

## **CONCEPT: PATHOGENS & DISEASES: BACTERIA**

### **Introduction to Bacteria**

◆ **Bacteria:** \_\_\_\_\_-celled microorganisms found inside and outside of the body.

► Some are beneficial while others are *pathogenic* - cause \_\_\_\_\_.

- Classified by \_\_\_\_\_: cocci (round), bacilli (rod-shaped), and spirilla (spiral).



◆ **Antibiotics:** medications used to kill bacteria.

► Due to overuse and misuse of antibiotics, antibiotic-\_\_\_\_\_ bacteria have emerged.

### **EXAMPLE**

Which of the following statements about bacteria is true?

- a) All bacteria can be pathogenic.
- b) Bacteria cannot survive outside of the host.
- c) All bacteria become resistant to antibiotics, regardless of how antibiotics are used.
- d) Bacteria are classified into spirilla, cocci, and bacilli shapes.

## **CONCEPT: PATHOGENS & DISEASES: BACTERIA**

### **Bacterial Infections**

- ◆ Pathogenic bacteria cause diseases by invading tissues and/or producing \_\_\_\_\_ that damage cells.
- **Colonization:** bacteria or other pathogens establish themselves in/on a host \_\_\_\_\_ causing illness.

<b>Bacterial Infections</b>		
<b>Infection/Disease</b>	<b>Symptoms</b>	<b>Transmission</b>
<b>MRSA</b>  Methicillin-resistant <i>Staphylococcus aureus</i>	 <ul style="list-style-type: none"> <li>• Skin infection: inflammation, pain, fever.</li> <li>• Can spread to bloodstream, bones, and other organs.</li> </ul>	<ul style="list-style-type: none"> <li>• Skin-to-skin or contact with surfaces.             <ul style="list-style-type: none"> <li>- Enters through cuts/wounds.</li> </ul> </li> <li>• Common in _____ care settings.</li> </ul>
<b>Strep Throat</b>  <i>Streptococcus</i>	 <ul style="list-style-type: none"> <li>• Sore throat &amp; white patches on _____.</li> <li>• Fever, headache, swollen lymph nodes.</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory droplets.</li> </ul>
<b>Meningitis</b>  <i>Streptococcus</i> or <i>Neisseria</i> but viral is more common.	 <ul style="list-style-type: none"> <li>• Inflammation of membrane covering _____ &amp; spinal cord.</li> <li>• Fever, severe headache, stiff neck.</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory droplets.</li> <li>• Direct contact with saliva or nasal secretions.</li> </ul>
<b>Pneumonia</b>  <b>Causes:</b> bacteria, virus, fungi, chemicals.	 <ul style="list-style-type: none"> <li>• Inflammation of _____.</li> <li>• Fever, shortness of breath, cough, fluid build up in lungs.</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory droplets.</li> <li>• Direct contact with contaminated surfaces.</li> </ul>

### **EXAMPLE**

A 20-year-old student is brought to campus clinic by his roommate with complaints of intense headache, light sensitivity, fever and extreme neck pain. Which is the most appropriate action?

- Treat student for possible strep throat infection with antibiotics.
- Drink plenty of liquids and rest in a dark room.
- Evaluate both students for possible meningitis and treat immediately if applicable.
- Recognize possible meningitis and treat the 20-year-old with antibiotics.

## **CONCEPT: PATHOGENS & DISEASES: BACTERIA**

### **Tuberculosis**

- ◆ Leading infectious disease killer worldwide, affecting \_\_\_\_\_-income countries.

<b>Bacterial Infections</b>		
<b>Infection/Disease</b>	<b>Symptoms</b>	<b>Transmission</b>
<b>Tuberculosis (TB)</b> 	<ul style="list-style-type: none"><li>► Infection of respiratory system.</li><li>► Fever, cough, weight loss, fatigue.</li></ul>	<ul style="list-style-type: none"><li>► Respiratory droplets.</li></ul> <p><b>Note:</b> 1/4 of world pop. has _____ <b>TB</b>.</p>

#### **Latent TB**

Inactive form of TB bacteria and is not contagious.

- Treated with \_\_\_\_\_ months long antibiotic combination regimen.

### **Escherichia Coli (O157:H7)**

- ◆ Most *E. coli* bacteria are \_\_\_\_\_ and reside in the intestines of humans and animals.
  - *E. coli* O157:H7 is a type that produces a \_\_\_\_\_ toxin and causes severe illness and even death.
    - Treated with hydration and electrolytes.

<b><i>E. coli</i> GI Infection</b>		
<b>Infection/Disease</b>	<b>Symptoms</b>	<b>Transmission</b>
<b><i>E. coli</i> (O157:H7)</b> 	<ul style="list-style-type: none"><li>► Bloody diarrhea, stomach cramps, vomiting.</li></ul>	<ul style="list-style-type: none"><li>► Consumption of contaminated:<ul style="list-style-type: none"><li>- _____ cooked ground beef.</li><li>- Produce and water.</li></ul></li></ul>

### **EXAMPLE**

Select correct statement about *E. coli* O157:H7.

- A specific type of *E. coli* bacteria that produces a harmful toxin and leads to severe illness in humans.
- Resides in the intestines of all humans and animals. Is treatable with antibiotics.
- Can not be transmitted through ingestion.
- A harmless type of *E. coli* bacteria that can cause illness if it overgrows in intestines.

## **CONCEPT: PATHOGENS & DISEASES: BACTERIA**

### **Tick-Borne Infections**

- ◆ Ticks pose multiple disease threats by carrying pathogenic bacteria that infect humans and pets through \_\_\_\_\_.
  - Both treated with antibiotics.

Tick-Borne Infections		
Infection/Disease		Symptoms
Lyme Disease		<ul style="list-style-type: none"><li>► Bull's _____-shaped rash.</li><li>► Fever, muscle aches, arthritis.</li><li>► Irregular heartbeat, neurological disabilities.</li></ul>
Rocky Mountain Spotted Fever		<ul style="list-style-type: none"><li>► Fever, headache, muscle aches, rash.</li><li>► Seizures, coma.</li></ul>

### **EXAMPLE**

Avery went hiking in the woods with a few of his friends last weekend. A few days later he started to feel really tired and had stiffness in his joints. He also noticed a start of a rash on his calf that had spread in a circular pattern. What is Avery most at risk of?

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- a) Meningitis
- b) Lyme disease
- c) MRSA
- d) Rocky Mountain spotted fever

### **PRACTICE**

After having a surgery, a patient develops an infection and soon experiences chest pain, cough, and fluid accumulation in the lungs. Which diagnosis best explains these symptoms?

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- a) Tuberculosis
- b) MRSA
- c) Pneumonia
- d) Severe allergies

### **PRACTICE**

Which of the following statements about tuberculosis is incorrect?

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- a) Majority of people with TB do not have symptoms and are not contagious.
- b) TB is caused by a bacterial infection and is easily treated with a few doses of antibiotics.
- c) World Health Organization estimates that a quarter of the world's population has latent TB.
- d) TB is highly contagious and is spread through respiratory droplets from infected people.