Hello students, this lecture series is for first year BSc

microbiology students. The title of the paper is introduction and

scope of microbiology.

This is Unit 2 and the name of the unit is diversity of

microorganisms. The name of the module is general

characteristics of cellular microorganisms. Part 2 and acellular microorganisms. This is module number 15. I am Ms. Shilpa Shirodkar, Assistant Professor, Government College of

Arts, Science and Commerce, Marcela, Goa. The outline is

cellular microorganisms, which

includes primarily. Algae, fungi, and protozoa, acellular

microorganisms include viruses, viroids and prions.

At the end of this module, the students will be able to explain

characteristics of cellular as well as acellular

microorganisms. And also will be able to cite examples of

different groups of microorganisms. What are cellular

and acellular microorganisms.

Cellular microorganisms are those which contain a living

cell. For example, bacteria,Archaea, protozoa, algae.

Acellular microorganisms are those which do not contain a

living cell.

For example, viruses, viroids,prions, these are called as

infectious agents. First, we'll move on to cellular

microorganisms. In this module will study only about algae,

fungi and protozoa. Algae are eukaryotic photosynthetic organisms.

The characteristics are as follows. They are eukaryotic

organisms and they contain a cell wall which is usually made up of

cellulose. Algae can be either unicellular or multicellular

organism. They are photosynthetic organisms because

they contain chlorophyll.

They lack a well defined body such as roots, stems, or leaves.

And hence thy are known as

nonvascular. They are found wherever there is adequate

moisture present. Reproductionin algae can be both asexual

and. In sexual forms.

Algae can be free living and some can form symbiotic

relationships with other organisms, for example Lichens.

Some are motile and some are non motile.

The first image is of Sargassum .

And the second image is giant kelp. Some examples of algae

include chlorella, spirulina, Spirogyra, etc.

The first image includes Gracilaria, which is a red algae

and second image is a microscopic image of Spirogyra.

Next we move on to fungi. Characteristics include.

Fungi are eukaryotic organisms.

Which includes yeast, molds,mushrooms. They are typically non motile and the cell wall is made up of chitin. They can be unicellular or multicellular.

Fungi are known to form characteristic threadlike filaments called hyphae. When These hyphae come together, it forms a mesh like structure called as mycelium and it helps them in absorbing materials.Different materials, organic materials, inorganic materials,almost all fungi produce filamentous structures except for yeast. yeast are unicellular fungi. The mode of reproduction can be either sexual or asexual. Sexually, they reproduce by means of spores. Some fungi can be macroscopic, for example bread mold, or mushrooms. These are some examples of fungi.First image is an example of mycelium which is formed by mushrooms. Second image is an yeast that is scanning electron microscope image of yeast. Fungi like chlorophyll and therefore they cannot photosynthesize and therefore are called as heterotrophic organisms. They Can be decomposers or saprophytes. That is they can feed on dead organic matter.

They can be.

In symbiotic relationship with other organisms, they'll be called as symbionts and they can be in a harmful relationship with other organisms called as host, and such fungi are called as parasites. Examples include Aspergillus niger, Penicillin Saccharomyces cereviseae, etc. The First image is, microscopic image of Penicillium. And the second image is an image of bracket fungi. Next we move onto

Protozoa. Protozoa are unicellular eukaryotes and they belong to Kingdom Protista.

They lack chlorophyll and therefore cannot photosynthesize except for genus Euglena.

Protozoa are heterotrophic organisms, and they obtain their nutrition through absorption or ingestion by using specialized structures. They may exhibit two life forms, that is, they can be either free living in aquatic,freshwater, or seawater, or they can be parasitic. They can be either ectoparasites or endoparasites. They can be either solitary, existing alone, or they can be found in colonies together. Reproduction can be through. Asexual means.

That is by binary Fusion or multiple fission, budding or through sexual means by forming gamets. Examples of protozoa

include Euglena para Marsham,Plasmodium species, etc. These are some images of protozoa.First images of Paramecium and the second image is of Euglena.

Now let's move onto a cellular microorganisms. Acellular microorganisms that we are going to discuss in this module are viruses, viroids and prions.Viruses are obligate parasites, which means that they cannot reproduce or function on their own. They need another cell called as a host for their for their survival. They will use host cell machinery to survive.

Now, viruses consist of nucleic acid code. It can be either DNAor RNA, but never both DNA or RNA can be either single stranded or double stranded, never both this nucleic acid core is surrounded by a protein coat known as capsule. Some Viruses also contain an extra lipid layer called as an envelope. The entire infectious virus particle is called as avery on, and they are known to infect other microorganisms.

Both prokaryotic as well as eukaryotic. Some examples of viruses include HIV, which causes AIDS polio virus, which causes polio. And Paramyxoviruses which causes measles. There are various other examples. The first image is an

image of Ebola virus and the second image is a 3D

representation of rabies virus.

Next we move on to viroids,

viroids. Are different from viruses, viroids contain naked

fragments of single stranded RNA, but they do not contain a

protein code and they are usually found to be affecting

plant cells and not animal cells as of now.

They are transmitted between plants in the same manner as

viruses. Some examples of diseases caused by viroids

include potato spindle tuber.

Which is caused by potato

spindle tuber viroid. And there are various other examples.

No animal diseases have been discovered yet caused by

viroids. Next we move on to

prions. Prions is derived from term proteinaceous infectious

particle which refers to pathogen that causes

transmissible spongiform

encephalitis. Prions are unique in a way that they do not

contain any nucleic acid code.These are just abnormally folded

proteins that cause

neurodegenerative diseases.Diseases such as bovine

spongiform encephalopathy in cattle and livestock scrapie in sheeps, Fatal familial insomnia in humans etc.

These are progressive degeneration. These cause progressive degeneration of brain and eventually they cause death.

Prions are smaller than viruses and only can be observed using an electron microscope. When They are aggregated and form a cluster. These are the references. Thank you.