

# [Ch. 1](https://assignbuster.com/ch-1/)

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Ch. 1 Prokaryotes = bacteria , archaea Eukaryotes = Fungi, protozoa , algae (Growth:: Mitosisæœ‰çµ²åˆ†è£‚) Bacterial cell â†’ Bacillus(rodlike) , cocus (spherical), spiral (curved) \*P. S. æœ‰æ™‚ æœƒstar-shaped or square â†’ å‡ºç�¾æ—¢å½¢å¼�: pairs, chains, clusters cell walls of bacteria â†’ peptidoglycan (carbohydrate & protein complex) cell walls of plant and algal cell â†’ cellulose Growth:: Binary fission = bacteria reproduce by dividing into two equal cells bacteria å�¸æ”¶nutrients from dead / living organisms/ photosynthesis / inorganic substance ä½¢åœ°å�¯ä»¥swim by moving flagella Archaea if ä½¢åœ°æœ‰cell wall â†’ lack peptidoglycan Found in extreme environments -Growth:: Binary fission -cell wall â†’ peptidoglycan åˆ†3 main groups â†’ methanogens + extreme halophiles + extreme thermophiles Methanogens â†’ produce methane Halophiles â†’ live in extreme env. eg. The Dead Sea Thermophiles â†’ live in hot sulfurous water eg. Hot springs at Yellowstone National Park Fungi Cells hv a district nucleus = DNA surrounded by special envelope(lipid membrane) = nuclear membrane unicellular(eg. yeast) / multicellular (eg. Mushrooms, molds) cell wall of true fungi â†’compose of chitin æœ€common fungi â†’ molds(mycelia (bread & fruit) â†’ compose of long hyphae) å�¸æ”¶nourishment by absorbing sol. of organic material from environment (eg. Soil , seawater)slime molds â†’ æ“�æœ‰characteristics of both fungi & amoebas Protozoa -unicellular -move by pseudopods, flagella , cilia å�¸æ”¶nutrients from absorb or ingest organic compound \*Euglena â†’ photosynthetic, use light as source and carbon dioxide as chief source to produce sugars Amebaeéƒ½ä¿‚ move by using pseudopods Algae å¥½å¤šshapes & sexually & asexual reproductive forms. -usually unicellular -rich in freshwater, salt water, soil, association wif plants -photosynthesis for food production & growth -no need organic compounds -Produce oxygen & carbohydrates for other organisms(eg. Animal) Viruses -so small (diff. From the aboves) -acellular (nt cellular) -only one type of nucleic acid (DNA/RNA) -st encase by envelope -reproduce by using the cellular machinery of other organisms. -parasites of other forms of life (é� å…¶ä»–ç” Ÿå‘½ç” Ÿå­˜like å¯„ ç” ŸèŸ²) Multicellular Animal Parasites -eukaryotes -eg. helminths(è •èŸ²) Genetics info. In a cell = genome Chomosomes contains DNA(genes) Genes = segment of DNA Genotype & Phenotype G. = inheritable info. (å�¯ç¹¼æ‰¿çš„) P. = å�—G. å½±åš®è€Œè¡¨ç�¾å‡ºä¾†, eg. Blood, height, iq, color of eye Ch. 10 Three domain: eukaryotes + prokaryotes (bacteria, archaea)-Each domain shares genes wif other domains eg. Thermotogaä¿‚ å¾žan archaeonæ¼” è®Šçš„ -Kingdom â†’ Phylum â†’ class â†’ order â†’ family â†’ Genus â†’ species \*Classification is base on similarity in nucleotide sequence in rRNAProkaryotes vs Virus:::-Virus cannot survive independently.-Virus ä¾�è³´host cell Ch. 4 After dividing, Cocci â†’ pairs = diplococci â†’ chainlike = streptococci â†’ groups of four = tetrads â†’ groups of eight = sarcine â†’ grapelike clusters = staphylococci Bacilli â†’ single = single bacillus â†’ pairs = diplobacilli â†’ chains = streptobacilli â†’ oval, like cocci = coccobacilli Spiral â†’ curved = vibrios â†’ helical shape, rigid = spirillum â†’ helical shape, flexible = spirochete External of cell wall -Glycocalyx (gelatinous polysaccharide & / polypetide covering) â†’ Capsule = the substance is organized & is firmly attached to the cell wall (\*protect pathogens from phagocytosis & prevent desiccation) â†’ Slime layer = .. unorganized & only loosely attacted. â†’ Extracellular polysaccharide -Flagella â†’ rotate to push the cell â†’ +ve taxis(movement of bacterium) moves towards an attractant, -ve taxis moves away from a repellent -Axial Filaments â†’ spiral cells tht move by spirochetes â†’ similar to flagella, diff. : it wrap around the cell (åŒ…ä½�) -Fimbriae and pili â†’ help cells adhere to surfaces â†’ pili are involved in DNA transfer & twiching motility Cell wall -prevent bacterial cells from rupturing when the water pressure inside the cell > outside the cell -maintains shape of bacterium -serves as a pt of anchorage for flagella Peptidoglycan -disaccharide (NAG + NAM)+ polypeptide Diff. Between Gram +ve & Gram-ve cell wall- -ve æœ‰outer membrane å…ˆåˆ°peptidoglycan å†�åˆ°plasma membrane while +ve ç›´æŽ¥pep. åŒ…ä½�plasma membrane- -ve æ—¢ peptidoglycan â†’ thin- +ve contains teichoic acids while -ve dun hv- +ve produce exotoxins; -ve produce exo. +endotoxin- +ve 2 rings basal body ~ -ve 4 rings \*prokaryotic plasma membrane less rigid than eukaryotic ,, . cuz lack of sterols (except Mycoplasma (prokar.) which has sterols) cytoplasm ä¿‚ plasma membraneå…¥é�¢ Nucleoid ï¼� bacterial chromosome Ribosome = protein synthesis (è¶Šhigh rate, è¶Šlarge no. of ribosome) \*prokaryotic ribosome smaller & less dense (70S ribosomes); eukaryotic cells (80S) Endospores (cells) å‘¢å€‹é�Žç¨‹å�« sporogenesis 1)Spore septum begins to isolate newly replicated DNA & a small portion of cytoplasm 2)Plasma membrane starts to surround DNA, cytoplasm, & membrane isolated in step 1. 3)Spore septum surrounds isolated portion, forming forespore. 4)peptidoglycan layer forms between membranes 5)spore coat forms 6)Endospore is freed from cell. Flagella & cilia (ç´°èƒžé�¢dæ¯›æ¯›)-flagella â†’ few & long -cilia â†’ short & numerous Nuclear envelopeä¿‚ åŒ…ä½�nucleusæ—¢membrane Nuclear envelope é™„ è¿‘ å€‹dä¿‚ endoplasmic reticulum(ER) Ch. 5 Metabolism: sum of the Chemical rxn;;; ATP & oxygen required catabolism = release energy , breakdown of complex organic compound; hydrolytic rxn; exergonic anabolism = require energy , building of complex organic molecules; dehydration synthesis rxn; endergonicMetabolic pathway = sequence of enzymatically catalyzed chem. rxn in a cell;; determined by enzymes = encoded by genesFactors affecting enzyme activity: 1)Temp. â†’ move faster = more energy ; best â†’ optimal temp. cuz denaturation if too high 2)pH â†’ optimum pH;; extreme change in pH = denaturation3)Substrate conc. â†’ increase conc of substrate molecules = increase rate until enzyme mole. are filled = max. rate4)inhibitor Respiration 1)Aerobic respiration â†’ the final electron acceptor in the e- transport chain is molecular O2 2)Anaerobic respirationm â†’ …....... is usually an inorganic substance and not O2 Fermentationâ†’ aerobic / anaerobicâ†’ spoilage of food(general use)â†’ produce alcoholic beverages / acidic dairy productsScientific definition â†’ release energy from oxidation of organic molecules; no need oxygen and use the krebs cycle ; the final electron acceptor is an organic molecule1)Alcohol fermentation â†’ produce ethanol + CO22)Lactic acid fermentation â†’ produce lactic acid\*homolactic fermentation produces lactic acid only heterlactic fermentation produce lactic acid & other compoundsCh. 6 Microbial GrowthPhysical requirement: 1)Temp. â†’ psychrophiles(cold-loving microbes) , mesophiles(moderate temp.), thermophiles(heat-loving) ; psychrotrophs â†’ grow at 0 or 20-30degree â†’ food spoilage2)pH â†’ grow best in pH 6. 5-7. 5; molds & yeast grow abt pH5-6 ; acidophiles grow in acidic envir. 3)Osmotic pressure â†’ hypertonic envir. = plasmolysis ; extreme / obligate halophiles = grow in high salt conc. ; facultative halophiles = no require high salt envir. But grow in salt conc. 2%Chemical requirements1)Carbon2)Nitrogen, sulfur, phosphorous3)Trace elements â†’ find in tap water, even distilled water4)Oxygen5)Organic growth factor Culture media = any material prepared for the growth of bacteria in a lab. Culture = microbes that grow and multiply in or on a culture mediaAgar = solidifying agentObtaining pure cultures â†’ streak plate methodPreserve microbes â†’ by deep-freezing / freeze-dryingBacterial replication:: Binary fission1)parent cell enlarges2)Duplication its chromosome3)cell wall & plasma membrane begin to constrict4)Cross-wall forms, completely separating the two DNA copies; then cells separateGeneration = time required for a cell to divideMeasurement of microbial growth:: Plate counts(ï¼�ç”¨plate åŽ» é‡�åº¦) â†’ needs some times 24hrs or up ; too many colonies â†’ inaccuraciesç‚ ºé�¿å…�too many, â†’ serial dilutionPour plate , spread plate(better â†� avoid contact between cells & melted agar)Mutation(3types)1. Beneficial mutations2. Harmful mutations3. Silent mutationsPhysical / chemical agents = mutagensWays of bacteria acquire new genetic: 1. Lysogenic Conversion2. Transduction3. Transformation4. ConjugationA plasmid can integrate into the chromosome = episomePlasmid:: 1. Conjugative plasmid: Carries genes for sex pili & transfer of the plasmid2. Dissimilation plasmids: Encode enzymes for catabolism of unusual compounds3. Complex transposons carry other genes