

# **MICROBIOLOGY**

## *Presentation Overview*

### ***Learning Outcomes Addressed in this Resource***

1. *Evaluate the evidence used to classify viruses as living or non-living*
  - Identify criteria for classifying organisms as living
  - Describe the basic structure of a virus, including the antigens, the membranous envelope, the protein capsid, and the nucleic acid core (DNA or RNA)
  - Identify the role of the host cell in viral reproduction
  - Compare the lytic and lysogenic cycles
  
2. *Evaluate the effects of viruses on human health*
  - Define and give examples of viral specificity
  - Describe the body's basic lines of defense against a viral attack including: primary, secondary and tertiary lines of defense
  - Give examples of ways to reduce the spread of viral diseases
  
3. *Analyze monerans as a life form at the prokaryotic level of organization*
  - Examine monerans and identify the characteristics that unify them
  - Illustrate moneran diversity with respect to the following: classification, shape and grouping of cells, motility, nutrition and human diseases
  - Illustrate moneran diversity with respect to the following: ecological role & reproduction
  - Give examples of the beneficial roles of bacteria
  
4. *Evaluate the effectiveness of various antibiotics, disinfectants, or antiseptics on bacterial cultures*
  - Examine the usage and effectiveness of antibacterial agents
  - Analyze the effectiveness of particular agents on specific bacteria
  - Explain how bacteria mutate to become resistant to antibiotic

### ***Unit Outline***

*Below is a list of resources included for this presentation package. Please note that each category will show as a separate folder in your desktop if using the CD once you have selected and opened the unit folder. Each item is listed in the recommended order of presentation.*

#### **Powerpoint Presentations**

#### ***Learning Outcomes and Suggested Achievement Indicators Addressed (derived from current BC ministry requirements for Biology 11)***

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Viral Structure</li> </ul>   | <ul style="list-style-type: none"> <li>• 1               <ul style="list-style-type: none"> <li>○ Identify criteria for classifying organisms as living</li> <li>○ Describe the basic structure of a virus, including the antigens, the membranous envelope, the protein capsid, and the nucleic acid core (DNA or RNA)</li> </ul> </li> </ul> |
| <ul style="list-style-type: none"> <li>• Viral Replication</li> </ul> | <ul style="list-style-type: none"> <li>• 1</li> </ul>  |

- Identify the role of the host cell in viral reproduction
  - Compare the lytic and lysogenic cycles
- Viral Specificity and Human Lines of Defense • 2
  - Define and give examples of viral specificity
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- Kingdom Monera – Bacteria – Characteristics and Diversity • 3
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  - Illustrate moneran diversity with respect to the following: classification, shape and grouping of cells, motility, nutrition and human diseases
- Kingdom Monera – Reproduction and Ecological Roles • 3
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  - Give examples of the beneficial roles of bacteria
- Antibacterial Agents and Resistance • 4
  - Examine the usage and effectiveness of antibacterial agents
  - Analyze the effectiveness of particular agents on specific bacteria
  - Explain how bacteria mutate to become resistant to antibiotics

**Student Templated Worksheets**

***Learning Outcome Addressed (refer to descriptions above)***

*Please note: Suggested achievement indicators addressed are similar to those of the powerpoint presentation above that they correspond with.*

- Viral Structure • 1
- Viral Replication • 1
- Viral Specificity and Human Lines of Defense • 2
- Kingdom Monera • 3
- Moneran Diversity • 3
- Antibiotics, • 4

Disinfectants and  
Antiseptics

# Antibacterial Agents and Resistance

NAME \_\_\_\_\_  
DATE \_\_\_\_\_

**In this presentation of notes we will:**

- Examine the usage and effectiveness of antibacterial agents
- Analyze the effectiveness of particular agents on specific bacteria
- Explain how bacteria mutate to become resistant to antibiotics

## Antibiotics

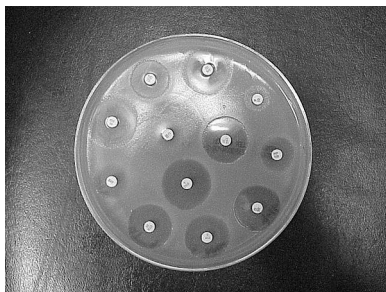


**Definition:**

### Where do antibiotics come from?

- many are produced from \_\_\_\_\_  
example. Penicillin is collected from the fungi \_\_\_\_\_ (above)  
Streptomycin comes from the bacteria \_\_\_\_\_
- some antibiotics are

## How do antibiotics work?



Above: Wafers containing antibiotics are placed on an agar plate of bacteria. The cloudy areas show bacterial growth. Circles of poor bacterial growth show that bacteria

\_\_\_\_\_  
\_\_\_\_\_

Antibiotics that target a wide range of bacteria are termed \_\_\_\_\_. Those that target a narrow range are termed \_\_\_\_\_.

Some antibiotics actually \_\_\_\_\_ (inhibit cell processes) whereas others keep the bacterial cell \_\_\_\_\_.

## Antibiotic Resistance

Failure to take entire prescribed dosages of antibiotics can lead to

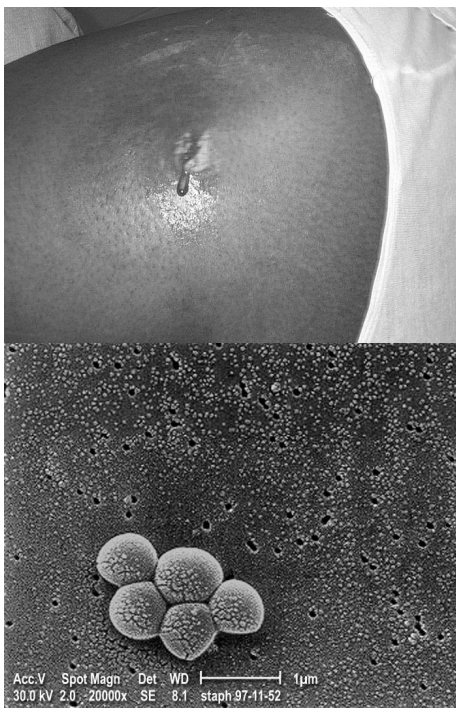
Improper usage and dosaging of antibiotics also contributes to



As close as possible to 100% of harmful bacteria must be killed off when taking a round of antibiotics. If not,

When antibiotics are administered when they are not needed we are

*NOTE: Remember as well that the genes for antibiotic resistance can also.*



*Staphylococcus aureus* bacteria are one of the types of bacteria normally found existing on \_\_\_\_\_. They are capable of causing skin infections in those with weakened \_\_\_\_\_. (see picture to above left)

Skin infections caused by these bacteria were treated successfully in the 1940's and 50's with penicillin. Presently, almost all strains are \_\_\_\_\_ which leaves only a small section of drugs (vancomycin) to treat it.

The picture to the bottom left shows a new form of *S.aureus* that is beginning to show \_\_\_\_\_.

## Antiseptics

### Definition:

- Some \_\_\_\_\_ bacteria (germicides) and some \_\_\_\_\_ bacteria
- Overuse can lead to increased \_\_\_\_\_



## Common Types of Antiseptics

### Alcohol (surgical alcohol)

- Used to

### Boric Acid

- Used in

### Chlorhexidine Gluconate

- Used in

### Hydrogen peroxide

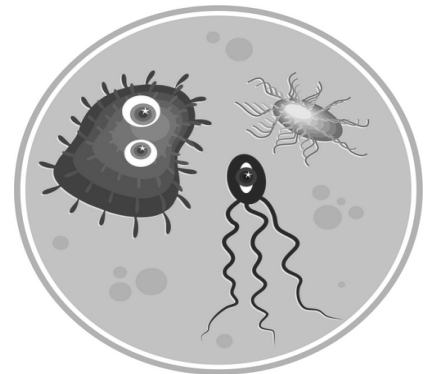
- Used for (although antibacterial soap and water is actually more effective)

### Iodine

- Used in

### Phenol compounds

- Used in



### Natural antiseptics

- Includes

## ***Disinfectants***

### **Definition:**



- Many disinfectants are harmful (toxic) to humans, animals and the environment
- Overuse can lead to resistant strains of bacteria

## ***Common Types of Disinfectants***

### **Alcohol**

- Wide spectrum, highly effective and

### **Oxidizing Agents** (ex. Chlorine, peroxide, iodine...)

- Destroys the
- Commonly used in
- 

### **UV light**

- Can be used in

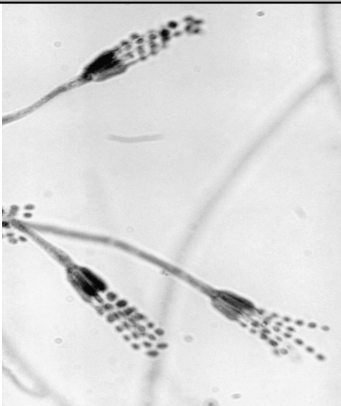
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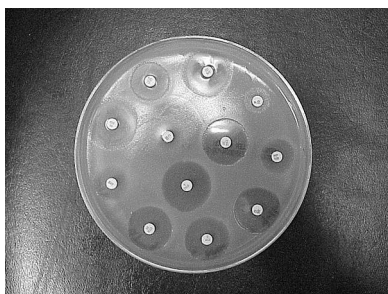


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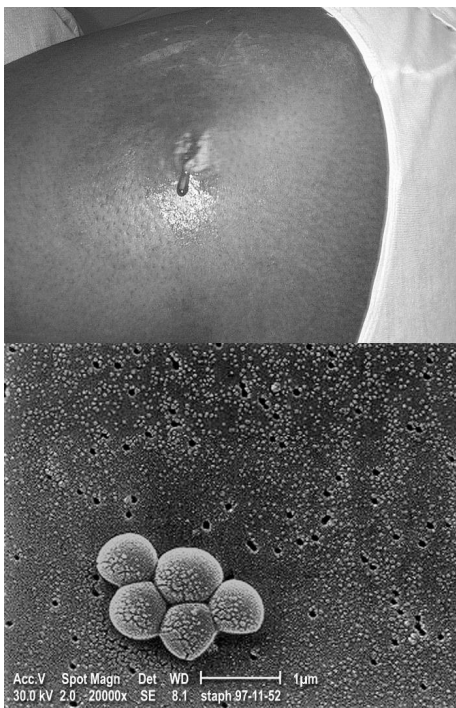
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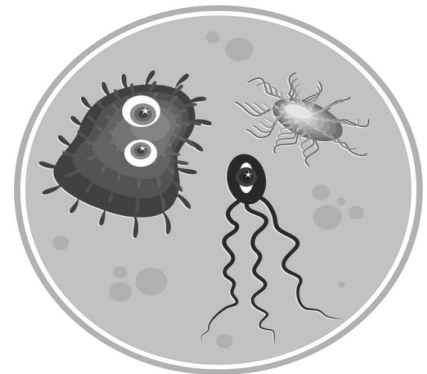
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