Chapter 5 Section 1

: Microorganisms and Biological Behavior of Living Things

**Discovery of Microorganisms**

Microorganisms are not able to be seen with the naked human eye. They are super tiny and have to be seen through a microscope. Microorganisms were discovered during a period between 1665-1683. The two men who discovered them were Robert Hooke and Antoni van Leeuwenhoek. Robert Hooke was born on July 18th, 1635 and died early March of 1703. He was a radiant scientist and was also an architect and philosopher. Antoni van Leeuwenhoek was born in 1632 and died in the year 1723. He did not have any higher education, so he was not like any other scientist. Yet, he managed to discover what is known today as the microscope. Antoni is also known as “the Father of Microbiology”. With the invention of the microscope, the discovery of microorganism arose. Leeuwenhoek described and also observed microscopic bacteria and protozoa. Microscopes made this possible for him to do. After centuries passing by, the microscope became the backbone in the understanding of the role of microbes in infections and the causing of diseases.

**Types of Microorganisms**

The study of microorganisms is called microbiology. Millions of microorganisms, also known as microbes, occupy almost every environment on Earth. . Some examples of microbes are bacteria and archaea which only consist of one single cell. Mainly the ones focused on the most are bacteria, fungi, and protista. Other groups included as a microbe are fungi and viruses.

**Bacteria**

Bacteria is single-celled, as mentioned before. The cell structure of a bacteria microbe is quite simple. It contains no nucleus nor a membrane bound organelle. Also, one would think that all bacteria are harmful, but the truth is that not all are harmful. Some bacteria even live in on or within other organisms. There are approximately 10 times more bacterial cells as there are human cells in the body. That is such a big amount of just bacteria. A lot of the bacteria is found in the digestive system lining. Do bacteria reproduce or just die off? Of course, they reproduce, that’s why there’s so many. The way that bacteria reproduce is binary fission. What ends up happening in binary fission is that the bacterium divides into two identical daughter cells. First thing that happens is that the DNA divides into two. Then the cells split into two daughter cells each with identical DNA to the parent cell. Each of the daughter cells are an exact clone as its parent cell. A bacteria cell replicates really fast and produces very many other bacteria. A reason humans become sick very fast is because of this.

**Fungi**

Fungi can differ from bacteria because it can be single-celled but it can also be a multicellular organism. It can be found mainly on soil or plant material, not so much in sea or fresh water. A decomposer that is found in soil play an important role to the cycling of carbon. There’s only a couple of diseases that fungi cause in animals. On the other hand, the fungi diseases that develop in humans are athletes foot, thrush and ringworm. There are also different types of fungi.

Three major fungi groups:

* single celled microscopic yeasts
* multicellular filamentous moulds
* macroscopic filamentous fungi that form large fruiting bodies.

Another fungus is yeast. Yeast tends to be the size of as some red blood cells. They don’t reproduce, they multiply by budding. Budding is an asexual reproduction method where a new organism develops from a bud or outgrowth caused by the cell division.

**Protozoa**

Protozoa are single celled just like bacteria. They have a variety of different sizes and shapes and they have a very complex structure. Protista live mainly in moist areas such as fresh water, marine areas and some soil. Some protozoa are actually parasitic, meaning they live off of other animals or even some plants and animals. There are certain ways that protozoa can move that are interesting. They are motile by:

* Flagella- in few amounts and are long and move in a whip-like motion that make waves.
* Cilia- many tiny hair like structures that are in the cells surface. They move and beat in persistent manners.

**Viruses**

Viruses tend to be one of the smallest microorganisms there are. A reason for the common cold is because there’s so many of them and they are incredibly small. One reason that they are unique from all the other microorganisms is because they can multiply in the cells of other living organisms. The host cell is where the viruses tend to multiply inside of. The virus itself is made of DNA or RNA. DNA stands for deoxyribonucleic acid and RNA stands for ribonucleic acid. It also consists of a protective layer called a capsid and an envelope. Viruses cannot reproduce sexually. There are two ways in which viruses multiply. One way that they are multiplied is by budding. Budding was already explained on how it functions. The other way that they are multiplied is by lysis. Lysis is where the virus bursts out of the hosts cell and tries to enter another host cell to start and multiply. Another reason to why viruses are more unique is because they are both living and nonliving microorganisms

**Biological Behavior in Living Organisms**

**Diversity among Organisms**

Living organisms are studied in many forms as to how they function, move, concepts and their theories. With all the knowledge that is known, it helps with a better understanding of the concept. A lot of organisms have a lot of similar ways as to how they live, maintain life, how they function and maintain energy. With that being said, not all organisms have the same similarities. One main example of an organism being different than others are plants. Plants seem to receive energy directly from the sun. Animals, on the other hand, maintain and get energy through the consuming of rich foods synthesized by plants. There are also some single- celled organisms and some multicell organisms. There are a lot of characteristics to why some living things pertain to a certain group.

**Cells**

Anything that is a self-replicating life-form has to do be composed from cells. Cells are just like microbes, they can only be seen through a microscope because they cannot be seen with the naked eye. Cells are the fundamental units of all human life. They have many basic functions, such as: extraction of energy, protein synthesis, replication and etc. There are many types of cells though, not just one type. They all have different functions to life and a different role on the human body. Cells are not just in humans, they are in everything else too. Furthermore, there are some that have some of the most basic functions. For example, a nucleus encloses on DNA and the protein skeleton helps operations be put together. Then, there are multicelled cells that perform some functions that other cells do not perform. Muscle cells contract, gland cells secrete some hormones and some other cells have other operations. Cell composition contains of some nitrogen, hydrogen, oxygen, sulfur, phosphorus, and mainly carbon.

Genetic information encoded in DNA give out information for assembling protein molecules. This kind of code is practically the same for all kinds of life forms. There a lot of complex ways in which DNA is used throughout the making of genes and proteins. The function of each protein depends on the amino acids and the sequence and the forms in order to gain the genetic information. Some of the molecules assembled help out with replication genetic information, helping with cells going in and out of the cell, and regulating molecular interactions. Some specialized cells, such as those of protein molecules, have some other kind of functions. Such things as effecting concentration, carrying oxygen, responding to outside stimuli and things like that. In other cells, they have other functions in which they serve. The types of other functions are that cells are assembled may be transmitted to be used as digestive enzymes, hormones, or some antibodies.

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