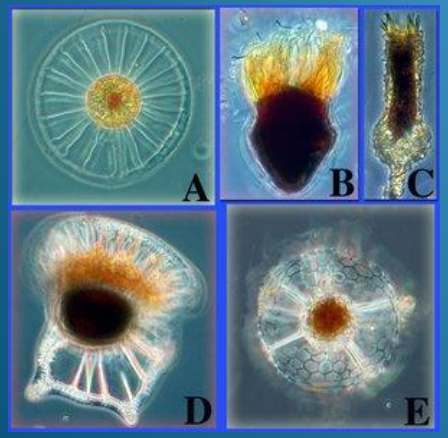
MICROBES

Are they all pathogens?



11.1Viruses

- Characteristics:
  - NOT cells;
  - do not use own energy to grow;
  - can't make own food
  - or produce wastes;
  - are able to multiply in host cell

Viruses

- Host
- organism that is source
- of energy for virus

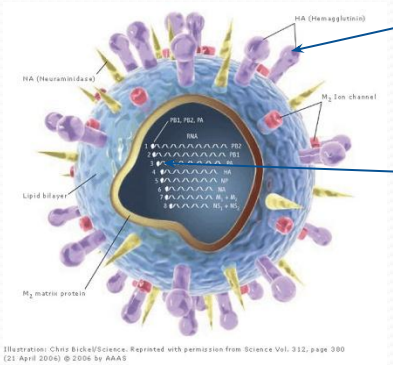
- Parasite
- virus causes harm to host cell—almost all viruses destroy the cell

Viruses

- Shapes:
  - bacteriophage- virus in Bacteria—robotlike shape
    Other types—round, Bricklike, threads or bullet
- Size:
  - 200 nanometers to 20 nanometers

Viruses

- Named:
  - for scientists, place found, or disease they cause
- Structure:
  - <u>Protein coat-lock</u> to fit certain host
  - <u>Inner core</u>-genetic material



Virus

- Reproduce
- must be inside host cell to produce a new virus
- Active Virus
- immediately attack and take over cell. Ex. Cold virus
- Hidden Virus
- Enter & hide temporarily

Ex. HIV virus & cold sore virus

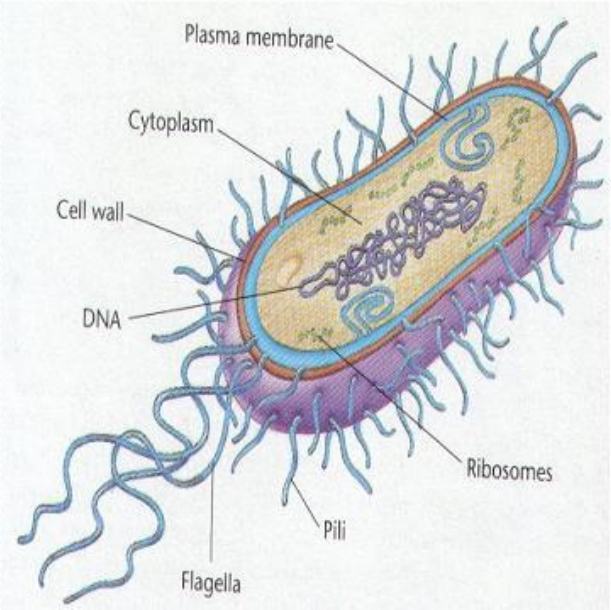
Impact of Viruses

- Negative DISEASE:
- *Shorterm Colds & Flu*
- *Longterm Rabies, distemper, HIV*

- Positive Gene Therapy:
- Virus acts as messenger to redirect cell for medical treatment. Ex. Cystic fibrous

11.2 Bacteria

- Bacteria Cell Structure:



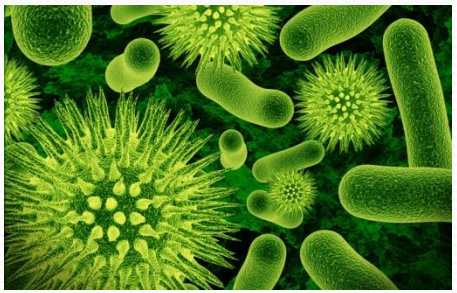
- single cell;**prokaroyotes** (no nucleus)
- Cell wall & membrane; cytoplasm & ribosomes
- Genetic material in cytoplasm like a tangled string

Bacteria

- Movement:
  - **flagellum** (whiplike tail) OR air currents OR water currents

Shape:

- Spherical, rod, or spiral



Bacteria

- Size:
  - o to ½ micrometer
- Food:
  - some are **autotrophs** so photosynthesis or chemical synthesis for food
  - Some **hetrotrophs** so consume food like decaying leaves, . . .

Bacteria

- Energy Source:
  - **respiration**—most use oxygen but some are **anaerobic**
- Reproduce:
  - Can reproduce as often as every 20 minutes;
  - **Asexual** by **binary fission** --cell copies & splits into 2 cells.
  - **Sexual**- 2 parent bacteria combine genetic material thru a threadlike bridge to produce a daughter cell. Called Conjugation.

Bacteria

- Reproduction continued:
  - From Endospores-when trying to survive harsh conditions. It forms a spore within the bacteria cell.
  - It contains genetic material and cytoplasm and can survive for many years.
  - Then can be released and carried to a new place.
  - Ex. Clostidium btoulinum –when conditions become favorable, they open up and begin to multiply
  -

Bacteria:

- Role of Bacteria:
  - **Positive:** oxygen production; recycling and clean up of decaying matter; food production—pickles, vinegar; medicine such as insulin; body processes such as digestion
  - **Negative:** spoiling food, disease such as strep throat
- Pasteurization:
  - method to kill bacteria in foods such as milk products; uses high heat and does not alter taste of food

11.3 Infectious Disease:

- What is an infectious disease?
  - Illness that passes from one organism to another
- How are they spread?
  - Inhaled, swallowed or ingested, enter through moist body cavities—ie. nose

11.3 Infectious Disease:

- Bacteria infections are treated with:
  - Antibiotics which are chemicals that can kill only the bacteria
- Viral ailments are treated:
  - Over the counter medications can relieve symptoms of most viral infections such as cold or flu
  - Some antiviral drugs are prescription such as ones for HIV

Infectious Disease:

- How prevented?

- Antibiotic Resistance is:

- Vaccines are introduced to the body to stimulate the production of chemicals to destroy the virus or bacteria.
- When bacteria adapt to resist the chemical affects of the antibiotic so the bacteria survives the antibiotic

11.4 Protists/Parasites:

Eukaroytes that CANNOT be classified in the animal, plant, or fungi kingdoms. Known as "odds & ends" kingdom. All live in moist surroundings. Can be uni or multicellular; may be auto or hetrotrophs; some move and some are stationary.

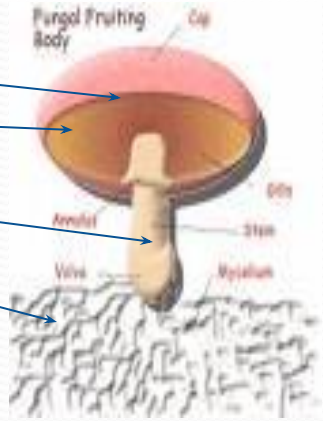
- **Unicellular** – composed of only one cell.
- **Multicellular** – composed of more than one cell.
- **Eukaryote**: an organism that contains membrane-bound organelles and genetic material within a nucleus.
- **Prokaryote**: a unicellular organism that lacks a true nucleus and membrane-bound organelle.

- Protozoans that are Parasites
  - Parasites are things that must have a host to survive.
  - Move in a wide variety of ways but must have a host to feed on.
  - *Plasmodium* a protozoans that causes Malaria has multiple hosts.
    - Usually spread by a mosquito biting an infected person then biting a healthy person

11. 5 What is a fungi?

- Fungi are:
- Eukaryotes that have cell walls and are hetrotrophs.
- Cell Structure:
- Arranged in structures called <u>hyphae</u>. These are branching, threadlike tubes that make up the bodies of multicellular fungi

Cap
Gills
Stalk
hyphae

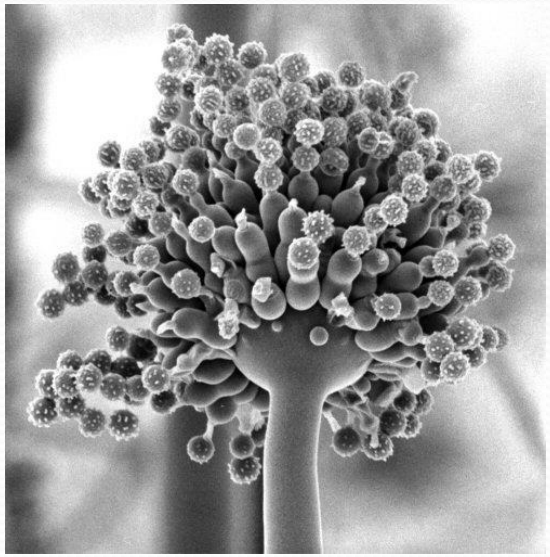


Fungi:

- Food:
  - Absorb food through the hyphae that grow on food source
- Reproduce:
  - Lightweight spores are surrounded by a protective coating & can be carried easily through water or air to a new site. Spores reproduce in fruiting bodies.
  - Most reproduce sexually & asexually.

Fungi

- Reproduce continued:



- Cells at the tip of the hyphae divide to form spores—grow into fungi that are identical to parent. Unicellular yeast undergoes budding (asexual). There are no spores. Yeast buds and breaks away from parent.
- When 2 hyphae from 2 fungi grow together genetic material is exchanged. Spores are different from either parent. (sexual)

Fungi:

- Classification:
  - Grouped according to reproduction—sac , fungi, club fungi, or zygote fungi
- Role in Nature:

  - \+ **<u>decomposers</u>** in nature-break down the chemicals in dead organisms
  - Food- yeast in bread; mold to blue cheese
  - Medicine- penicillin
  - Lichens-fungi + alage in community

Fungi:

- Role in nature:
- – sensitive to air pollution & indicate health of an area
- Plant roots grow into Hyphae underground spread out and absorb water & nutrients from soil, help plant grow better