

Physiotherapy

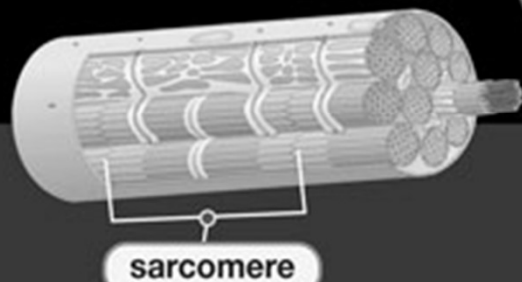
Unit 6 – Muscles

Muscles:

Structure and Activity



flex

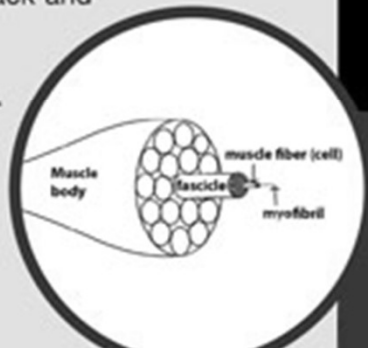


stretch

Muscles are essential to physical functions. To understand these functions, one needs to understand their structure.

Muscles consist of soft connective tissue. They also consist of **muscle fibers**, or muscle cells. A bundle of fibers is a **fascicle**. A **myofibril** is a unit of muscle fiber. Each fiber contains proteins. **Sarcomeres** are other units of muscle. Each sarcomere contains long, fibrous proteins. Under a microscope, sarcomeres appear as light and dark bands. These bands slide back and forth as muscles **contract**.

Muscles contract during physical movement. This occurs each time we **stretch** or **flex**. **Elastic** muscle fibers elongate or **shorten** during these contractions. After they relax, they resume their original position.



Please discuss with your neighbour the following question:

What is the structure of a muscle?

1 What is the structure of a muscle?

A muscle consists of soft connective tissue.

It is also made up of long, tubular proteins.

These tubular proteins are called muscle fibers, or muscle cells.

Please discuss with your neighbour the following question:

What is the function of muscles?

2 What is the function of muscles?

Muscles have several functions:

The most important function is to help the human body move.

Muscles contract to produce movement.

They also stretch and flex.

Fascicle is a bundle of muscle

Fascicle is a bundle of muscle fibers.

Myofibril is a muscle fiber containing

Myofibril is a muscle fiber containing proteins.

Sarcomere: Long, proteins that slide back and forth. Appear as light or dark under a microscope.

Sarcomere: Long, fibrous proteins that slide back and forth. Appear as light or dark bands under a microscope.

Write a word or phrase that is similar in meaning to the underlined part:

1 After working out, Craig suffered from cramps in his soft, contracting tissues.
(_ _ s _ _ _)

2 Ava examined a slide of long proteins that slide past each other under a microscope.
(_ a _ _ _ _ e _ _)

3 Actin, myosin, and titin are some of the proteins in a(n) rod-like unit of a muscle cell.
(_ _ o _ _ _ _ i _)

4 Bundles of muscle fiber help to transmit electrical signals in the heart.
(_ a _ _ _ _ _ s)

5 Elongated, tubular cells help form skeletal and cardiac muscles.
(_ _ _ _ e) (_ i _ _ _ s)

1 After working out, Craig suffered from cramps in his soft, contracting tissues.
(muscle)

2 Ava examined a slide of long proteins that slide past each other under a microscope.
(sarcomeres)

3 Actin, myosin, and titin are some of the proteins in a rod-like unit of a muscle cell.
(myofibril)

4 Bundles of muscle fiber help to transmit electrical signals in the heart.
(Fascicles)

5 Elongated, tubular cells help form skeletal and cardiac muscles.
(Muscle fibers)

Fill in the blanks with the correct words from the word bank.



shorten

flex

elastic

stretch

contract

- 1 Muscles in order to produce movement in limbs.
- 2 After exercising, I to avoid cramping up.
- 3 Madeleine asked Steve to his arms so that she could see his biceps.
- 4 Muscle tissue is due to its ability to change size and shape.
- 5 Sarcomeres by one-third when actin and myosin slide past each other.

- 1 Muscles **contract** in order to produce movement in limbs.
- 2 After exercising, I **stretch** to avoid cramping up.
- 3 Madeleine asked Steve to **flex** his arms so that she could see his biceps.
- 4 Muscle tissue is **elastic** due to its ability to change size and shape.
- 5 Sarcomeres **shorten** by one-third when actin and myosin slide past each other.

Listen to a conversation between two students.
Mark the following statements as *True* or *False*.



1 Muscles are made of connective tissue and muscle fibers. **True**

2 Sarcomeres appear as light and dark bands under a microscope. **True**

3 A myofibril is a bundle of muscle fibers. **False**

- a unit of muscle fibers that contain long proteins

Listen again and complete the conversation

Student 1: Let's review **1)** , shall we?

Student 2: Sure. Why don't you just quiz me? I think that'll move things along more quickly.

Student 1: Okay. First, what do muscles consist of?

Student 2: **2)** and muscle fibers.

Student 1: Right. What is a **3)** “.....”?

Student 2: A bundle of **4)**

Student 1: Very good. What is a **5)** “.....”?

Student 2: A unit of muscle fibers that appear as light and dark bands under a microscope.

Student 1: Actually, you described a **6)** A myofibril is a unit of muscle fibers that contain long proteins.



Listen again and complete the conversation

Student 1: Let's review **muscle structure**, shall we?

Student 2: Sure. Why don't you just quiz me? I think that'll move things along more quickly.

Student 1: Okay. First, what do muscles consist of?

Student 2: **Connective tissue** and muscle fibers.

Student 1: Right. What is a **fascicle**?

Student 2: A bundle of **muscle fibers**.

Student 1: Very good. What is a **myofibril**?

Student 2: A unit of muscle fibers that appear as light and dark bands under a microscope.

Student 1: Actually, you described a **sarcomere**. A myofibril is a unit of muscle fibers that contain long proteins.



Speaking

8 Complete the conversation below based on Task 7, with the phrases given. Then, take roles and act it out.

USE LANGUAGE SUCH AS:

Let's review ... shall we?

What is a ...?

Actually, you described ...

Student A: You are a student. Talk to Student B about:

- muscle structure
- the definitions of muscle parts
- the characteristics of muscle parts

Student B: You are a student. Talk to Student A about the different parts of muscles and their characteristics.

Let's review muscle structure again, shall we?

Those are sarcomeres.

What is a "myofibril"?

First, what do muscles consist of?

Actually, you described a fascicle.

Let's review muscle structure again, shall we?

Those are sarcomeres.

What is a "myofibril"?

First, what do muscles consist of?

Actually, you described a fascicle.

A:

B: Okay. Why don't you quiz me? That'll help us get done faster.

A: All right.

B: Connective tissue and muscle cells.

A: That's right.

B: A bundle of muscle fibers.

A:

A myofibril is a unit of muscle fibers that consist of long, rod-like proteins.

B: Do they appear as light and dark bands under a microscope?

A: No.

Suggested answers:

A: Let's review muscle structure again, shall we?

B: Okay. Why don't you quiz me? That'll help us get done faster.

A: All right. First, what do muscles consist of?

B: Connective tissue and muscle cells.

A: That's right. What is a „myofibril“?

B: A bundle of muscle fibers.

A: Actually, you described a fascicle. A myofibril is a unit of muscle fibers that consist of long, rod-like proteins.

B: Do they appear as light and dark bands under a microscope?

A: No. Those are sarcomeres.