

**The Biology Digital Reserve**

**Podcast #1 transcription, September 2007.**

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**PODCAST NUMBER 1: LIVING BEINGS**

Hello and welcome to RADIO NUMBER ONE, The Biology Digital Reserve's Podcast service.

This is our first Podcast. The date of this recording is: September 24th, 2007.

This podcast has 2 sections: The first one is called "THE LECTURE", which consists of a brief summary of selected topics explained by the biology teacher. The second section is called "THE SONG", featuring a surprise melody.

O.K. now, let's begin THE LECTURE.

Living beings, also named organisms, are characterized for having 4 fundamental stages.

The first one, birth, will occur when a mammal comes out of the uterus, when a bird comes out of an egg, when a plant germinates or when a bacterium cell divides.

The second one, growth, happens when the organism's cells divide and produce an increase in length or weight, or when a single cell organism produces substances that allow new functions.

The third one, reproduction, will occur when organisms mate, such as male and female animals or plants, or when a single cell divides to produce two cells.

The fourth and final one, death, will happen when vital functions cease in an organism.

Apart from having these four stages, all living beings are also formed by CELLS, which are the structural and functional unit for living beings, which means, a cell is the smallest portion of matter capable of having life within. Cells were first observed by Antonie van Leeuwenhoek when he built the first microscope; then Robert Hooke coined the term "cell", because they looked like the geometrical figures that are present in cork. Later, Schleiden and Schwann proposed all living beings were formed by cells, and this was the first cellular theory. Finally, Virchow added that the cells contained hereditary information, which is now known as DNA, and cells pass on this information when they divide.

The organisms are classified by a science called TAXONOMY. Carl Linneus proposed the BINOMIAL NOMENCLATURE, or scientific name, for naming all living beings and also those who did exist in the past but are now extinct, like dinosaurs. The first word in the scientific name is the GENUS or genre, and the second one is the SPECIES. As an example, the domestic cat is named *Felis catus*, this means, "Felis" is the genus and "catus" is the species. The binomial nomenclature is useful for scientists as organisms receive a worldwide unique name.

Several genera form a FAMILY; several families form an ORDER; many orders form a CLASS; a lot of classes form a PHYLUM, and finally PHyla join together to form KINGDOMS.

5 kingdoms exist: Monera, Protista, Fungi, Plantae and Animalia.

The Monera kingdom is composed of bacteria, which are unicellular organisms that do not possess a nucleus, this means, their DNA is floating around in the cytoplasm. Remember that, organisms without a nucleus are also called PROKARYOTES. They feed on detritus or decomposing matter, or from other living beings when they produce an infection.

The Protista kingdom is made of protozoans, which are unicellular organisms that do possess a nucleus which means, their DNA is surrounded by a special nuclear membrane. Remember that organisms with a nucleus are named EUKARYOTES. An example in this kingdom would be the parasite amoebas, which invade and obtain nutrients from a host organism.

The Fungi kingdom is composed of mushrooms, molds and yeasts, they are multicellular organisms and are heterotrophic which means they feed on other living beings to obtain energy. They have external digestion, this means, they pour digestive juices out of their bodies and over other organisms, and later they absorb the nutrient molecules.

The Plantae kingdom is made of plants, which are multicellular organisms and they are autotrophic. Autotrophic organisms are capable of PHOTOSYNTHESIS, which is a chemical reaction that depends on a CHLOROPHYLL a substance lying in the CHLOROPLASTS inside the plant cells. The photosynthesis reaction uses up carbon dioxide and sunlight energy to produce carbohydrates or sugars and oxygen.

The Animalia kingdom is made of multicellular heterotrophic organisms which have an internal digestion, this means, they ingest or eat their foods and the digestive juices are mixed with the nutrients inside their bodies. Animals possess respiration instead of photosynthesis. Respiration uses oxygen and carbohydrates to produce energy and carbon dioxide. This is the biggest kingdom, with the highest number of species.

All cells are formed by a MEMBRANE that holds several carbohydrate, protein and fat molecules used for communication between cells and for other chemical reactions. The plant cells possess an extra layer outside the membrane called the CELL WALL. The CYTOPLASM inside the cells is their most abundant substance, it is made of water and several proteins that hold and transport the ORGANELLES. Examples of organelles are: the mitochondria, which produces energy in heterotrophic cells; the chloroplasts that contain chlorophyll for photosynthesis in plant cells; the endoplasmic reticulum and Golgi apparatus which synthesize and pack proteins that will be exported out of the cell; and the nucleus, which holds the D.N.A. or deoxyribonucleic acid.

The DNA is a molecule that carries the instructions, or genes, that are required for producing all the necessary proteins in a living being. The DNA is formed of phosphate, the sugar deoxyribose and four bases which are known as: ADENINE, THYMINE, GUANINE and CYTOSINE. The sequence of those bases code up the genes. All the functions of your bodies, all your organs, your physical

characteristics and even the way you think, are all coded in the genes inside your cells. The sum of all the genes inside a cell is called GENOME and this will be transferred to your children when you get to reproduce.

All living beings possess some other important characteristics: they are formed by 4 main chemical elements, carbon, hydrogen, oxygen and nitrogen. They possess irritability, which means they can respond to external stimuli like light, darkness, high or low temperatures, sound, touch, etc. They also possess metabolism which is a group of functions for producing or using energy like respiration, excretion, digestion, and temperature. They possess homeostasis which is the regulation of the internal balance of water levels, temperature, hormones, etc.

The living beings show some important interactions, and perhaps the most important is the one related to ENERGY TRANSFER. When plants use sunlight to produce carbohydrates, they are actually transforming pure energy into a fuel that can be used by other living beings. This energy transfer process is also known as TROPHIC NET or food chain.

Plants are also known as PRIMARY PRODUCERS, and are able to absorb up to 10% of the sunlight's energy. The organisms that eat plants, known as PRIMARY CONSUMERS or herbivores, absorb only 1% from the original sunlight energy when they eat the plants. SECONDARY CONSUMERS or carnivores are organisms that eat herbivores, and will absorb only 0.1% from the original sunlight energy. TERTIARY CONSUMERS are carnivores that eat other carnivores and absorb only 0.01% from the original sunlight energy. Finally, DECOMPOSERS like bacteria or fungi degrade and break up the molecules of a living being after it dies, and carbon dioxide is produced during this process. The energy that is not absorbed is returned to the atmosphere as HEAT.

This is the end of THE LECTURE.

Now, this is THE SONG. I won't tell the name of the song or the singer – you'll have to guess them! Send your answers to my e-mail, and if you guess them correct you may get a special surprise.

Thanks for tuning RADIO NUMBER ONE, The Biology Digital Reserve's podcast service. Good bye, until the next Biology podcast.