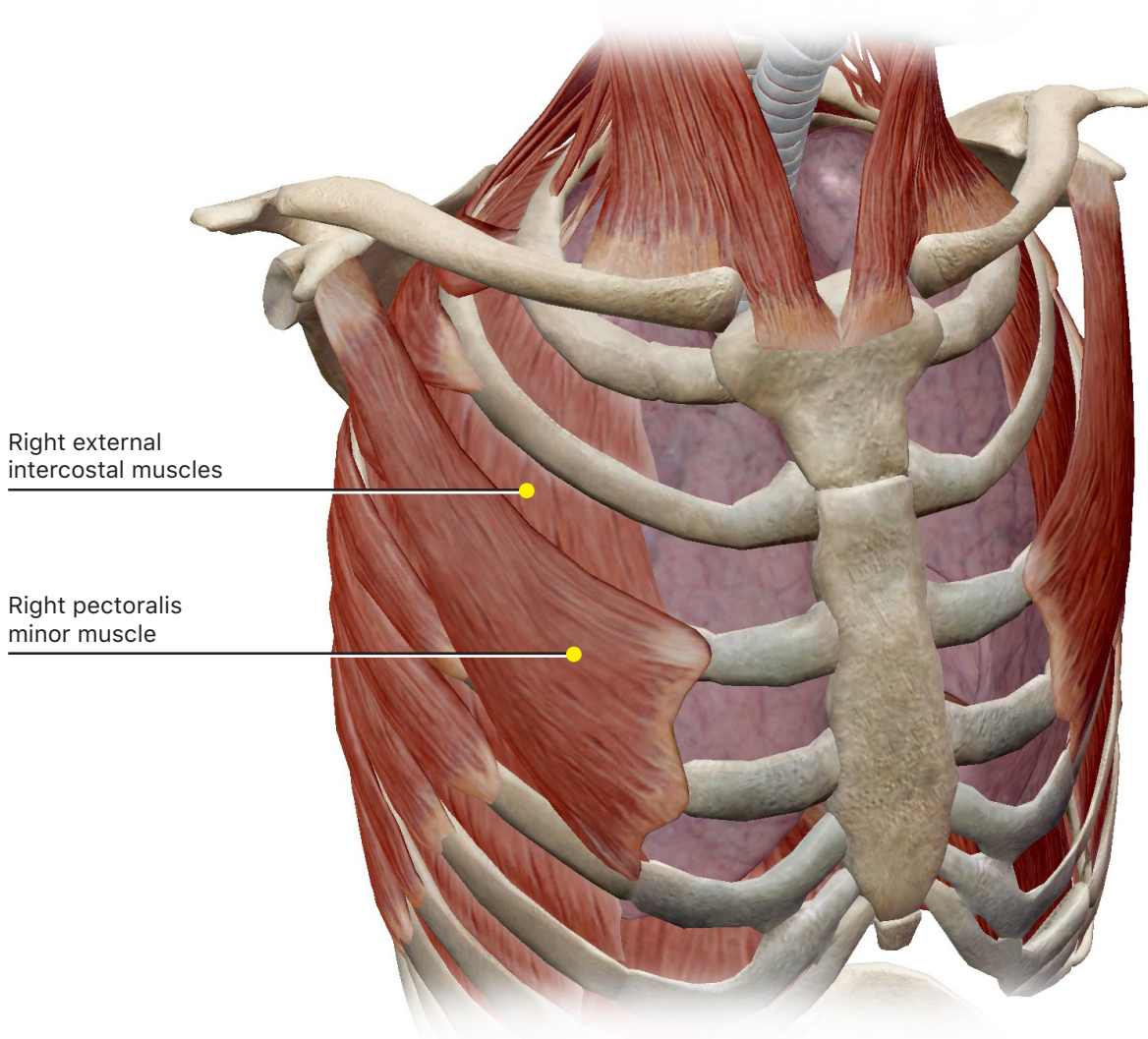
PRE-LAB EXERCISES

Before coming to lab, get familiar with a few muscle groups we'll be exploring during lab. Open Visible Body Suite. Search for and select the Muscular System View "Inhalation" and find the following muscles. When you select a muscle, you can use the book icon in the content box to read the muscle's definition.

1. External intercostals
2. Pectoralis minor

Define the following terms:

1. Flexion
2. Extension
3. Elevation
4. Depression



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 specimen 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 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, and 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.

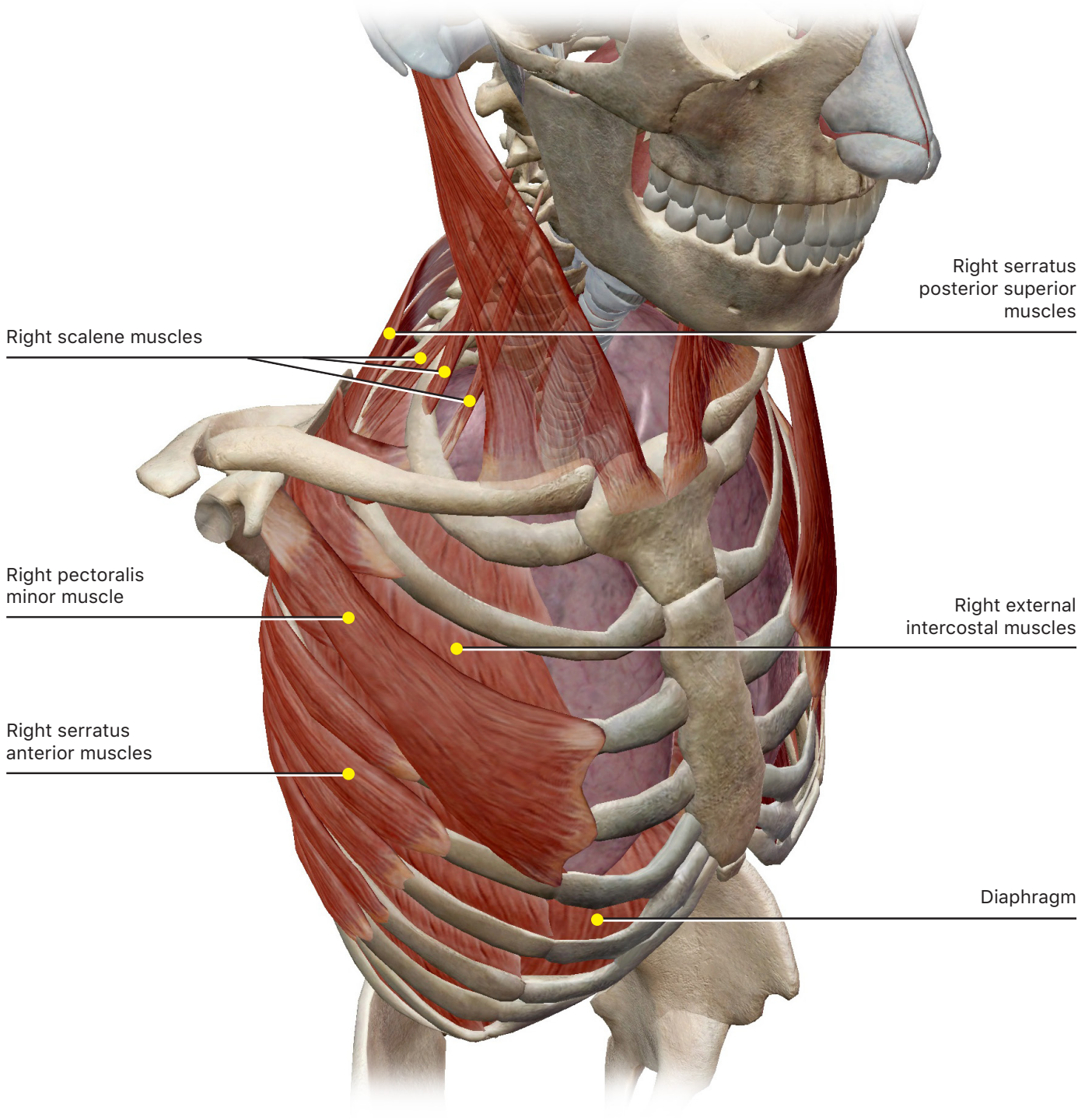
Access 3D views and animated muscle actions in Visible Body Suite, which will be especially helpful to visualize muscle actions. When you select a structure in Visible Body Suite, you’ll see options to read the definition and hear the pronunciation in the content box. When you select a muscle, be sure to select the blue pin icon in the content box. This will give you the option to view origins and insertions as visible pins on the muscle (select Attachments), view the blood supply, and/or the nerve supply.

In the modules below, identify the following:

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

A. Inspiratory Muscles

Search for and open the Muscular System View "Inhalation" and the Muscle Action "Ribs elevation."



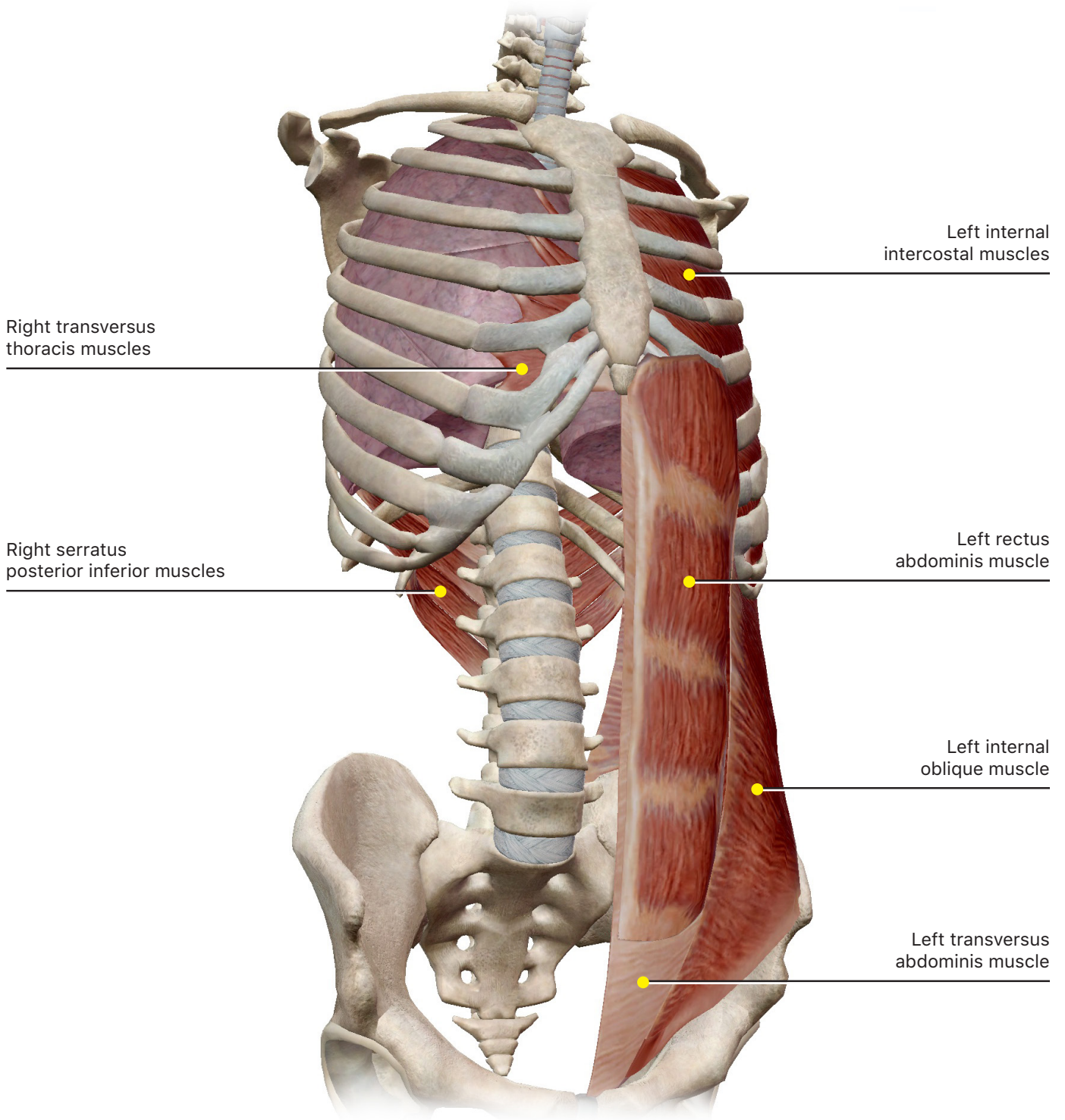
These muscles are responsible for inspiration during pulmonary ventilation. Although the diaphragm and, to a lesser extent, the external intercostals are primarily responsible for inspiration, additional accessory respiratory muscles can contract to assist in a more forceful inspiration.

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.

Inspiratory Muscles				
Muscle	Origin	Insertion	Action	Innervation
Diaphragm				
External intercostal				
Pectoralis minor				
Serratus anterior				
Serratus posterior superior				
Scalenes				

B. Expiratory Muscles

Search for and open the Muscular System View "Exhalation" and the Muscle Action "Ribs depression."



These muscles are responsible for expiration during pulmonary ventilation. In a normal, quiet exhalation, the relaxation of the diaphragm and external intercostals are responsible for air departing the lungs. However, accessory respiratory muscles may be used in a more forceful exhalation.

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 since they run in opposite directions.

Expiratory Muscles				
Muscle	Origin	Insertion	Action	Innervation
Internal intercostal				
Transversus thoracis				
Serratus posterior inferior				
Rectus abdominis				
Internal oblique				
Transversus abdominis				

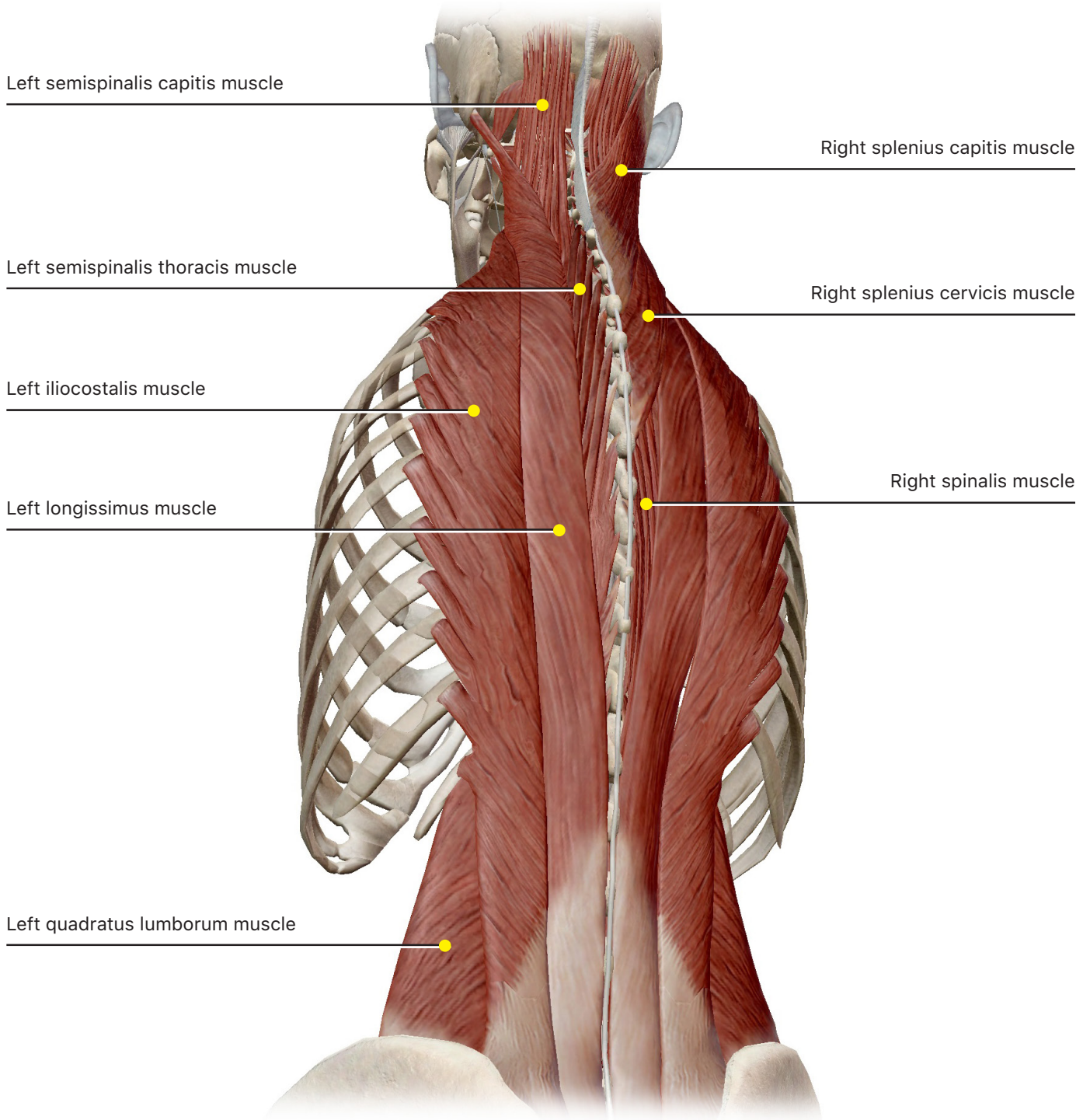
TIME TO PRACTICE!
SEARCH FOR AND TAKE THE FOLLOWING MUSCULAR SYSTEM QUIZ:
INTERCOSTALS

C. Back Muscles

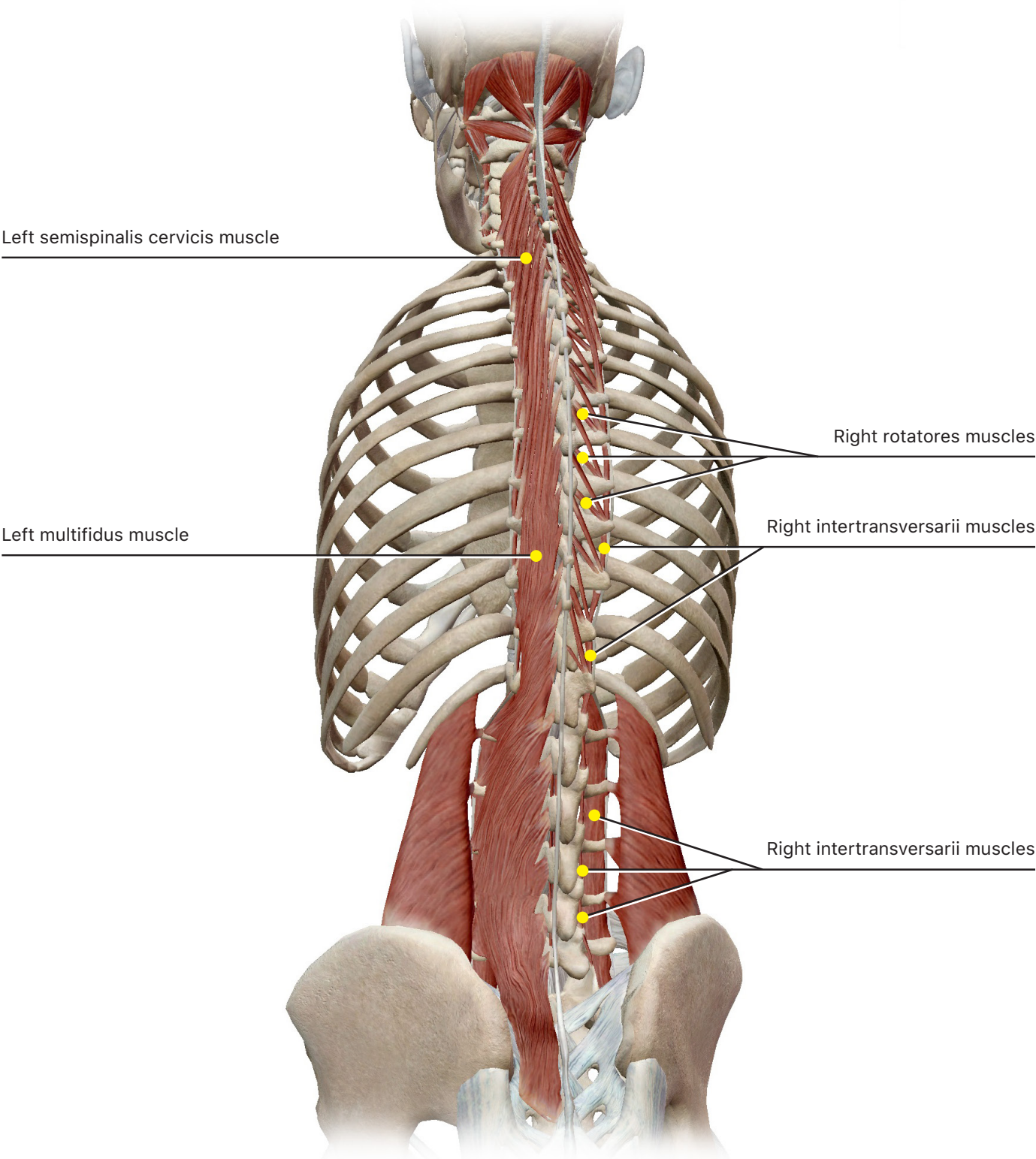
Search for and open the following Muscular System Views and Muscle Actions.

Muscular System Views: Upper Back and Lower Back

Muscle Actions: Spine flexion, Spine extension, Spine lateral flexion, and Spine rotation



Muscular System View "Lower Back"



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 lie parallel to the spine and extend the back. The transversospinales group, composed of the semispinalis, multifidus, and rotatores muscles, are so named because of their position between the transverse and spinous processes on the vertebrae.

Some of these muscles are deep to other muscles listed, so be sure to use the Hide function on the superficial muscles on one side of each of the views to reveal the deeper muscles.

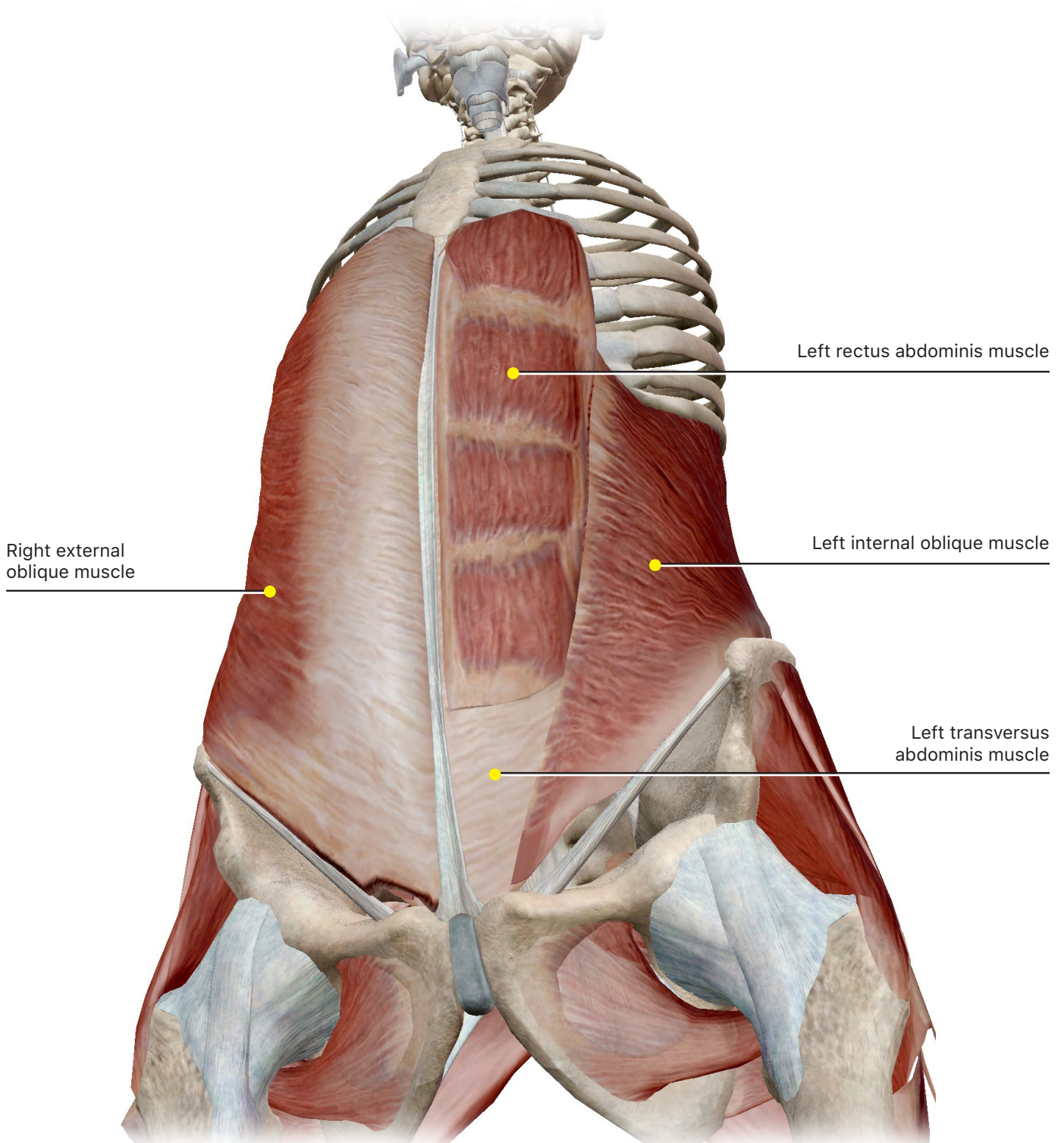
Back Muscles				
Muscle	Origin	Insertion	Action	Innervation
Splenius capitis				
Splenius cervicis				
Semispinalis capitis				
Semispinalis cervicis				
Semispinalis thoracis				
Spinalis				
Longissimus				

Back Muscles (continued)				
Muscle	Origin	Insertion	Action	Innervation
Iliocostalis				
Multifidus				
Rotatores				
Interspinales				
Intertransversarii				
Quadratus lumborum				

[TIME TO PRACTICE!](#)
[SEARCH FOR AND TAKE THE FOLLOWING MUSCULAR SYSTEM QUIZ:](#)
[POSTERIOR THORAX](#)

D. Abdomen

Search for and open the Muscular System View "Abdomen," the Cross Section "Abdomen (L02-L03)," and the Muscle Action "Spine rotation."

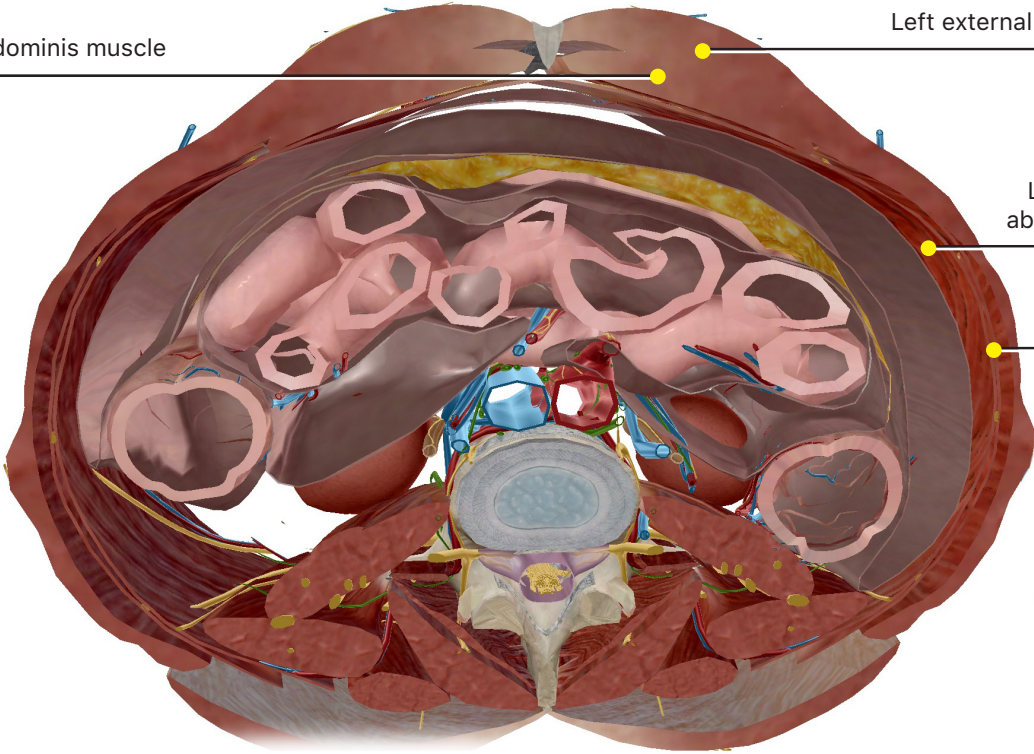


Left rectus abdominis muscle

Left external oblique muscle

Left transversus abdominis muscle

Left internal oblique muscle



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

When viewing the cross section, note how the abdominal muscles overlap each other, especially on the anterior side.

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

[TIME TO PRACTICE!](#)
[SEARCH FOR AND TAKE THE FOLLOWING MUSCULAR SYSTEM QUIZ:](#)
[ABDOMEN](#)

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

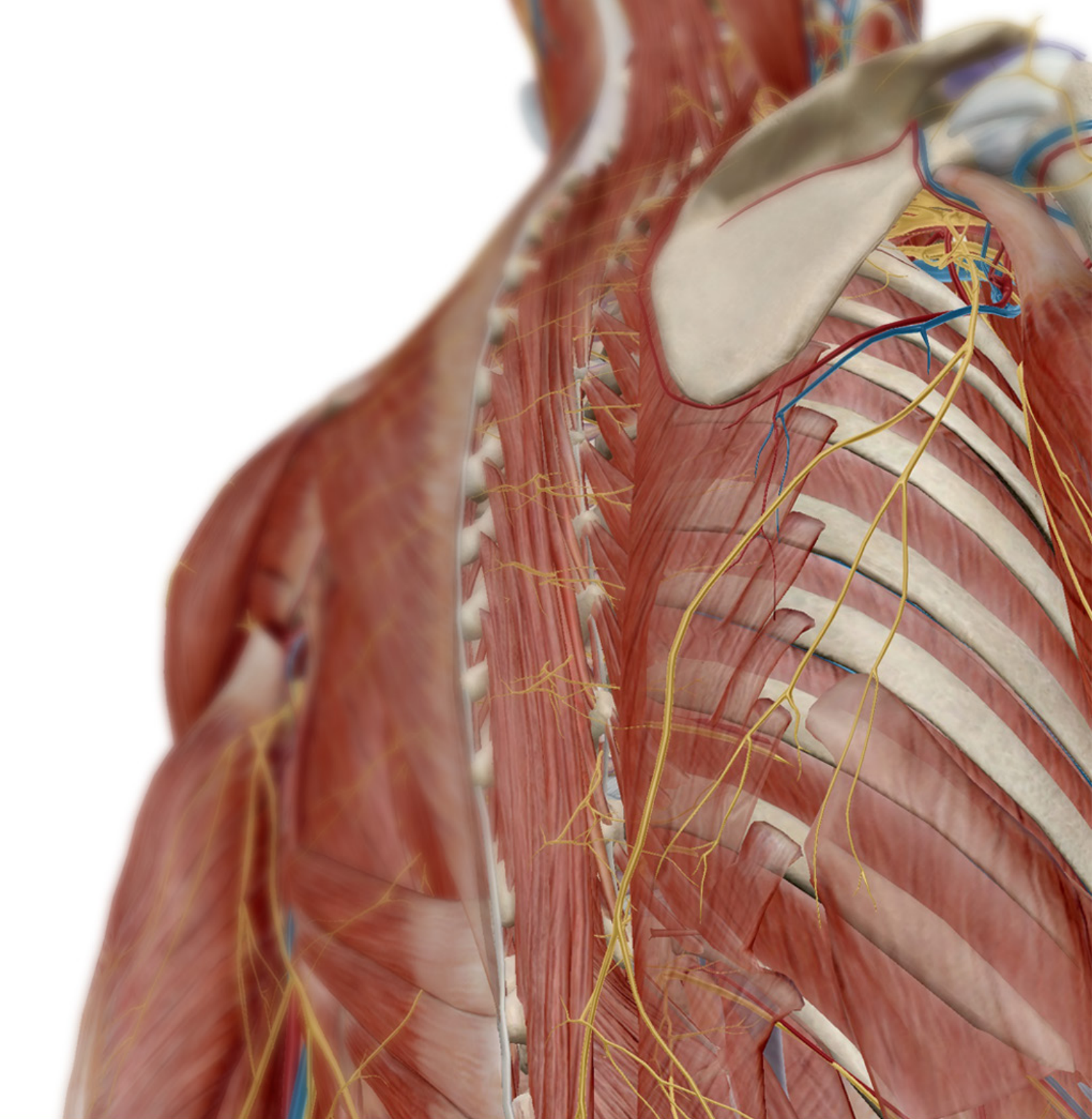
b. Standing erect

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

d. Taking a bow after a performance

e. Inhaling deeply

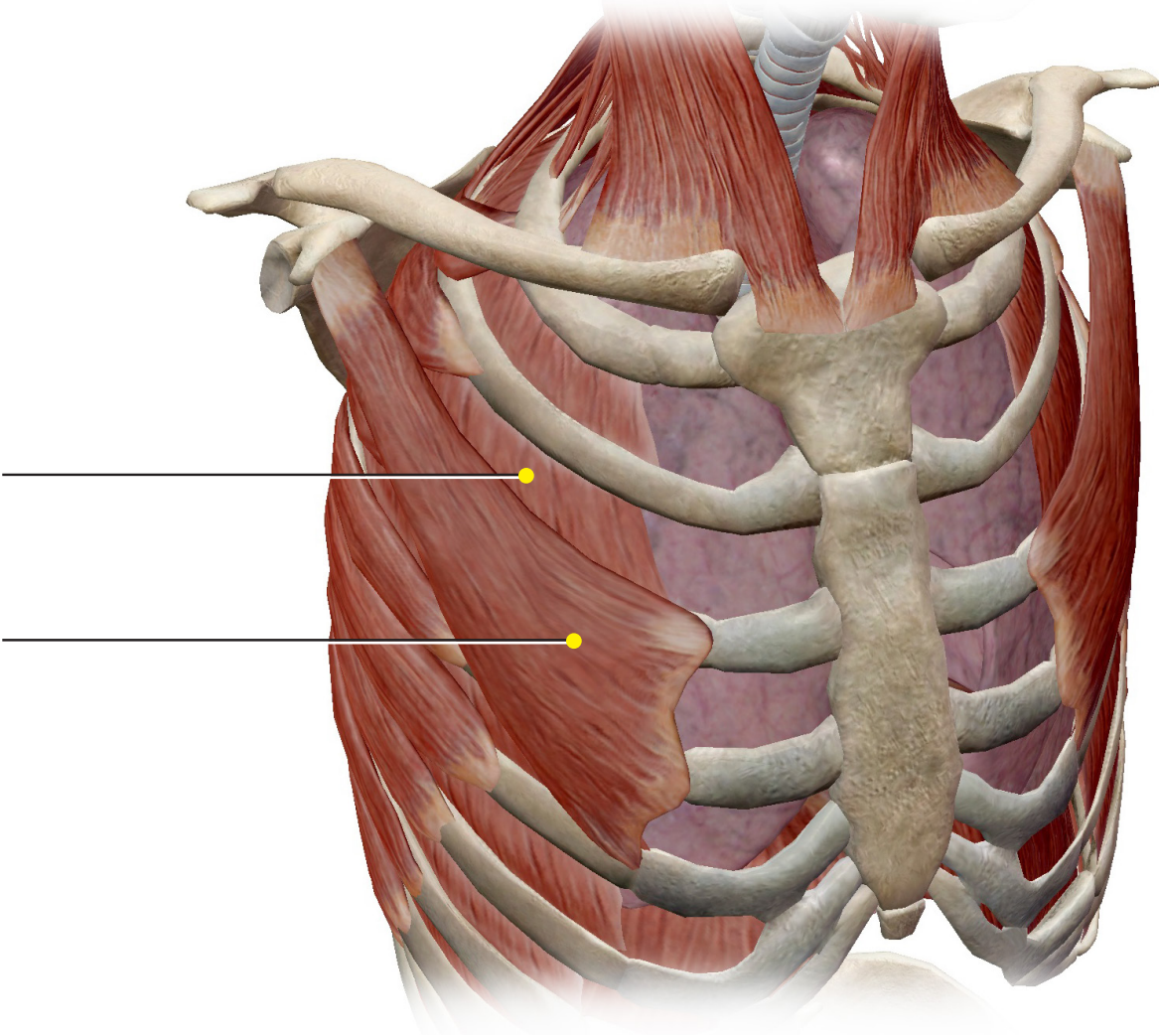
3. Sometimes acid that regurgitates from the stomach can irritate the phrenic nerve, causing it to fire spontaneously. What effect do you think this would have?



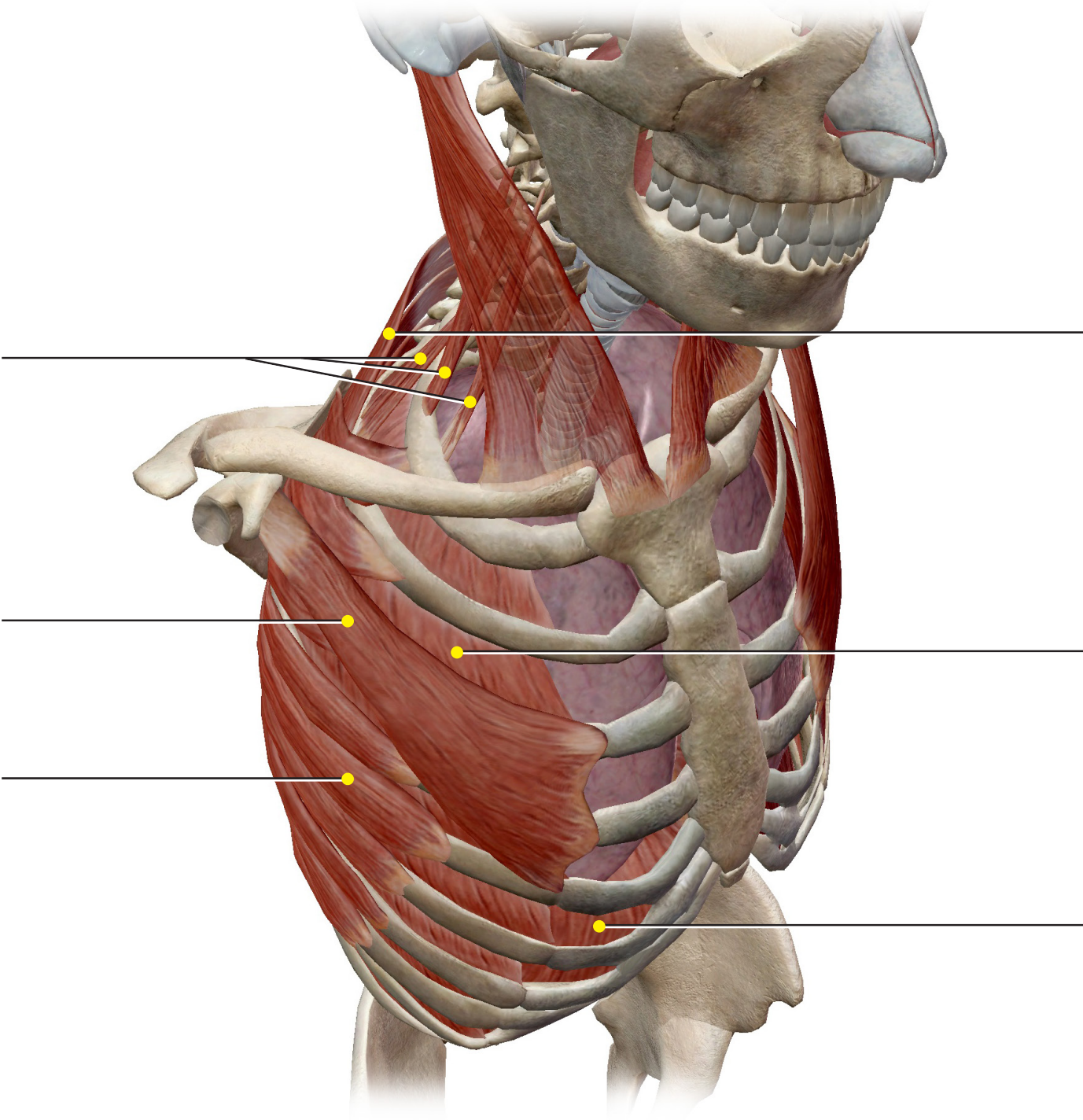
Student Practice

Label all the structures on the following images:

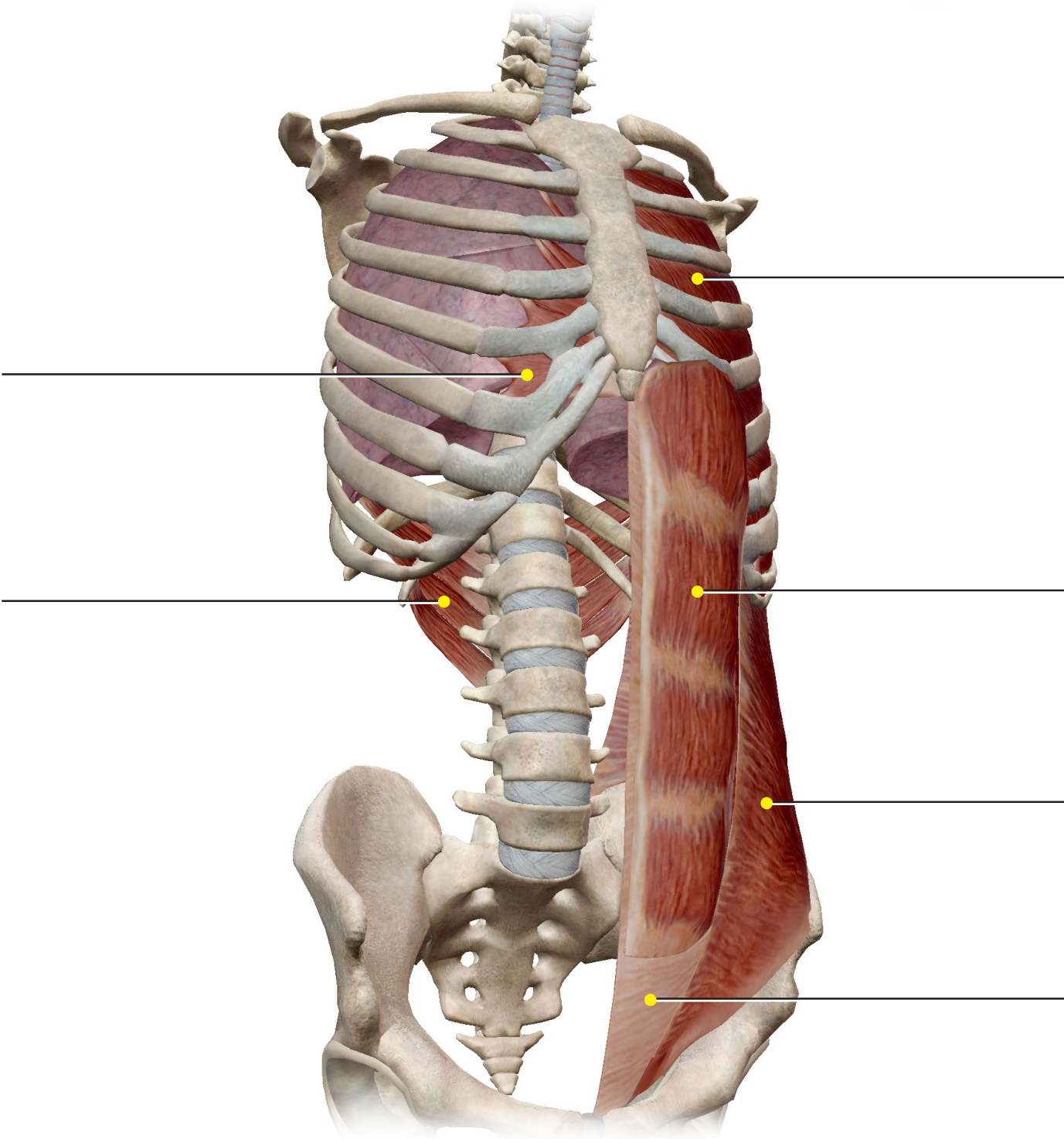
Muscular System View "Inhalation"



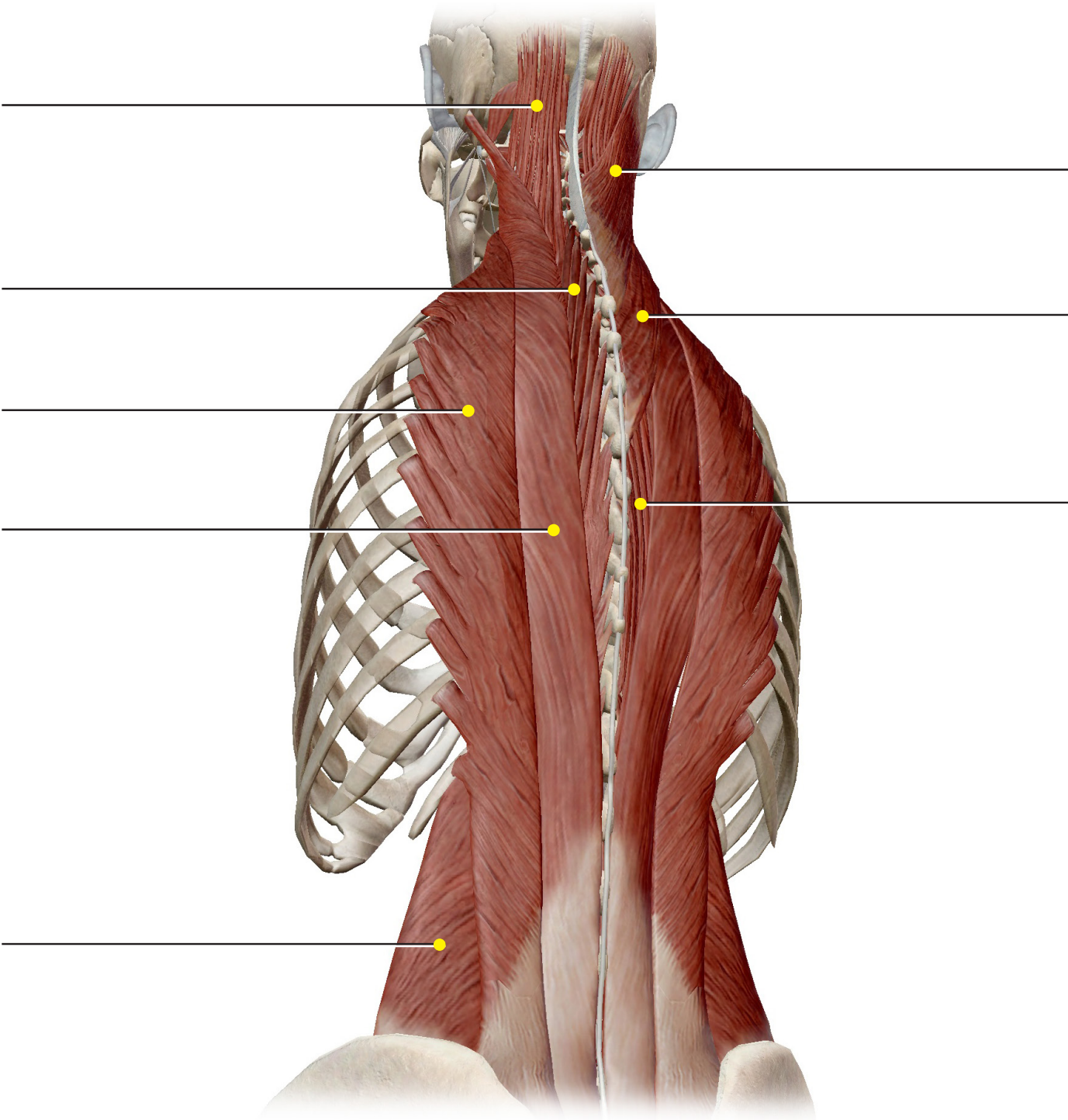
Muscular System View "Inhalation"



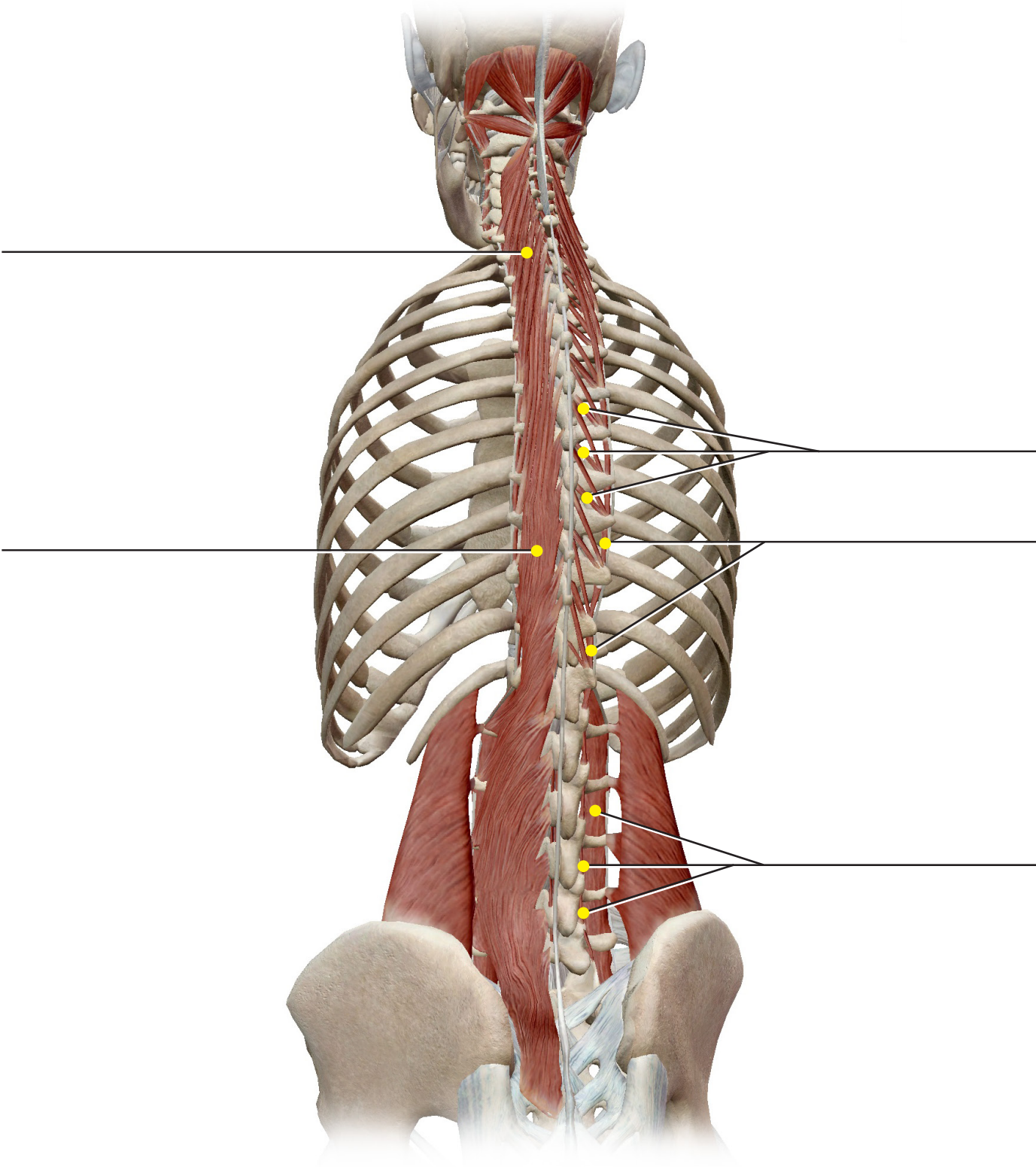
Muscular System View "Exhalation"



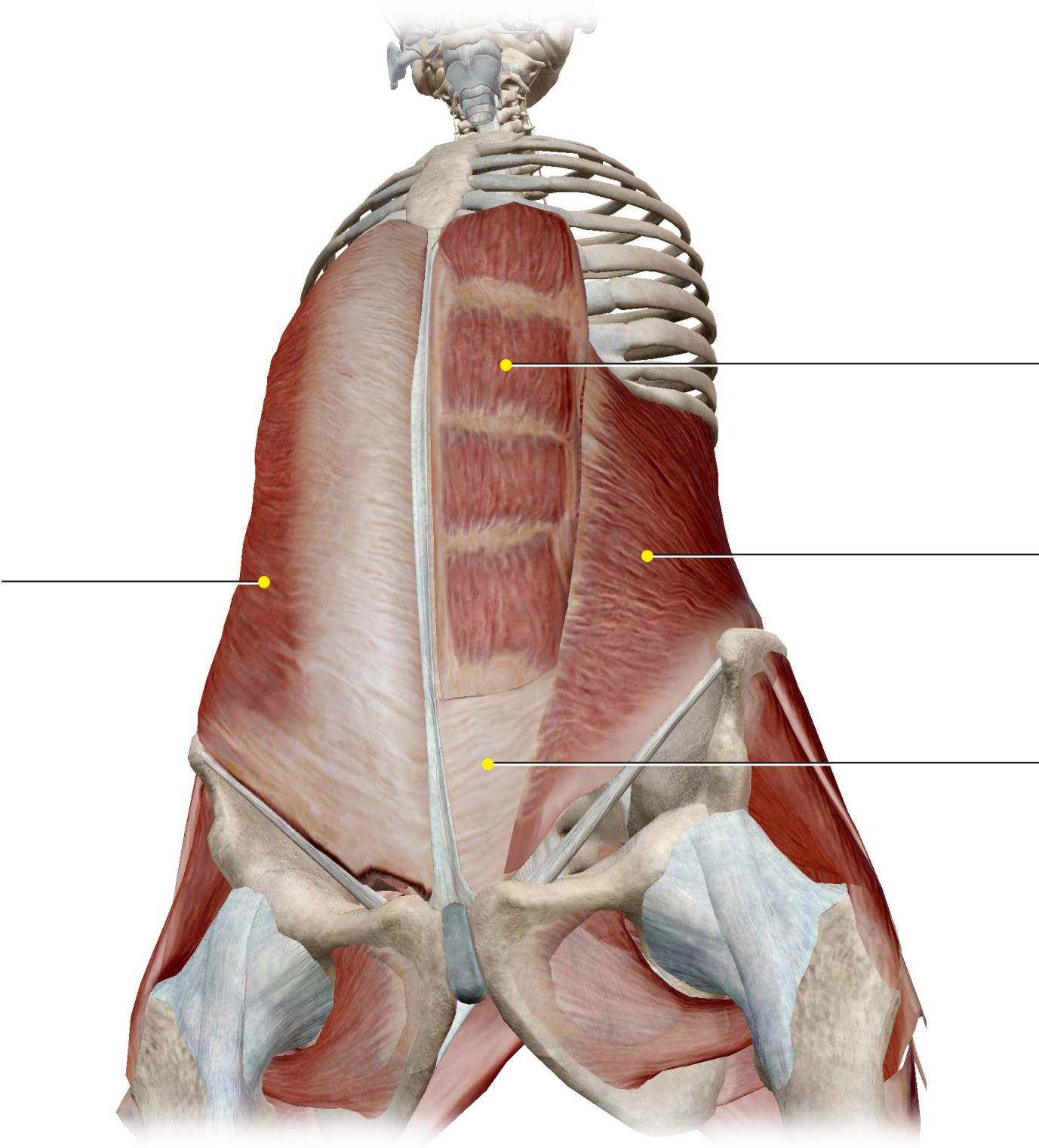
Muscular System View "Upper Back"



Muscular System View "Lower Back"



Muscular System View "Abdomen"



Source: Cross Section "Abdomen (L02-L03)"

