

Name :Ali mehran

Id#13724

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Teacher:Maam Pashmina

Q1:difference b/w prokaryotic cells and eukaryotic cells?

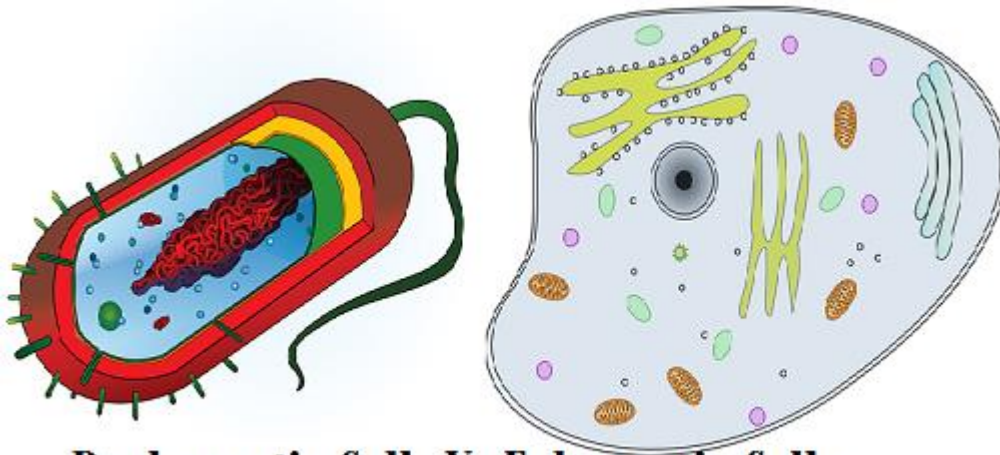
Ans: **Prokaryotes**

are simple, small cells, whereas **eukaryotic cells** are complex, large structured and are present in trillions which can be single celled or multicellular. Prokaryotic cells do not have a **well-defined nucleus** but DNA molecule is located in the cell, termed as **nucleoid**, whereas eukaryotic cells have a **well-defined nucleus**, where genetic material is stored. Based on the structure and functions, cells are broadly classified as Prokaryotic cell and Eukaryotic cell

Prokaryotic Cells

are the most primitive kind of cells and lack few features as compared to the eukaryotic cell. **Eukaryotic cells** have evolved from prokaryotic cells only but contain different types of organelles like Endoplasmic reticulum,

Golgi body, Mitochondria etc, which are specific in their functions. But features like growth, response, and most importantly giving birth to the young ones are the commonly shared by all living organisms.



Prokaryotic Cells Vs Eukaryotic Cells

Differences between Prokaryotic and Eukaryotic cells

Features	Prokaryotic	Eukaryotic
Size	Size of cell is 1-2µm by 1-4µm or less.	Greater than 5 µm in diameter.
Cell type	Mostly unicellular(some cyanobacteria)	Mostly multicellular.

	may be multicellular).	
Nucleus	True nucleus is absent. Nucleus lack nuclear membrane and nucleolus. Such nucleus is called nucleoid.	Nuclear membrane and nucleolus are present.
Chromosome	Usually single circular without histones.	Multiple linear with histones.
Genes	Expressed in groups called operons.	Expressed individually.
Zygote	Merozygotic (partially diploid).	Diploid.

Cell division	Binary fission of budding	Involves mitosis.
Sexual reproduction	No meiosis. Transfer of DNA only.	Involves meiosis.
Permeability of nuclear membrane	Absent.	Selective.
Cytoplasmic streaming	Absent	Present
Cytoskeleton	Absent	Present
Pinocytosis	Absent	Present
Gas vacuoles	Can be present	Absent
Mesosome	Present. Performs the function of Golgi	Absent

bodies and mitochondria and also help in the separation of chromosome during cell division.

Ribosome	Smaller size 70S, distributed in the cytoplasm.	Larger size 80s, found on membranes as in endoplasmic reticulum; 70s present in organelles such as chloroplast and mitochondria.
Mitochondria	Absent	Present
Chloroplast	Absent	Present

Endoplasmic
Reticulum

Absent

Present

Q2: what do you know about the normal flora? write Down its advantages and disadvantage?

Ans: normal flora:

It is a mixture of micro organisms that are regularly found at any anatomical sites of human body. These are like the permanent residents of a city; they're not just passing through! Depending on what part of the body we're talking about, the normal flora can vary. For instance, on the skin, normal flora is made up of bacteria such as staphylococci. In the mouth, bacteria called streptococci can be found.

- **Advantages**

1. They prevent colonization by pathogens by competing for attachment & nutrients.
2. Some synthesize vitamins that are absorbed as nutrients by the host (e.g. K & B12).
3. Some produce substances that inhibit pathogenic species.

4. They stimulate the development of certain tissues, e.g. colon and lymphatic tissues in gastrointestinal tract.
5. They stimulate production of cross-reactive antibodies. Since the normal flora behave as antigens in an animal, they induce low levels of antibodies that cross react with similar antigens on pathogens, preventing infection or invasion

- **Disadvantage**

1. It has both advantages as well as disadvantages.
2. They prevent or suppress the entry of the pathogens.
3. Colonies produced by some organisms of normal flora have a harmful effect on the pathogens.
4. Endotoxins liberated by normal flora may help the defense mechanism of the body.....

Q3: differentiate the following:

Ans: Archea vs Bacteria

Comparison Chart

BASIS FOR COMPARISON	ARCHAEA	BACTERIA
Meaning	Archaea are single-cell, simple microorganisms and are capable of surviving under extreme condition. They are considered as the most primitive cells, which originated on the earth 4 billion years ago.	Bacteria are also single-cell but have the complex structure. All types of bacteria except archaea falls under this category.
Found in	Archaea are found in unusual environment like in hot spring,	They are found everywhere like in the soil, water, living

BASIS FOR COMPARISON	ARCHAEA	BACTERIA
	ocean depth, salt brine.	and non-living organisms.
Cell Wall	The cell wall is said to be as pseudopeptidoglycan .	The cell wall is made up of peptidoglycan with muramic acid or lipopolysaccharide.
Lipid membrane	Archaea have ether bonds with the branching of aliphatic acids in their lipid membrane.	Eubacteria or bacteria have lipid membrane of ester bonds with fatty acids.
Metabolic pathway	Archaea do not follow glycolysis or Krebs cycle	Follow glycolysis pathway and Kreb's cycle to

BASIS FOR COMPARISON	ARCHAEA	BACTERIA
	but uses similar pathway.	break down glucose.
Types	Methanogens, Halophiles, Thermoacidophiles.	Gram-positive and gram-negative.
Reproduction	Archaea reproduce asexually by binary fission, fragmentation, or by the budding process.	Bacteria can produce spores which allow them to live in unfavourable condition.
Other features	Thymine is absent in the tRNA (transferase RNA).	Thymine is present in the tRNA.

BASIS FOR COMPARISON	ARCHAEA	BACTERIA
	Introns are present.	Introns are absent.
	RNA polymerase is complex and contains 10 subunits.	RNA polymerase is simple and contains 4 subunits.
	Archaea are non-pathogens.	Some bacteria are pathogens.
Examples	<ol style="list-style-type: none"> 1. Pyrolobus fumarii. 2. Sulfolobus acidocaldarius. 3. Pyrococcus furiosus. 4. Methanobacterium formicum. 	<ol style="list-style-type: none"> 1. Streptococcus pneumoniae. 2. Yersinia pestis. 3. Escherichia coli (E.coli). 4. Salmonella enterica.

B) differentiate b/w endotoxins and exotoxins

Exotoxins are usually heat labile proteins secreted by certain species of bacteria which diffuse into the surrounding medium.

Endotoxins are heat stable lipopolysaccharide-protein complexes which form structural components of cell wall of Gram Negative Bacteria and liberated only on cell lysis or death of bacteria.

S.N.	Exotoxins	Endotoxins
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1	Excreted by organisms, living cell	Integral part of cell wall
2	Found in both Gram positive and Gram Negative bacteria	Found mostly in Gram Negative Bacteria
3	It is polypeptide	It is lipopolysaccharide complex.
4	Relatively unstable, heat labile (60°C)	Relatively stable, heat tolerant
5	Highly antigenic	Weakly immunogenic
6	Toxoids can be made by treating with formalin	Toxoids cannot be made
7	Highly toxic, fatal in μg quantities	Moderately toxic

8	Usually binds to specific receptors	Specific receptors not found
9	Not pyrogenic usually, Toxin Specific	Fever by induction of interleukin 1 (IL-1) production, Shock
10	Located on extrachromosomal genes (e.g. plasmids)	Located on chromosomal genes
11	Filterable	Not so
12	It has mostly enzymatic activity	It has no enzymatic activity
13	Its molecular weight is 10KDa	Its molecular weight is 50-1000KDa
14	On boiling it get denatured.	On boiling it cannot be denatured.

15	Detected by many tests (neutralization, precipitation, etc)	Detected by Limulus lysate assay
16	Examples: Toxins produced by <i>Staphylococcus aureus</i> , <i>Bacillus cereus</i> , <i>Streptococcus pyogenes</i> , <i>Bacillus anthracis</i> (Alpha-toxin, also known as alpha-hemolysin (Hla))	Examples: Toxins produced by <i>E.coli</i> , <i>Salmonella Typhi</i> , <i>Shigella</i> , <i>Vibrio cholera</i> (Cholera toxin- also known as cholera toxin)
17	Diseases: Tetanus, diphtheria, botulism	Diseases: Meningococccemia, sepsis by gram negative rods

C)differentiate b/w protozoa and fungi

Ans

- Fungi

Fungi belong to the group of Eukaryotes which includes different types of species. Common types of fungi are yeasts, mold, and mushrooms. The kingdom fungi could be classified into five true phyla namely, Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota and the recently described Phylum Glomeromycota. The characteristic feature that distinguishes fungi from other plants, some protists and bacteria is their presence of chitinous cell walls. Fungi are heterotrophic which make them similar to animals. They secrete different types of digestive enzymes on organic matter to absorb food by decomposing them.



Fungi do not possess chlorophyll. Therefore, they do not photosynthesize. In the context of fungal growth, they accomplish their locomotive motives. In simple terms, their growth is their means of mobility. They may also produce spores which are flagellated or not. Flagellated spores accomplish their mobility through the flagella and the rest of the spores have the capacity to travel through air or water.

- **protozoa**

Protozoa are considered to be single-celled organisms which are eukaryotes that possess cell nuclei. They also share common characteristics with animals. Common characteristics include locomotion and heterotrophy. Protozoa are abundantly present in environments that possess high levels of moisture (aqueous environments) and soil in which they occupy different stages of trophic levels. Protozoa accomplish their movement through the presence of cilia and flagella or amoebic movement through pseudopodia. The protozoan that possesses flagella is referred to as flagellates. They may possess a single flagellum or multiple flagella. Ciliates move due to the presence of hair-like cilia. According to the pattern of the beating of cilia, these protozoa can alter their direction of the route. Protozoa such as *Amoeba* accomplish locomotion through pseudopodia. Some protozoa are stationary and they do not move. These types of protozoa are referred to as sessile organisms.

They utilize different techniques and biological mechanisms to fulfill their food requirement for their growth and survival. Osmotrophy is a biological process which protozoa implement to absorb nutrients through their cell membranes. They perform phagocytosis by engulfing food particles with the assistance of pseudopodia. They also have the ability to directly uptake food particles from an aperture like structure which is called the cytosome. These processes are

identical to different types of protozoa species. Once taken in, the food particles are digested within the large vacuole the protozoa possess.



Fungi vs Protozoa	
Fungi are a group of organisms which are multicellular eukaryotes.	Protozoa are a group of organisms in Kingdom Protista which are unicellular animals.
Cellular Structure	
Fungi are mainly multicellular.	Protozoa are unicellular.
Locomotion	

Fungi move through flagella, air or water.	Protozoa locomote by flagella, cilia, pseudopodia.
Cell Wall	
Fungi cell wall possesses chitin.	Protozoa cell wall possesses a pellicle which helps in protection and locomotion.
Examples	
Some examples of fungi are <i>Aspergillus</i> , <i>Penicillium</i> , <i>Curvularia</i> , yeasts, <i>Agaricus</i> , <i>Mucor</i>	Some examples of protozoa are <i>Amoeba</i> , <i>Paramecium</i>

D) differentiate b/w host and parasite.

- Host

The host is the organism that harbours another organism in a symbiotic relationship. There are three types of symbiotic relationships as mutualism, commensalism or parasitism. In mutualism, the host benefits. While, in commensalism, the host does not get benefits or losses/harm. But, in parasitism, the host gets harmed. For example, take termites. Termites are an example of a host

in a mutualistic relationship with protozoa in which the protozoa live inside the gut of the termite, easing the digestion of the cellulose. Whales, turtles, and sharks are examples of hosts in a commensalistic relationship with remoras. Here, the remoras can adhere to their host to be freely transported. In parasitism, we can identify several types of hosts. Moreover, the primary or the definitive host allows the maturation of the parasite and its sexual reproduction. However, the secondary or the intermediate host harbours only a short transition period of the parasite.

- **Parasite**

A parasite is an organism that depends at the expenses of the host. Parasites always show a lower organization than their host and there are major parasitic groups among arthropods, mollusks, annelids, nematodes, flatworms, and cnidarians. Furthermore, plants can also become parasitic on other plants. In addition, fungi, protozoa, bacteria, and viruses can become parasites as well. However, the main characteristic feature of a parasite is that it always benefits at the expenses of the host.



E) Differentiate b/w plant and animal cells.

Ans: Plant Cell vs. Animal Cell

Plant and animal cells have several differences and similarities. For example, animal cells do not have a cell wall or chloroplasts but plant cells do. Animal cells are mostly round and irregular in shape while plant cells have fixed, rectangular shapes.

Plant and animal cells are both eukaryotic cells, so they have several features in common, such as the presence of a cell membrane, and cell organelles, like the nucleus, mitochondria and endoplasmic reticulum.

Comparison chart

Animal Cell versus Plant Cell comparison chart

	Animal Cell	Plant Cell
Cell wall	Absent	Present (formed of cellulose)
Shape	Round (irregular shape)	Rectangular (fixed shape)
Vacuole	One or more small vacuoles (much smaller than plant cells).	One, large central vacuole taking up to 90% of cell volume.
Centrioles	Present in all animal cells	Only present in lower plant forms (e.g. chlamydomonas)
Chloroplast	Absent	Plant cells have chloroplasts to make their own food.

Animal Cell versus Plant Cell comparison chart

	Animal Cell	Plant Cell
Cytoplasm	Present	Present
Ribosomes	Present	Present
Mitochondria	Present	Present
Plastids	Absent	Present
Endoplasmic Reticulum (Smooth and Rough)	Present	Present
Peroxisomes	Present	Present
Golgi Apparatus	Present	Present
Plasma Membrane	Only cell membrane	Cell wall and a cell membrane
Microtubules/ Microfilaments	Present	Present
Flagella	Present in some cells (e.g.	Present in some cells (e.g. sperm of bryophytes and

Animal Cell versus Plant Cell comparison chart

Animal Cell Plant Cell

mammalian pteridophytes,
sperm cells) cycads and
Ginkgo)

Lysosomes occur in cytoplasm. Lysosomes usually not evident.

Nucleus Present Present

Present Most plant cells do not contain cilia.

Cilia

