

## Lesson 8: Muscular and Digestive Systems and Hepatitis B

### Glossary

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1. **cardiac muscles:** found only in the heart, they pump blood through the heart and body
2. **esophagus:** food moves down this tube-like body part after you swallow, with the help of muscle contractions
3. **gallbladder:** this organ stores the bile from the liver and releases it into the small intestine, which helps break down the fat in foods
4. **Hepatitis B (HBV):** a virus that causes inflammation of the liver and may lead to severe liver damage
5. **large intestine (also called bowel or colon):** undigested food from the small intestine ends up here, where excess water is absorbed by the body
6. **liver:** this organ filters toxins out of your blood; the liver also makes a fluid called bile, which helps release nutrients from your food
7. **muscular system:** works with the skeletal system to make body movement possible; your body moves when muscles contract
8. **rectum and anus:** food from the large intestine passes through the rectum and anus, where waste is eliminated
9. **skeletal muscles:** sometimes called voluntary muscles, skeletal muscles are associated with voluntary movement (such as picking up a cup)
10. **small intestine:** food moves from the stomach to the small intestine, where major digestion happens and nutrients are absorbed into the circulatory system
11. **smooth muscle:** known as involuntary muscle, it is found in all systems of the body responsible for unconscious movement (such as the movement of food down the esophagus)
12. **stomach:** strong acid (hydrochloric acid) in this organ breaks down proteins in your food
13. **muscle strain:** occurs when a muscle tears or stretches too much, or when the muscle separates from the tendon

# Lesson 8: Muscular and Digestive Systems and Hepatitis B

## Reading Comprehension

### Hepatitis B Virus (HBV)

#### Biological Background<sup>1</sup>

The liver does several important things for the body. For example, the liver:

- Makes and stores energy
- Cleans the blood by removing toxins (harmful materials)
- Makes bile, a fluid that helps with digestion
- Breaks down medicines

#### What is Hepatitis B?<sup>2</sup>

Hepatitis B (HBV) is a virus that attacks the liver. It causes the liver to become inflamed (swollen). Over time, the liver can become badly damaged. A diseased liver does not work well. Liver failure causes serious health complications and sometimes death. People with Hepatitis B are also more likely to develop liver cancer, which may lead to death.

There are two types of Hepatitis B infection<sup>3</sup>:

**Acute:** Acute HBV infection usually lasts less than 6 months. The immune system gets the virus out of the body quickly. Someone with acute HBV is able to recover from the disease. Those who are infected with HBV as adults usually have acute HBV and are able to recover from the illness.

**Chronic:** People with chronic Hepatitis B are unable to fight off the virus with their immune system. They must live with the virus for life. Individuals living with chronic HBV are at risk for liver cancer, cirrhosis (scarring of the liver) and other serious illnesses. Children who are infected with HBV at a young age (age 1 to 5) are more likely to develop chronic HBV.

#### Why is Hepatitis B prevention and treatment so important?<sup>4,5</sup>

- 1) Untreated Hepatitis B can lead to liver failure, liver cancer and death

<sup>1</sup><http://www.cyh.com/HealthTopics/HealthTopicDetailsKids.aspx?p=335&np=152&id=2661>

<sup>2</sup>[http://digestive.niddk.nih.gov/ddiseases/pubs/hepb\\_ez/#what](http://digestive.niddk.nih.gov/ddiseases/pubs/hepb_ez/#what)

<sup>3</sup><http://www.mayoclinic.com/health/hepatitis-b/DS00398/DSECTION=causes>

<sup>4</sup><http://www.webmd.com/digestive-disorders/digestive-diseases-liver-failure>

<sup>5</sup><http://www.plannedparenthood.org/health-topics/stds-hiv-safer-sex/hepatitis-b-4270.htm>

- 2) For now, there is no cure for chronic Hepatitis B, but there is a vaccination to prevent getting it.

#### What are some symptoms of Hepatitis B?<sup>6</sup>

Hepatitis B often has no symptoms. Only half of people infected with the virus show symptoms.

Symptoms of HBV may include:

- extreme fatigue
- muscle soreness
- upset stomach, abdominal pain
- fever
- jaundice (yellow skin and eyes)
- loss of appetite
- diarrhea
- dark-yellow urine
- light-colored stools

Hepatitis B symptoms may appear weeks or months after someone gets the virus.<sup>7</sup> If you notice symptoms of Hepatitis B, talk to your doctor immediately.

#### How is Hepatitis B diagnosed?

Hepatitis B is diagnosed through blood tests given by your doctor.

#### How is Hepatitis B spread?<sup>8, 9, 10</sup>

People with acute or chronic HBV can spread the virus to other people. Hepatitis B is spread through the exchange of bodily fluids such as blood, semen and vaginal fluids.

Some common ways HBV is spread:

- From mother to baby during childbirth<sup>11</sup>
- Unprotected sex
- Injection drug use (the virus lives on needles and other equipment used by an infected person)
- Sharing personal items that may have blood on them, such as razors and toothbrushes<sup>12</sup>

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<sup>6</sup>[http://digestive.niddk.nih.gov/ddiseases/pubs/hepb\\_ez/#what](http://digestive.niddk.nih.gov/ddiseases/pubs/hepb_ez/#what)  
<sup>7</sup>[http://www.hbvadvocate.org/hepatitis/factsheets\\_pdf/HBV%20FAQ.pdf](http://www.hbvadvocate.org/hepatitis/factsheets_pdf/HBV%20FAQ.pdf)

<sup>8</sup>[http://www.hepb.org/professionals/acute\\_vs\\_chronic\\_hbv.htm](http://www.hepb.org/professionals/acute_vs_chronic_hbv.htm)

<sup>9</sup>[http://www.hbvadvocate.org/hepatitis/factsheets\\_pdf/HBV%20Guide.pdf](http://www.hbvadvocate.org/hepatitis/factsheets_pdf/HBV%20Guide.pdf)

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<sup>11</sup>[http://digestive.niddk.nih.gov/ddiseases/pubs/hepb\\_ez/#what](http://digestive.niddk.nih.gov/ddiseases/pubs/hepb_ez/#what)  
<sup>12</sup><http://www.hbvadvocate.org/hepatitis/easyBfacts/HepB.pdf>

<sup>12</sup><http://www.plannedparenthood.org/health-topics/stds-hiv-safer-sex/hepatitis-b-4270.htm>

# Lesson 8: Muscular and Digestive Systems and Hepatitis B

## Reading Comprehension

### How is Hepatitis B treated?<sup>13</sup>

**Acute HBV:** People with acute HBV usually get better without treatment, because the body's immune system fights off the infection. Most adults and children over the age of 5 recover without treatment. Rest and care for symptoms are usually enough to help an individual recover. Follow-up blood tests are done to make sure the person no longer has HBV.

**Chronic HBV:** Those with chronic Hepatitis B take medication that slows the damage done by the virus. A liver transplant may be needed for people with severe liver damage. People with chronic HBV should see the doctor regularly for check-ups.

### Who is at risk for Hepatitis B?<sup>14</sup>

Everyone is at risk for Hepatitis B.

Some individuals are at greater risk:

- Immigrants and refugees from countries where HBV is common (Asia, Africa, South America, Pacific Islands, Eastern Europe and Middle East)
- Health care providers and emergency responders (such as police officers and paramedics)
- Sexually active heterosexuals with more than 1 partner in the past six months
- Men who have sex with men
- Persons who inject drugs

### How can I protect myself against Hepatitis B?<sup>15</sup>

- *Get vaccinated against HBV*
- If a pregnant woman has Hepatitis B, her baby can be vaccinated as soon as it is born, to protect it
- Follow safer sex practices by using condoms and dental dams
- Use gloves when handling other people's blood and body fluids
- Wash hands well with soap and water, especially after contact with blood or body fluids
- Disinfect surfaces that have been contaminated with blood or body fluids
- If you think you've been exposed to HBV, call your doctor immediately. Receiving a special injection right away can help prevent you from developing hepatitis B. <sup>16</sup>

<sup>13</sup>

[http://digestive.niddk.nih.gov/ddiseases/pubs/hepb\\_ez/#what](http://digestive.niddk.nih.gov/ddiseases/pubs/hepb_ez/#what)

<sup>14</sup> [http://www.hepb.org/professionals/high-risk\\_groups.htm](http://www.hepb.org/professionals/high-risk_groups.htm)

<sup>15</sup> <http://www.hbvadvocate.org/hepatitis/easyBfacts/HepB.pdf>

### Write short answers based on the reading.

1. What is Hepatitis B?

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2. Name 3 symptoms of Hepatitis B.

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3. How is Hepatitis B spread?

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4. How is Hepatitis B treated?

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### Critical thinking skills:

1. Think about the question.
2. Talk about the answer with a partner.
3. Write a brief paragraph to answer the question.

How can you protect yourself against Hepatitis B?

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<sup>16</sup> <http://www.mayoclinic.com/health/hepatitis-b/DS00398/DSECTION=treatments-and-drugs>

# Lesson 8: Muscular and Digestive Systems and Hepatitis B

## Reading and True and False

### What is the purpose of the muscular system?

The muscular system works with the skeletal system to make body movement possible. The body moves when muscles contract. Some movements are external—for example, lifting a weight. Other movements are internal, such as the muscular contractions that make the heart beat. Here are some other examples of what the muscular system does:

- Muscles allow you to stand up
- Muscle movement makes breathing possible
- Muscles in blood vessels help move blood through the body
- Eating and digesting food happens through muscle movement
- 85% of body heat is a byproduct of muscle contraction. This heat helps to maintain body temperature.

### Muscular System Background<sup>1</sup>

The muscular system is made up of muscle fiber cells. Muscles are attached to bones, internal organs and blood vessels. There are different types of muscles:

- Skeletal muscles: Sometimes called voluntary muscles, skeletal muscles are usually associated with voluntary movement (such as picking up a cup).
- Cardiac muscles: Cardiac muscles are found only in the heart. They pump blood through the heart and body.
- Smooth muscle: Known as involuntary muscle, smooth muscle is found in all systems of the body. Smooth muscles are responsible for unconscious movement. For example, smooth muscle in the intestinal wall helps push food through the intestines.<sup>2</sup>

### What is an example of a muscle problem?

Muscle strain is a type of muscle injury. A strain occurs when the muscle tears or stretches too much, or when the muscle separates from the tendon. (Remember that tendons connect muscle to bone). This usually happens when the muscle is already weakened or hasn't been warmed up before exercise.

<sup>1</sup> <http://training.seer.cancer.gov/anatomy/muscular/>

<sup>2</sup> [www.bbc.co.uk/science/humanbody/body/factfiles/skeletal/moothandcardiac/heart\\_beat.shtml](http://www.bbc.co.uk/science/humanbody/body/factfiles/skeletal/moothandcardiac/heart_beat.shtml)

It is common for people to strain lower back muscles, which can become weak from too much sitting. Back muscles can be strained when lifting something heavy. The hamstring muscle, located at the back of the thigh, is a common site of strain for soccer players and other athletes.

### Why is exercise and stretching important for healthy muscles?

- Healthy muscles allow a person to move freely without difficulty or pain. Muscles that are not used will atrophy. This means that the muscle becomes smaller and weaker.<sup>3</sup> This may contribute to muscle strains. Injured muscles make work difficult.
- Muscles help to protect joints. If the muscles around a joint are weak, injury to the joint is more likely.
- If you suffer an injury and have to rest for a while, you will probably go through physical therapy to strengthen your muscles, to prevent another injury.<sup>4</sup>

### Read each sentence. Then circle True or False.

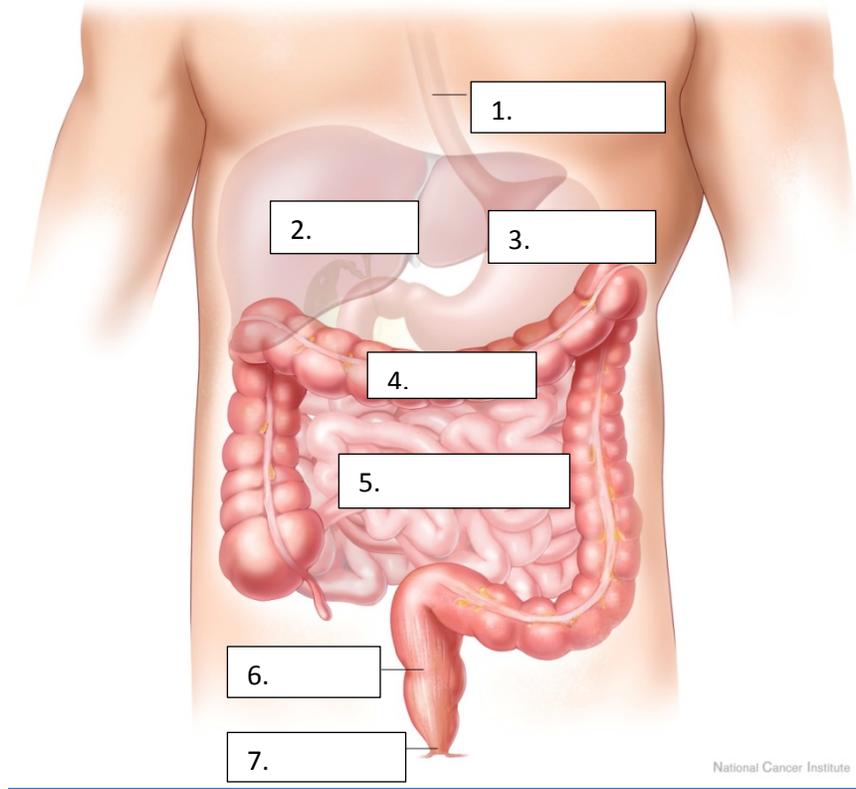
- |  |      |       |
|--|------|-------|
| 1. Muscle movement makes breathing possible.                                   | True | False |
| 2. There is only one type of muscle.   | True | False |
| 3. Cardiac muscles are found in the heart.                                     | True | False |
| 4. Muscles help protect joints.  | True | False |
| 5. Smooth muscles are known as voluntary muscles.                              | True | False |
| 6. Muscle strain injuries occur when there is a tear or stretch in the muscle. | True | False |

<sup>3</sup> [www.niams.nih.gov/health\\_info/Kids/healthy\\_muscles.asp](http://www.niams.nih.gov/health_info/Kids/healthy_muscles.asp)

<sup>4</sup> [www.niams.nih.gov/health\\_info/Kids/healthy\\_muscles.asp](http://www.niams.nih.gov/health_info/Kids/healthy_muscles.asp)

# Lesson 8: Muscular and Digestive Systems and Hepatitis B

Label the Chart



Label the digestive system chart. Use the words in the box below to help you. Then write the words on the lines.

rectum	anus	liver	small intestine	esophagus	stomach	colon
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- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_

## Lesson 8: Muscular and Digestive Systems and Hepatitis B

### Sequencing and Writing

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#### Why is the digestive system important?

The digestive system turns food into basic nutrients. The nutrients are used to fuel your body. Your body needs this fuel for energy to complete daily activities.

#### How does the digestive system work?

Food travels through the mouth, esophagus, stomach, small intestines and the large intestines. The small intestines absorb nutrients. The large intestines filter out water from undigested food. What your body does not need is considered waste. The waste leaves the body through the rectum and anus.

After reading the passage above, read and think about the sentences below. Then number the sentences in order (1-7) to describe the cycle in which food is digested in the body.

- \_\_\_\_\_ What the body does not need is considered waste.
- \_\_\_\_\_ Finally, the waste leaves the body through the rectum and anus.
- \_\_\_\_\_ The small intestines absorb the nutrients.
- \_\_\_\_\_ Then the food travels through the small intestines and the large intestines.
- 1   First the food travels through the mouth, esophagus and stomach.
- \_\_\_\_\_ Next, the large intestines filter out water from undigested food.

Now write the sentences from above in the correct order.

1. First the food travels through the mouth, esophagus and stomach.
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

## Lesson 8: Muscular and Digestive Systems and Hepatitis B

### Vocabulary Card Match

Mouth	Esophagus	With your mouth, you chew food into smaller pieces. Chemicals in your saliva help to digest these food pieces.	Food moves down this tube-like body part after you swallow, with the help of muscle contractions. A little flap covers the windpipe to prevent you from choking!
Stomach	Liver	Strong acid (hydrochloric acid) in this organ breaks down proteins in your food.	This organ makes a fluid called bile which helps release nutrients from your food. It also filters toxins out of the blood.
Gallbladder	Small Intestine	This organ stores bile from the liver and releases it into the small intestine, which helps break down the fat in foods.	Food moves from the stomach to this organ. Major digestion happens here, and nutrients are absorbed into the circulatory system.
Large Intestine	Rectum and Anus	Undigested food from the small intestine ends up here. Excess water is absorbed by the body, and vitamins K and B are produced.	Food from the large intestine passes through these body parts. This is where waste is eliminated.

## Lesson 8: Muscular and Digestive Systems and Hepatitis B

### Vocabulary Card Match

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Copy the words and their definitions after you match all of the cards.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

## Lesson 8: Muscular and Digestive Systems and Hepatitis B

### Conversation

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**Ali is at the doctor's office to get some digestive issues checked out. Listen to what advice the doctor has for Ali about maintaining a healthy digestive system.**

Doctor: Ali, your test results are normal, so that's good news. I'd like to give you some advice on maintaining a healthy digestive system.

Ali: Thank you. I'd appreciate that.

Doctor: Make sure you eat a healthy diet, with lots of vegetables, fruits and whole grains. Exercise regularly.

Ali: I could do better when it comes to exercise.

Doctor: It's never too late to start exercising! Also, avoid smoking, because it increases the likelihood of digestive problems like liver disease and Crohn's disease.

Ali: I have been smoke-free for the last 12 years!

Doctor: That's great! Also, do you know if you have been vaccinated for Hepatitis B?

Ali: I'm not sure.

Doctor: I'll ask your previous clinic to send your medical records. We can vaccinate you if necessary.

Ali: Good. I like to protect my health.

Doctor: It was good to talk with you, Ali. Call our clinic if you have any more digestive symptoms, such as diarrhea, constipation, bloating or cramping.

Ali: OK, I'll do that. Thanks for your help.

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**Talk with your partner and write a short answer to the following question.**

What did the doctor recommend for Ali to maintain a healthy digestive system?

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## Lesson 8: Muscular and Digestive Systems and Hepatitis B

### Quiz

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Read the questions. Then circle A, B, C or D.

1. What is the purpose of the muscular system?
  - A. to allow you to stand up
  - B. to make breathing possible and move blood through the body
  - C. to enable eating and digesting
  - D. all of the above
  
2. What is a muscle strain?
  - A. a tear or stretch in the muscle
  - B. building muscle mass
  - C. working out
  - D. a tired muscle
  
3. To what body part does food move after you swallow?
  - A. stomach
  - B. esophagus
  - C. liver
  - D. gall bladder
  
4. How can you prevent Hepatitis B?
  - A. wash hands with water only
  - B. don't practice safe sex
  - C. get vaccinated
  - D. clean up blood spills with water only
  
5. Why is Hepatitis B prevention and treatment so important?
  - A. untreated Hepatitis B can lead to liver failure, liver cancer and death
  - B. there is no cure for Hepatitis B
  - C. both A and B
  - D. neither A nor B
  
6. In what body part are nutrients absorbed?
  - A. mouth
  - B. esophagus
  - C. anus
  - D. small intestine
  
7. What is **not** a symptom of Hepatitis B?
  - A. increased appetite
  - B. jaundice (yellow skin and eyes)
  - C. dark yellow urine
  - D. light-colored stools
  
8. How can you find more information about Hepatitis B?
  1. \_\_\_\_\_  
\_\_\_\_\_
  2. \_\_\_\_\_  
\_\_\_\_\_
  3. \_\_\_\_\_  
\_\_\_\_\_

**Student Survey: Muscular and Digestive Systems / Hepatitis B Unit**

1. Did you learn more information about Hepatitis B and digestive health from studying this lesson?

1	2	3	4	5
no		some		yes

2. Would you share this information with family and friends?

1	2	3	4	5
no		maybe		yes

3. After studying this lesson, are you more likely to ask your health care provider about Hepatitis B and digestive health?

1	2	3	4	5
no		somewhat		yes

4. Do you know where to find more information about Hepatitis B and digestive health if you have more questions?

1	2	3	4	5
no		somewhat		yes

5. Did you like the class activities?

1	2	3	4	5
no		somewhat		yes

We value your opinions! Could you tell us what you liked or give us some suggestions on how to improve this lesson?

Thank you!