

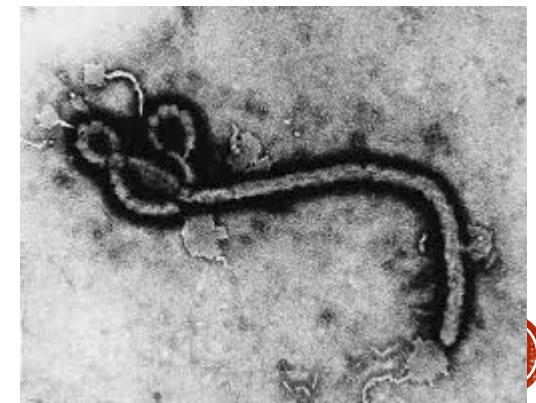
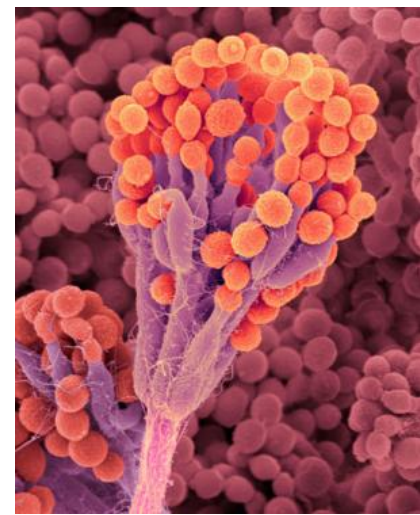
44-1:THE NATURE OF DISEASE

Introduction

A. Disease: *any change, other than an injury, that interferes with the normal functioning of the body*

B. Infectious diseases are produced by pathogens

Pathogens: *are disease-causing microorganisms such as viruses, bacteria, fungi, and protozoans*



I. WHAT IS DISEASE?

A. **Infection:** *when the body is successfully invaded by a pathogen*

1. The numbers of micro-organisms around us is so large that infection is a daily event

2. **Sickness** is not a daily event because *not all infections produce disease*

3. **Infectious disease results only when** *the growth of a pathogen begins to injure the cells and tissues of an infected person*



II. HOW IS INFECTIOUS DISEASE SPREAD?

Pathogens require only opportunity to enter the body.

Ted-Ed How do Germs Spread

TED-Ed Pandemics in History

Examples:

- **Bacterium *Clostridium tetani* lives in soil and enters thru a cut or puncture in the skin**
- **Common cold, measles, mumps, influenza spread thru coughing or sneezing**
- **Others spread thru contaminated water supplies**
- **Through food handled by an infected person**
- **Spread by infected animals (e.g. ticks and mosquitoes)**
- **sexual contact**



III. THE GERM THEORY OF INFECTIOUS DISEASE

A. In the past it was believed disease was

caused by: *evil spirits, magic or miasmas (vapors rising from marshes or decaying plant or animal matter)*

TED-Ed Vampires

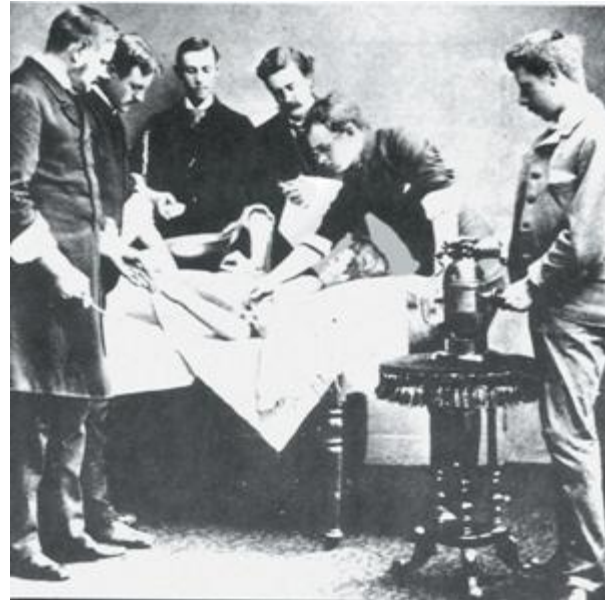


B. People who became ill were thought to be

cursed* or had *bad luck



C. Germ Theory of Infectious Disease: *idea that infectious diseases are caused by microorganisms*



KOCH'S POSTULATES:

Microbiologist Robert Koch was born in 1843. Koch's postulates are a series of ground rules to determine whether a given organism can cause a given disease. Koch theorized that:

TED-Ed Germ Theory

1. *The microorganism should always be found in the body of the host organisms and not in a healthy organism*

Koch's Postulates

2. *The microorganisms must be isolated and grown in a pure culture away from the host.*



3. *When the microorganisms grown in pure culture are injected into a new host organism, they produce disease.*



4. *The same microorganisms should be reisolated from the second host and grown in a pure culture, after which the microorganisms should still be the same as the original microorganisms.*

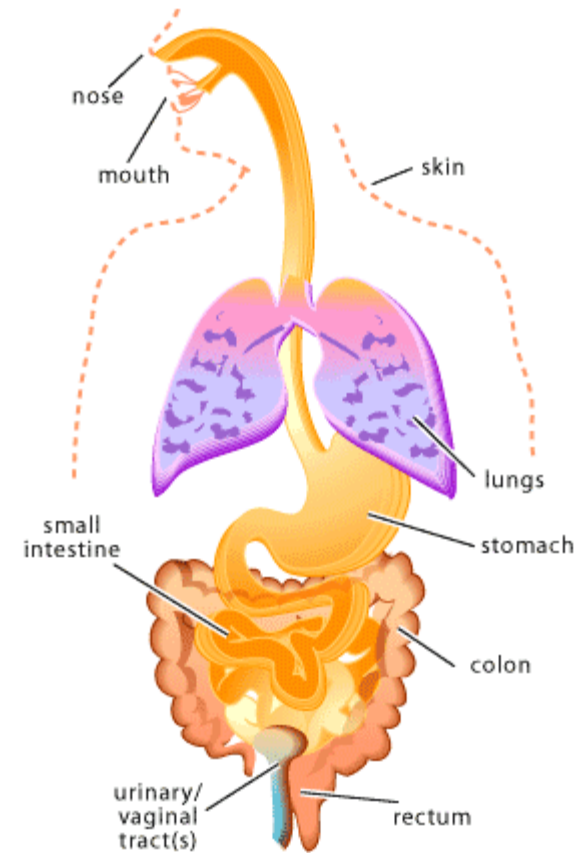


44-2 AGENTS OF DISEASE

I. Introduction

- A. A few micro-organisms find the human body an *inviting* home
1. It is *warm, protected, and full of nutrients*
 2. Friendly ones settle in and live in *certain parts of the body*

Teacher note: These are called normal flora; our skin, mucus membranes, digestive system, etc. are host to billions; they actually help to keep us healthy by taking up niches that could otherwise be invaded by the pathogenic varieties!



Locations of Normal Flora



B. Some may invade and multiply in tissues,
or travel through the bloodstream

1. Unchecked, they may cause serious illness

C. Diseases are grouped according to the kind of pathogen that
causes them



II. Viruses TED-Ed HIV/AIDS

TED-Ed SmallPox2

TED-Ed Ebola

A. Complete the following chart :

Disease	Organism that Causes the Disease	Methods of Spreading the Disease
Chicken Pox	one virus	droplets in air; direct contact with infected person
Common Cold	many viruses	droplets in air; direct contact with infected person
German Measles	one virus	droplets spread; direct contact with infected person
Influenza	two important types (A, B) of virus and many subtypes	direct contact with infected person; droplet infection; also may be airborne
Mumps	one virus	droplets spread; direct contact with infected person
Polio	three types of virus	direct contact with infected person

17-3: DISEASES CAUSED BY MONERANS

II. Bacteria and Disease

A. Only a few types cause disease

B. Louis Pasteur was the 1st person to show
that bacteria cause disease



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C. Some diseases caused by pathogenic
bacteria:

1. *Diphtheria*
2. *Tuberculosis*
3. *Typhoid fever*
4. *Tetanus*
5. *Hansen disease*
6. *Syphilis*
7. *Cholera*
8. *Bubonic plague* *TED-Ed Bubonic Plague*



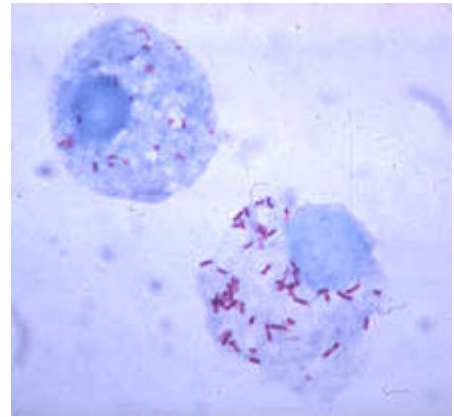
D. Two ways in which bacteria cause disease:

- 1. Damage cells/tissues of infected organism by breaking down living cells for food***
- 2. Release toxins that travel through body & interfere with normal activity of host***



E. CLASS RICKETTSIAS

- 1. Can only grow *inside a living cell***
- 2. Cause disease by method #1**
- 3. Some diseases they cause:**
 - a. *Rocky Mountain spotted fever***
 - b. *Typhus***
 - c. *Q fever***



E. METHODS FOR FIGHTING DISEASE

1. Stimulating *immune* system through
Vaccines

[TED-Ed Vaccines](#) [TED-Ed SmallPox1](#)

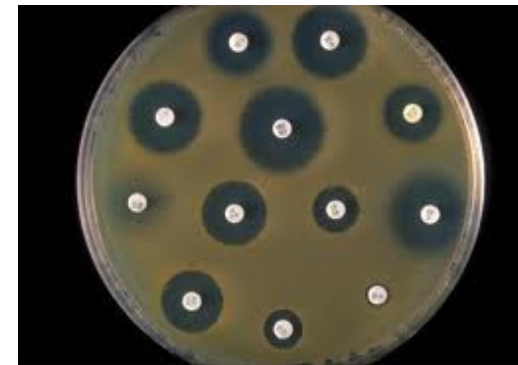
[TED-Ed Flu Shot](#)

[Vaccine Activities](#)

[In a Nutshell: Vaccines](#)

2. Antibiotics (def'n): *a natural compound that can destroy bacteria* [ANIMATION](#)

[Ted-Ed Resistance](#)



III. CONTROLLING PATHOGEN PRESENCE

A. Sterilization: *Destruction of living bacteria by exposure to great heat or chemical action*

1. Heat: most can be killed in *boiling* water



Autoclaves are used to sterilize medical and laboratory equipment

2. Disinfectant (def'n): *a chemical solution that kills bacteria*



B. FOOD PROCESSING

1. When bacteria “eat” our food, they cause it to spoil

2. Preventing spoilage:

a. Refrigeration: slows the growth of bacteria

b. Sterilization by cooking (e.g. boiling, frying, steaming)

c. Canning: sterilized food is sealed into glass or metal containers

d. Chemical treatments that inhibit bacterial growth in food:

i. salt (e.g. salted meat)

ii vinegar (e.g. pickled vegetables)

iii sugar (e.g. jam)



FOLLOW UPS:

- Summarize the text into a good set of “fill in the blank” notes.
[TED-Ed Immune System](#)
- [Nutshell-Immune System Overview](#)
- [Nutshell-Measles](#)
- [Crash course Immune system](#)
 - [Ted-Ed Cells vs. Virus](#)

