BACTERIA

1. Common shapes
	1. Cocci (round)
		1. Streptococcus
		2. Staphlylococcus
	2. Bacilli (rod-shaped) ex*. E. coli, Salmonella*
	3. Spirilla- helical
2. Cell Walls
	1. Peptidoglycans- polymer of sugars and amino acids
	2. Gram-Positive (absorbs and retains crystal violet stain 🡪 Purple)
		1. Thick peptidoglycan layer
		2. *Staphylococcus, Listeria, Clostridium*
	3. Gram-negative (does not absorb crystal violet 🡪 Pinkish)
		1. Thin peptidoglycan layer
		2. *E. coli, Yersinia pestis, Neisseria gonorrhoeae, Neisseria meningitides*
		3. Often associated with hospital-acquired infections
	4. Antibiotic treatment depends on type (works on cell walls)
3. Reproduction
	1. Binary fission- cell grows, replicates DNA and splits
	2. Budding- new individual develops as bud from parent
	3. No sexual reproduction- so how do you exchange genetic info?
		1. Conjugation (horizontal gene transfer)
			1. Through tube called pilus
			2. Exchange plasmids (small DNA portions)
4. Plasmids
	1. Can exist independently from bacterial chromosome
	2. Small, circular portion of DNA
	3. Usually is adaptive for bacteria
	4. F plasmid
		1. F+ can transfer to F-
		2. F=Fertility
		3. Passed to daughter cells
	5. R Plasmids
		1. Resistance to antibiotics
		2. Can transfer resistance to different species of bacteria (more pathogens!)





1. Antibiotics
	1. Difficult to manufacture because they need to specifically target bacterial cells but not harm your own cells.
	2. Penicillin- originally discovered through mold growing on bacterial plates (Alexander Fleming)
	3. Have greatly reduced the number of deadly infections in humans (tuberculosis, surgery infections)
	4. Types
		1. Weaken cell wall
		2. Weaken cell membrane
		3. Interfere with bacterial enzymes
	5. Resistance
		1. All antibiotic classes used today were discovered prior to the mid 80’s
		2. Bacteria with random mutations that cause resistance to antibiotics are able to survive and reproduce while those without selected against
		3. We are essentially selecting for bacteria that do not respond to antibiotics
		4. Misuse
			1. Against viruses
			2. Prophylactic
			3. Failure to finish prescribed dose
			4. Food animals to prevent infections
		5. Superbugs
			1. Resistant to many types of antibiotics
			2. Thought to form is hospital settings where resistant strains come together
			3. Makes treatment nearly impossible
			4. Multi Drug Resistant TB, Methicillin Resistant Staph Aureus
			5. ‘Post Antibiotic Era’?