

Ch. 1

Literature, Russian Literature



Ch. 1 Prokaryotes = bacteria , archaea Eukaryotes = Fungi, protozoa , algae
 (Growth:: Mitosis) Bacterial cell â†’ Bacillus(rodlike) , coccus
 (spherical), spiral (curved) *P. S. , star-shaped or square â†’
 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 , nutrients from dead / living organisms/
 photosynthesis / inorganic substance swim by moving
 flagella Archaea if cell wall â†’ lack peptidoglycan Found in
 extreme environments -Growth:: Binary fission -cell wall â†’ peptidoglycan
 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 distinct 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 common fungi â†’ molds(mycelia
 (bread & fruit) â†’ compose of long hyphae) , nourishment by
 absorbing sol. of organic material from environment (eg. Soil ,
 seawater)slime molds â†’ characteristics of both fungi &
 amoebas Protozoa -unicellular -move by pseudopods, flagella , cilia
 , nutrients from absorb or ingest organic compound *Euglena â†’
 photosynthetic, use light as source and carbon dioxide as chief source to
 produce sugars Amebae, move by using pseudopods Algae
 shapes & 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...¶lä»-ç" Yå'½ç" Yå~like å-,, ç" YèY²) Multicellular Animal Parasites -eukaryotes -eg. helminths(è •èY²) Genetics info. In a cell = genome Chomosomes contains DNA(genes) Genes = segment of DNA Genotype & Phenotype G. = inheritable info. (å◆-ç¹¼æ %o¿çš,,) P. = å◆—G. å½±åš®è€€èj"ç◆¾å±ºä¾¼†, 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®Ščš,, -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 & / polypeptide 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 attached. â†' Extracellular polysaccharide -

Flagella rotate to push the cell +ve taxis (movement of bacterium) moves towards an attractant, -ve taxis moves away from a repellent -Axial Filaments spiral cells that move by spirochetes similar to flagella, diff. : it wrap around the cell -Fimbriae and pili help cells adhere to surfaces pili are involved in DNA transfer & twitching 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 outer membrane peptidoglycan plasma membrane while +ve plasma membrane- -ve thin- +ve contains teichoic acids while -ve don't have +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, plasma membrane... Nucleoid bacterial chromosome Ribosome = protein synthesis (high rate, large no. of ribosome) *prokaryotic ribosome smaller & less dense (70S ribosomes); eukaryotic cells (80S) Endospores (cells) 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 -flagella few & long -cilia short & numerous Nuclear envelope, nucleus 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; endergonic Metabolic pathway = sequence of enzymatically catalyzed chem. rxn in a cell;;; determined by enzymes = encoded by genes Factors 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 = denaturation 3)Substrate conc. â†' increase conc of substrate molecules = increase rate until enzyme mole. are filled = max. rate 4)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 products Scientific definition â†' release energy from oxidation of organic molecules; no need oxygen and use the krebs cycle ; the final electron acceptor is an organic molecule 1)Alcohol fermentation â†' produce ethanol + CO₂ 2)Lactic acid fermentation â†' produce lactic acid*homolactic fermentation produces lactic acid only heterlactic fermentation produce lactic acid & other compounds Ch. 6 Microbial Growth Physical requirement: 1)Temp. â†' psychrophiles(cold-loving microbes) , mesophiles(moderate temp.), thermophiles(heat-loving) ; psychrotrophs â†' grow at 0 or 20-30degree â†' food spoilage 2)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 requirements

- 1) Carbon
- 2) Nitrogen, sulfur, phosphorous
- 3) Trace elements

find in tap water, even distilled water

- 4) Oxygen
- 5) 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 media

Agar = solidifying agent

Obtaining pure cultures

- streak plate method
- Preserve microbes
- by deep-freezing / freeze-drying

Bacterial replication:: Binary fission

- 1) parent cell enlarges
- 2) Duplication its chromosome
- 3) cell wall & plasma membrane begin to constrict
- 4) Cross-wall forms, completely separating the two DNA copies; then cells separate

Generation = time required for a cell to divide

Measurement of microbial growth:: Plate counts

- 1/4 plate
- 24hrs or up ; too many colonies
- inaccuracies
- serial dilution

Pour plate , spread plate (better

- avoid contact between cells & melted agar)

Mutation (3 types)

1. Beneficial mutations
2. Harmful mutations
3. Silent mutations

Physical / chemical agents = mutagens

Ways of bacteria acquire new genetic:

1. Lysogenic Conversion
2. Transduction
3. Transformation
4. Conjugation

A plasmid can integrate into the chromosome = episome

Plasmid::

1. Conjugative plasmid: Carries genes for sex pili & transfer of the plasmid
2. Dissimilation plasmids: Encode enzymes for catabolism of unusual compounds
3. Complex transposons carry other genes