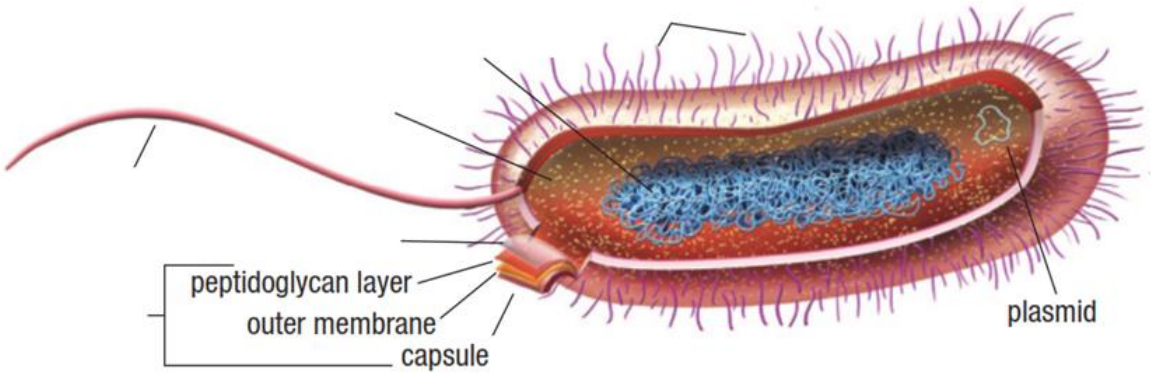
Prokaryotes

Key Characteristics

- The smallest organisms on Earth (1-2µm long)
- Single-celled
- Lack a true nucleus (instead have a nuclear region called a nucleoid)
- Lack membrane bound organelles

Label this simplified diagram of a typical prokaryotic cell



Cell Part	*Function*
DNA	
Ribosomes	
Plasmids	
Pilli	
Cell membrane	
Cell wall	
Flagellum	

List examples of beneficial effects of prokaryotes in our bodies and in the environment.

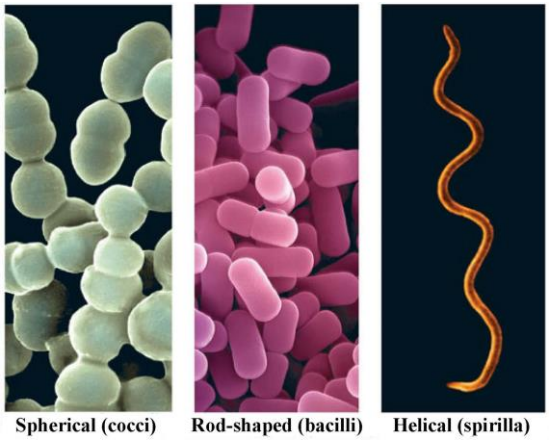
In Our Bodies	In The Environment

What is a ***pathogen?***

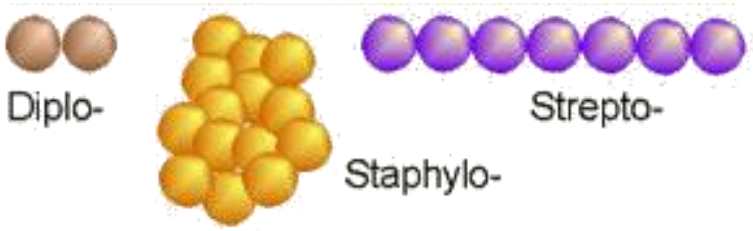
_____

Identifying Bacteria

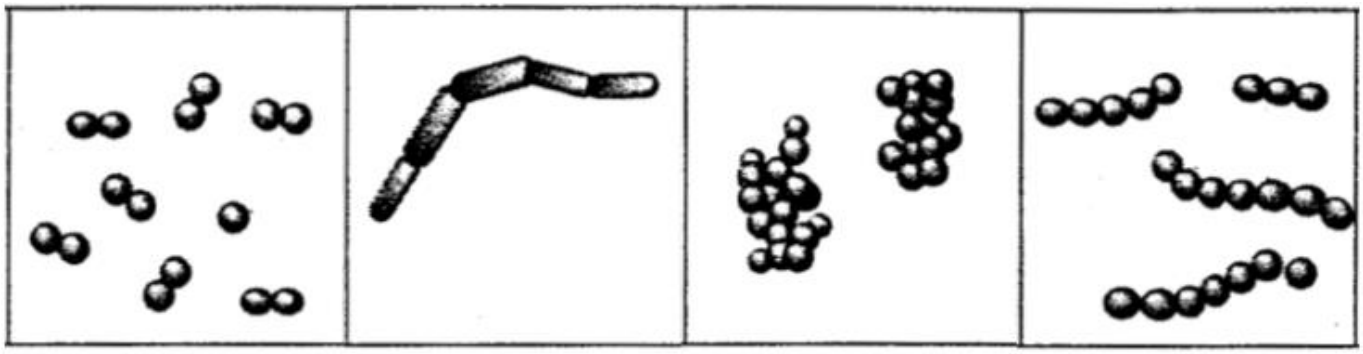
Common Bacterial Shapes



Common Bacterial Groupings



Name the following types of bacteria:



Variable Metabolism

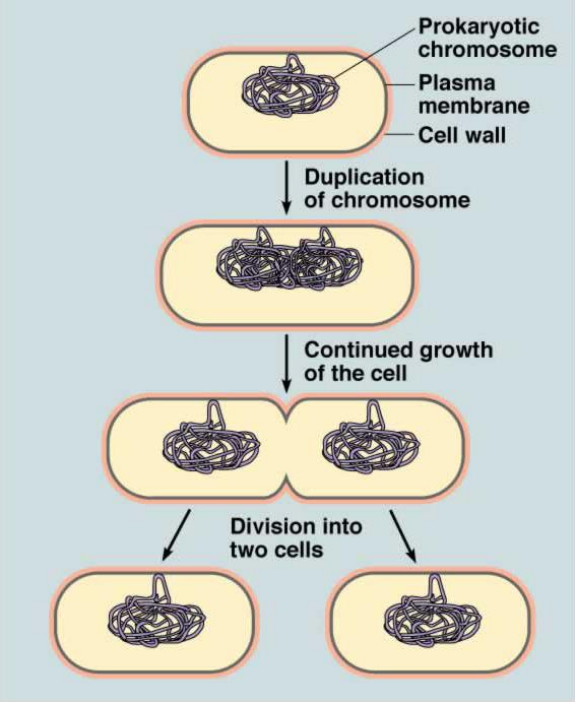
Compare the following terms

Autotroph	*vs*	*Heterotroph*

Obligate aerobe	*vs*	*Facultative aerobe*	*vs*	*Obligate anaerobe*

Reproduction

Prokaryotes almost exclusively reproduce asexually. This means that they produce an exact copy of themselves during reproduction. The process of prokaryotic parent cells splitting into two identical daughter cells is called ***binary fission***. This is very similar to mitosis, however the key differences are that prokaryotes have no nucleus or membrane bound organelles to divide, and they only have one molecule of DNA rather than multiple chromosomes to sort in eukaryotes.



Reproduction in bacteria can occur very rapidly under ideal conditions. The bacteria *E. coli* can replicate once every 20 minutes. In just 10 hours a single bacteria may produce over 130 000 000 copies. Rapid reproduction, coupled with relatively frequent errors when copying the DNA (mutations) allow bacteria to evolve and adapt very quickly.

Even though prokaryotes are generally considered asexual, many have the ability to either share segments of DNA between cells or aquire new genes from DNA sequences in their environments.

Summarize each of the following methods used by bacteria to acquire new genes.

conjugation:

_____

_____

transformation:

_____

horizontal gene transfer:

_____

Spore Production

When living conditions are poor, some bacteria can transform into a highly resistant structure called an endospore. In this form, these prokayotes can lay dormant for long periods of time and survive extreme conditions.

In your notes summarize how some bacteria cause disease and discussion antibiotics and antibiotic resistance.

Archaea

The Archaea are considered prokaryotes but are viewed as distinct from the bacteria.

What are the main properties that make archaeal cells distinct from bacteria and eukaryotes?

- Much of their biochemistry is more similar to eukaryotes than bacteria
- Their membranes are made a different material than either bacteria or eukaryotes
- They use a much greater variety of materials as an energy source than bacteria or eukaryotes
- Many are considered ***extremophiles***

What is meant by the term extremophile?

_____

_____

Use table 3 on pg 52 to determine in which types of environments each of the following subgroups of Archaea thrive?

Methanogens	*Halophiles*	*Thermophiles*	*Psychrophiles*

Homework:

Do pg. 53 #1, 3, 8, 9, 14