

ILLUSTRATED
GUIDE BOOK

4D MASTER

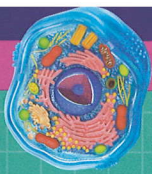
4D SCIENCETM ANIMAL CELL



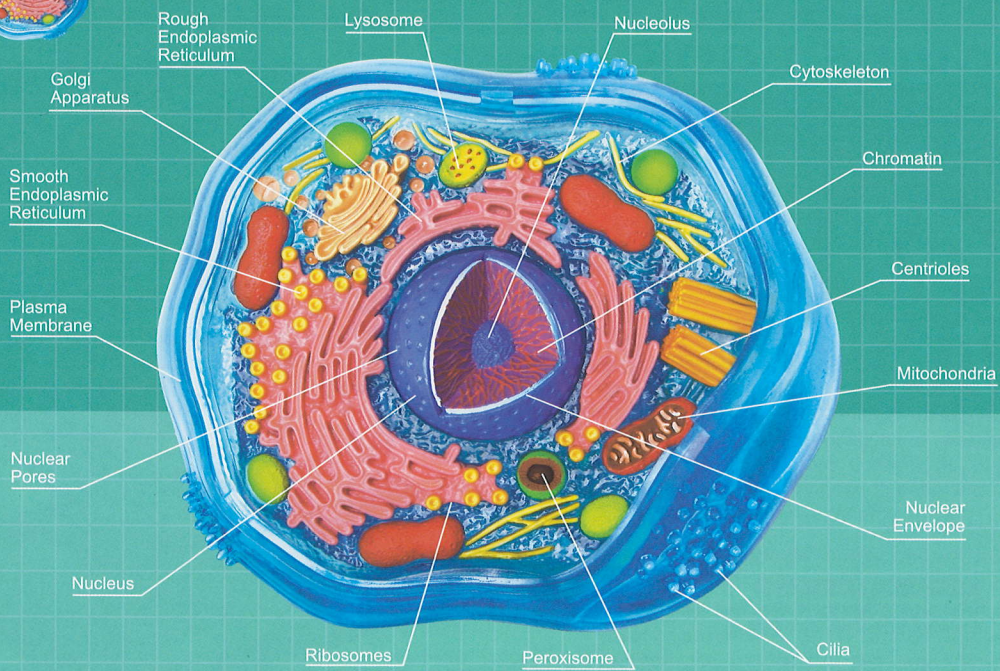
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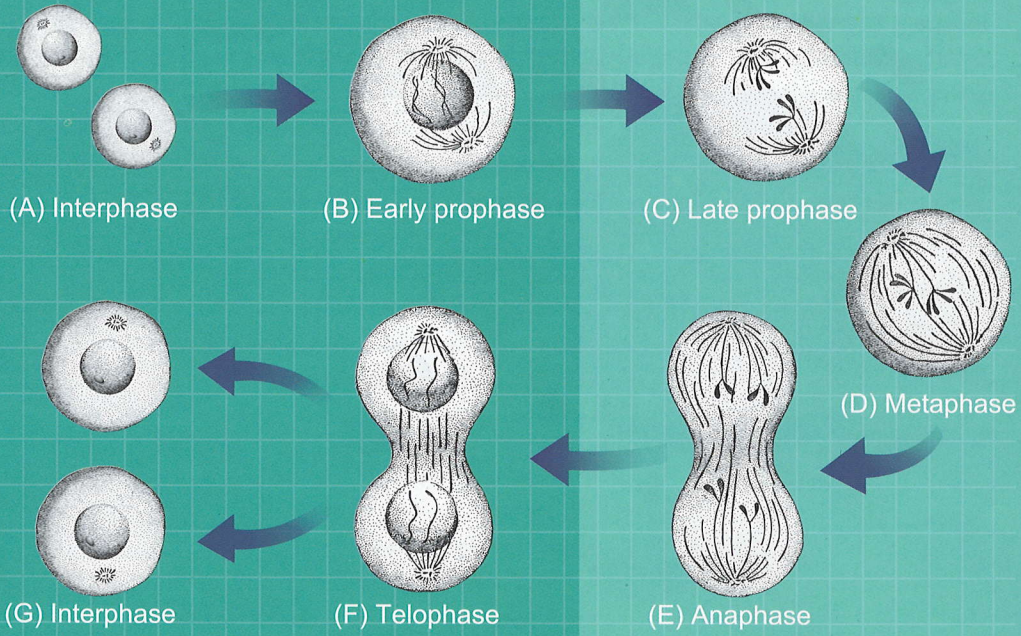
• MASTER SCULPTURING • DETACHABLE PARTS • HIGHLY DETAILED FINISH •



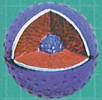
ANIMAL CELL ANATOMY



MITOSIS IN ANIMAL CELL



NUCLEUS



The nucleus is the most obvious organelle in most of eukaryotic cells, which is enclosed in a double membrane and contains most of the cell's genetic material, organized as multiple long linear DNA molecules in complex with a large variety of proteins, such as histones, to form chromosomes.

NUCLEOLUS



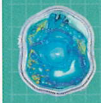
It is a prominent structure inside the nucleus, which is where ribosomal RNA is produced. Scientist found that some cells have more than one nucleolus.

CENTROSOME



The centrosome in animal cell is also called the Microtubule Organizing Center (MTOC), which consists of a pair of centriole (animal cells only). During animal cell division, the centrioles replicate and the centrosome divides. Then the two centrosomes move to opposite ends of the nucleus, and microtubules of the centrosomes grow into a "spindle" which is responsible for separating replicated chromosomes into the two daughter cells.

CYTOPLASM



It is a semi-transparent jellylike fluid that fills most cells, and consists of three major elements; the cytosol, organelles and inclusions. The cytosol is the "soup" inside all the cells.

SMOOTH ENDOPLASMIC RETICULUM



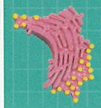
Endoplasmic reticulum (ER) is a vast network of membrane-bound vesicles and tubules responsible for the production of hormones and other secretory products. The smooth ER has different functions depending on the specific cell type.

RIBOSOMES



They are packets of RNA and protein. As an essential role in both prokaryotic and eukaryotic cells, it assembles individual amino acids into polypeptide chains of proteins. This process is called "translation".

ROUGH ENDOPLASMIC RETICULUM



It appears "pebbled" due to numerous ribosomes on its surface. Proteins synthesized on these ribosomes are collect in the endoplasmic reticulum for transport throughout the cell.

PEROXISOME



It is membrane-bound packet of oxidative enzymes. In animal cells, they protect the cell from their own production of toxic hydrogen peroxide. That is the way that white blood cells produce hydrogen peroxide to kill bacteria. Peroxisomes also help to break down the hydrogen peroxide into water and oxygen.

MITOCHONDRIA



It is a bacteria sized power generator; it provides the energy needed for a cell to move, to divide, to produce secretory products. They may have different shapes depending on the cell type. Scientists found that mitochondria contain DNA too; we called it Mitochondrial DNA (mtDNA).

CYTOSKELETON



It is the skeleton contained within the cytoplasm, which helps to maintain cell shape. Actually, the internal movement of cell organelles, such like cell locomotion and muscle fiber contraction could not function without the cytoskeleton. The cytoskeleton consists of three primary protein filaments (microtubules, microfilament and intermediate fibers).

GOLGI COMPLEX



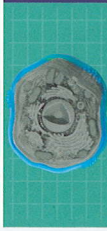
It also called Golgi apparatus, Golgi body or dictyosome. This important apparatus has the function to manufacture and package the macromolecules such as proteins and lipids that are synthesized by the cell. The Golgi complex plays as a part of the endomembrane system of eukaryotic cells, which regulates protein traffic and performs metabolic functions.

SECRETORY VESICLES



They are membrane-bound vesicles derived from the Golgi complex and contain material (e.g. hormones, neurotransmitters.) that is to be released from the cell, and then transported to the cell surface for release.

CELL MEMBRANE



All cells have a "skin" called the cell membrane or plasma membrane. It is semipermeable lipid bilayer and made of phospholipids, which is compatible with water both within the cytosol and outside of the cell. It acts as a protective barrier to the uncontrolled flow of water, also made more complex by the presence of numerous proteins that are crucial to cell activity

Q: What does a plant cell have that an animal cell doesn't have?

A: A Plant cell has cell walls, and may have chloroplast and large vacuole, while animal cell does not have . Some animal cells have very tiny vacuole though.

Q: What does an animal cell have that a plant cell doesn't have?

A: Animal cell has a structure called centriole, which plays a very important part in animal cell division, but plant cell doesn't have.

Q: Do all the animal cells look the same?

A: No, there are many different kinds of animal cells, in various shapes and functions. Even in a single organism, its cells won't be the same in different parts of the individual.

Q: What is the main substance that builds up an animal cell?

A: WATER!! It is the main substance which found in cytoplasm of animal cells. Our body contains 60-70% of water, and the body of an adult jellyfish is made up of 94-98% water.

Q: What drive a cell to divide?

A: The simple answer is "genes"! The DNA inside the nucleus of original and paternal cell is the "blueprint" that shows how to build an organism. Genetic material prompt drive the cell to divide into two cells, then two cells divide to make four.....and so on and on.

Q: Why animals need to eat food, but plants do not?

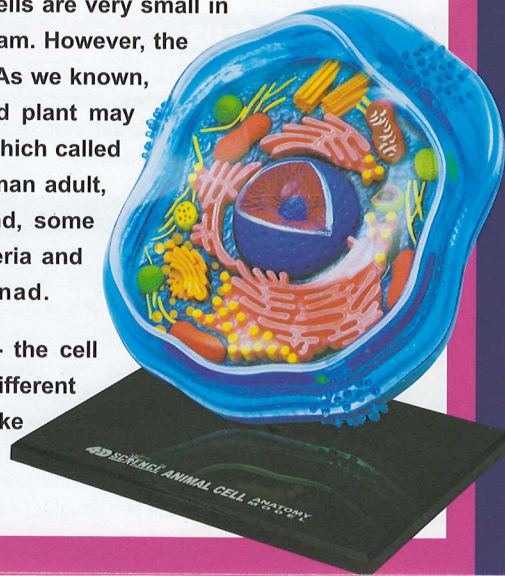
A: That is because; most of the plants can produce food by themselves during the photosynthesis. They use the sunlight to convert carbon dioxide and water into carbohydrates. On the other hand, animals cannot directly use the sunlight as their energy source, so they need to eat plants or other animals to get their energy.

Q: Can we see a single animal cell without using microscope?

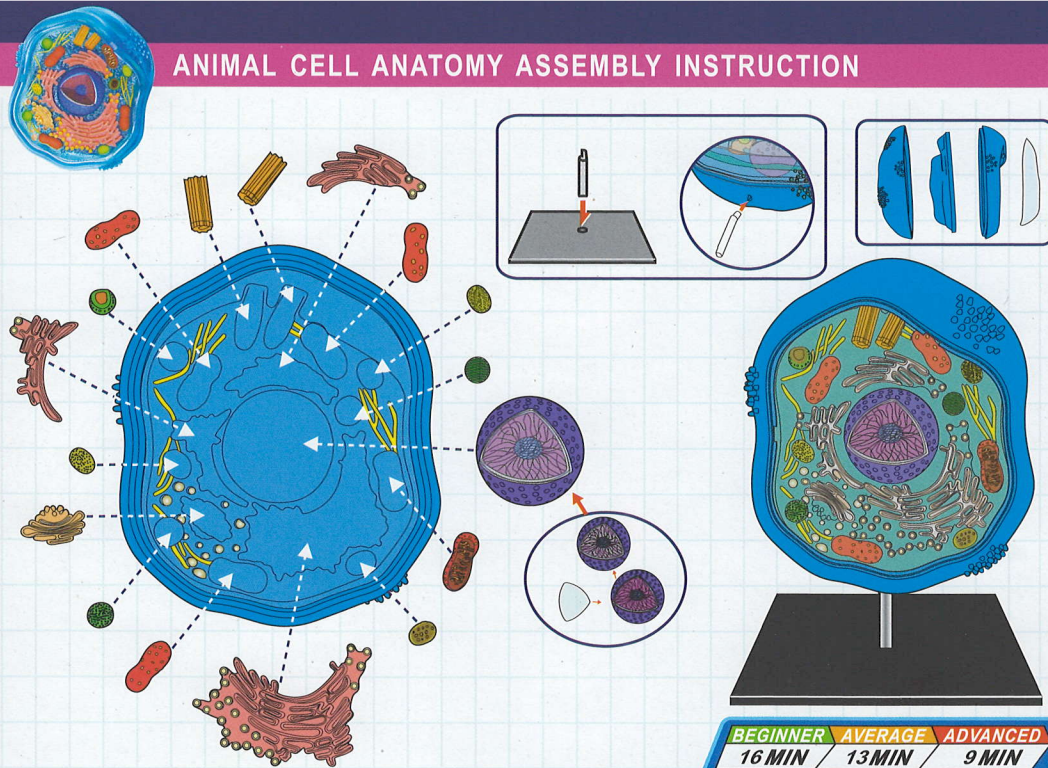
A: Yes! Eggs are the biggest single cell in most of organisms. Some of them are big enough for us to see. As we known, ostrich egg is the biggest of all.

The word cell comes from the Latin cellula, which means a small room. Robert Hooke was the first to study and record cells by using a microscope. The descriptive name "CELL" for the smallest living biological structure was also given by him, and used in his book that published in 1665. In 1837, a Czech Jan Evangelista Purkyně first observed small "granules" at the plant tissue through a microscope. The cell theory was first developed in 1839 by Matthias Jakob Schleiden and Theodor Schwann. The cell is a basic functional part and the smallest living unit in all known living organisms. Most of the living cells are very small in size, and measured in unit of μm , and weight in nanogram. However, the eggs are the biggest single cell in most of organisms. As we know, ostrich egg is the giant of all. One single animal and plant may consists of a great number of cells in different types, which called multicellular. Some complex organisms, such as a human adult, may have over 100 trillion of cells. On the other hand, some organisms only consist of a single cell, such as bacteria and ameba, which are called unicellular, protist or monad.

The Animal Cell is enclosed in a thin, double layer - the cell membrane. This small room contains many different organelles including a membrane-bound nucleus. Unlike the plants cells, animal cells do not have cell wall.

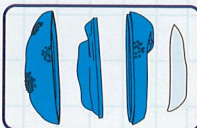
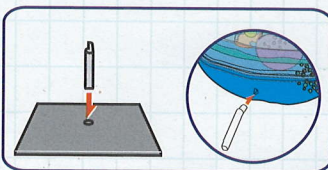
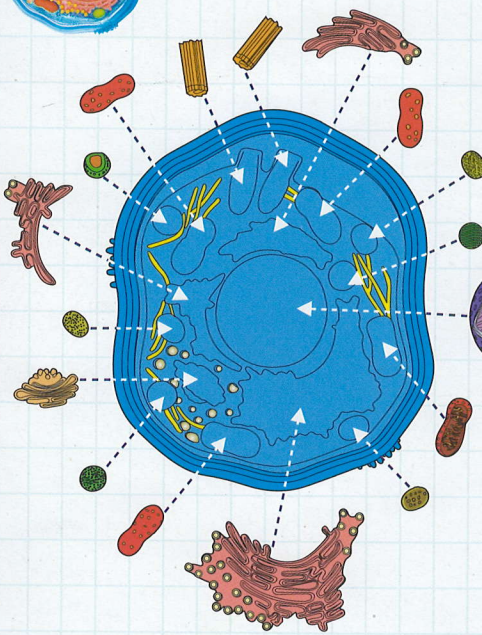
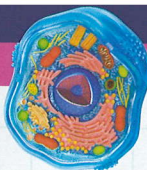


ANIMAL CELL ANATOMY ASSEMBLY INSTRUCTION

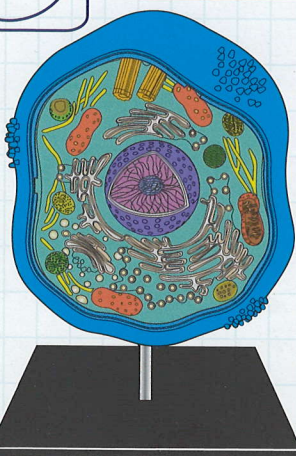


Total 24 pcs

ANIMAL CELL ANATOMY ASSEMBLY INSTRUCTION



Total 24 pcs



BEGINNER	AVERAGE	ADVANCED
16 MIN	13 MIN	9 MIN
YOUR RECORD !!		