Introduction to physiology

Physiology is the science that seeks to explain the physical and chemical mechanisms that are responsible for the origin, development, and progression of life. Each type of life, from the simplest virus to the largest tree or the complicated human being, has its own functional characteristics.

Human Physiology. The science of human physiology attempts to explain the specific characteristics and mechanisms of the human body that make it a living being.

What is the composition of our body?

Atoms—— molecules—— cells—— tissues——organs—— system—— organism

Homeostasis

Keep everything in balance

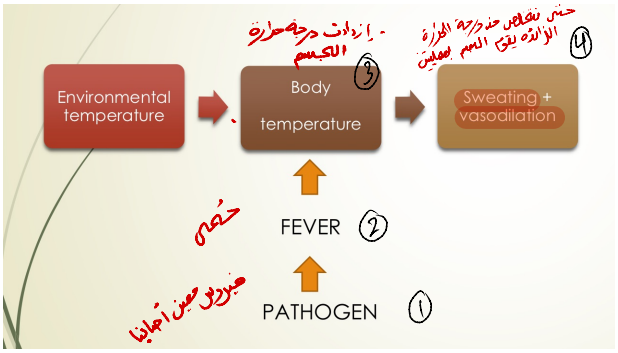
homeostasis to describe the maintenance of nearly constant conditions in the internal environment

-في حياتنا اليوميه قد نتعرض للعديد من uncontrolled external forces
فتتغير من بعض الحالات الطبيعيه داخل جسمنا

١.درجة الحراره

٢. Pathogen

a bacterium, virus, or other microorganism that can cause disease.



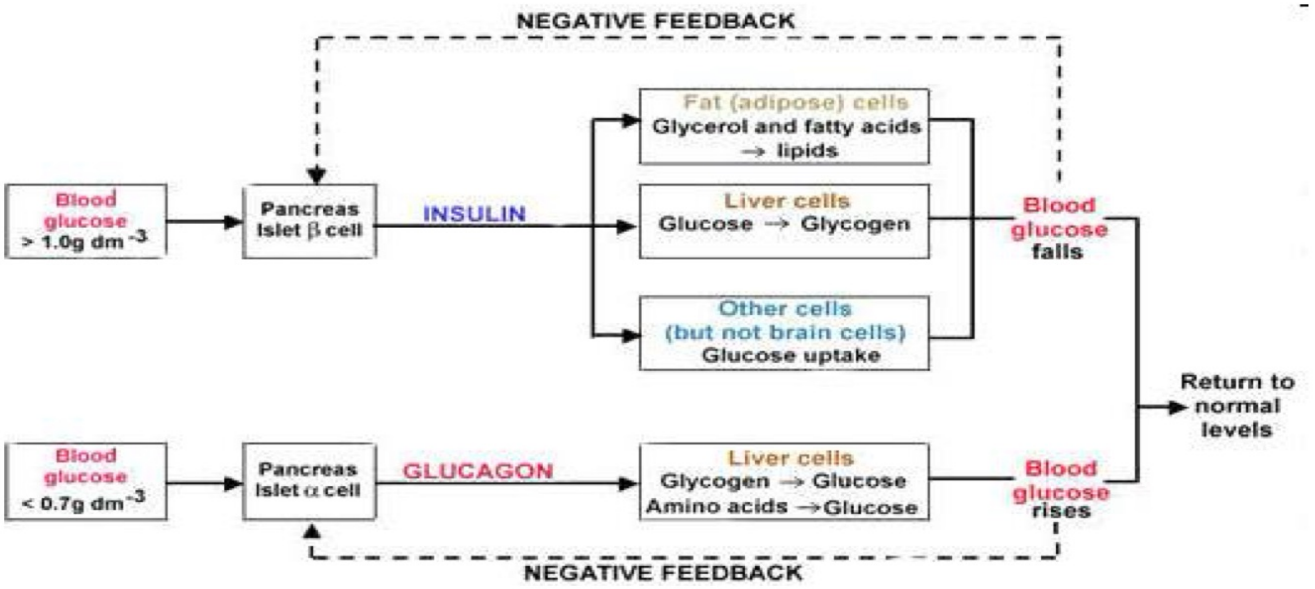
من خلال Homeostasis ترجع للحاله الطبيعيه

When the body temperature increases due to an increase in air temperature or certain pathogen, the body must return the temperature to the normal rate.

Note : **vasodilation** when blood vessels in your body widen, allowing more blood to flow through them and lowering your blood pressure so that help in heat loss.

example 2 of homeostasis

Glucose levels



When the level of glucose in the blood increases ,Insulin is . secreted to stimulate cells to up take glucose

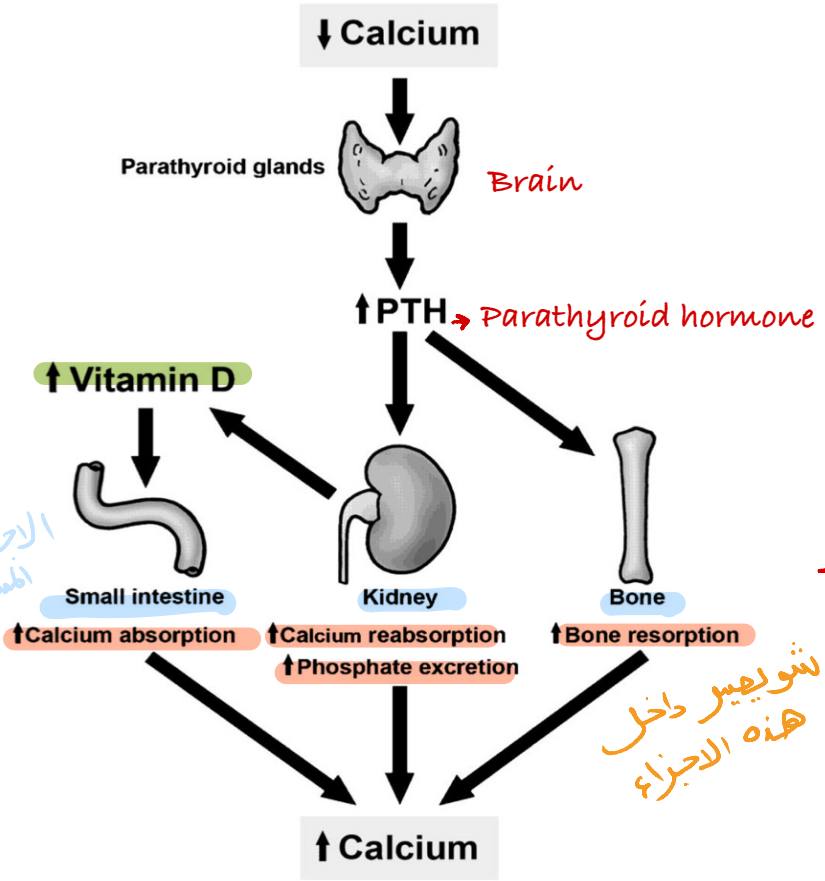
How? Liver cells convert glucose to glycogen

fat cells convert glycerol and fatty acids to lipids

When the level of glucose in the blood decreases, Glucagon is secreted to increase glucose.

How? Liver cells convert glycogen to glucose and amino acid to glucose

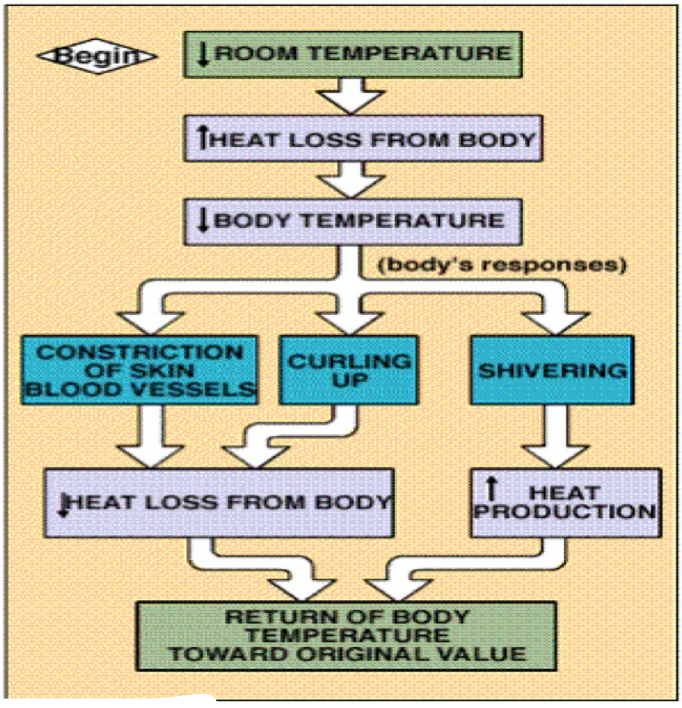
example 3 of homeostasis



when a calcium level decreases of its normal level ,certain receptor Send a signals to the control center which is the brain , the brain will make specific response which is stimulate the parathyroid glands so parathyroid hormone secretion will increase and then calcium levels return to the normal concentration.

→ It's important to know these mechanisms.

Note: the kidney convert the inactive form of vitamin D to active form



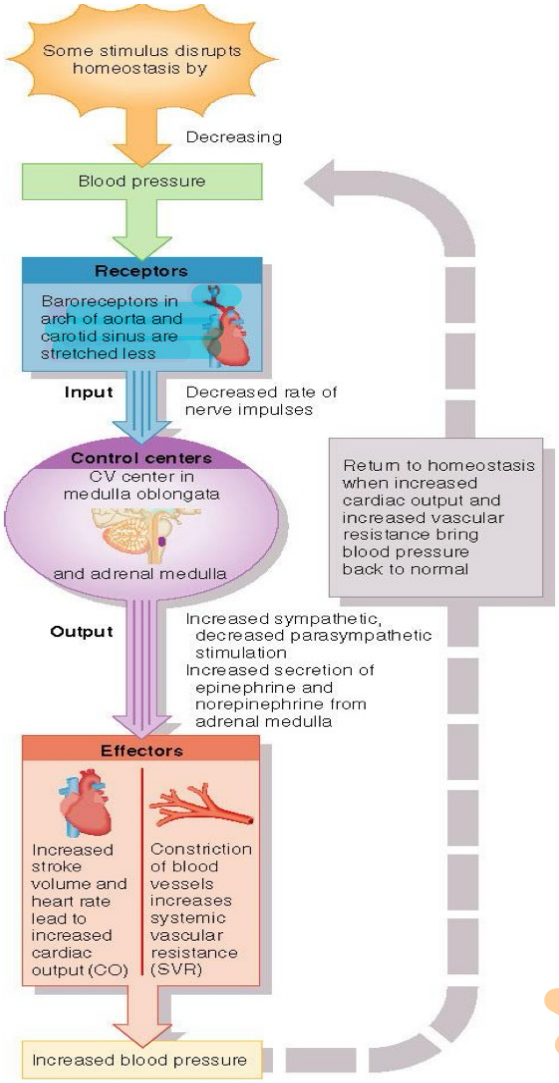
example 4 of homeostasis

→ it's clear

اللهم احرس أهل غزة بعينك التي لا تنام

example 5 of homeostasis

case: blood pressure decreases



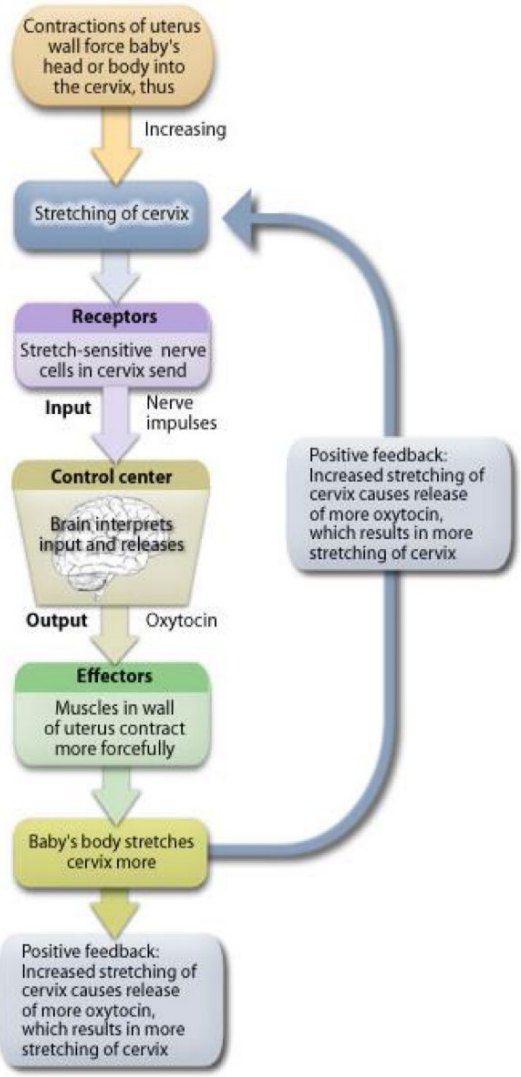
The Receptors (called baroreceptors) send signals to the control center (medulla oblongata and adrenal medulla) , the response is 1. Increased hart rate and stroke volume 2. Constriction of blood vessels increases SVR

↓

increased blood pressure

You have to know in case , which one is the receptor , control centers, effectors

example 6of homeostasis



Uterine contractions pushes baby to cervix

Stretch-sensitive receptors in cervix send impulse to brain

- Oxytocin is released into the blood

Contractions are enhanced and so Oxytocin release and baby pushes farther down the uterus

Cycle continues to the birth of the baby (no stretching)

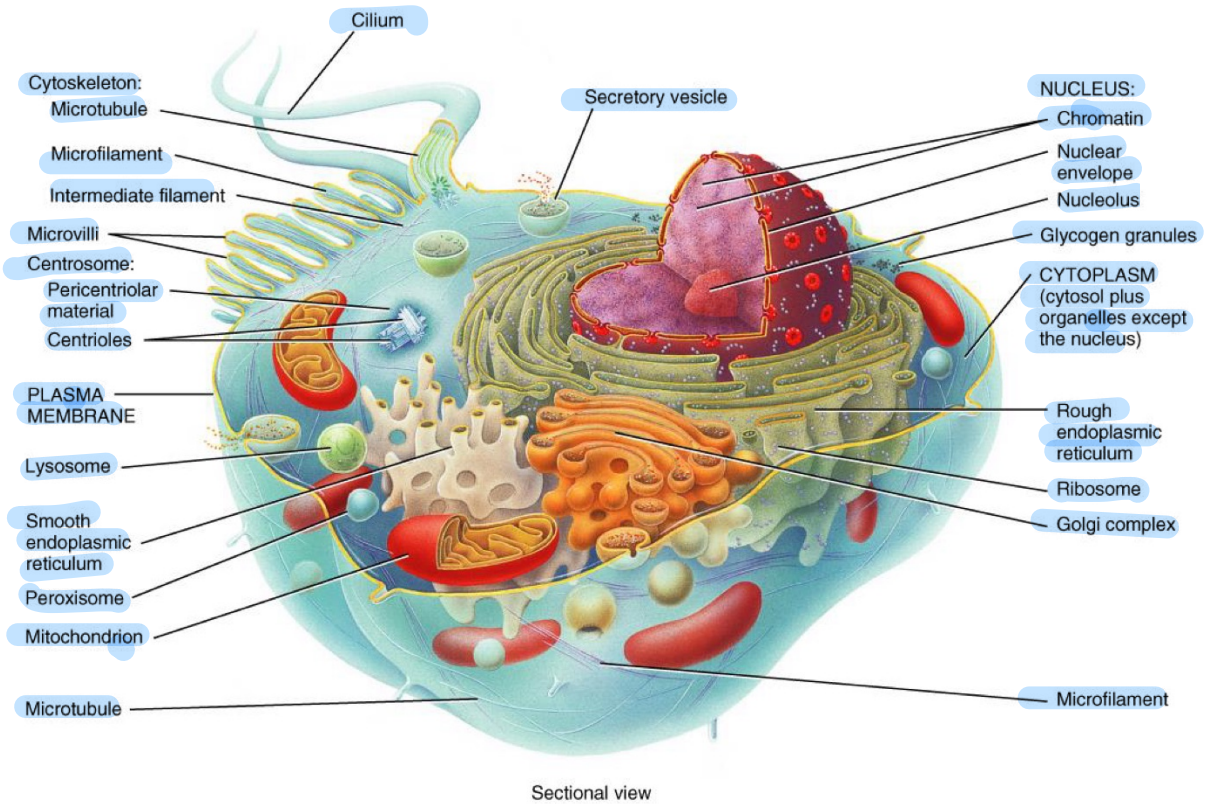
Feedback: is the mechanism by which our bodies maintain homeostasis

- **Negative**: Stimulus and response are opposite
- **Positive**: Stimulus and response in the same direction

كيف نحدد إذا كان negative أو positive ؟

في المثال الخامس ،ضغط الدم قل كيف عالجت الأمر؟ زدت ال contractivity وال heart rate

negative ←

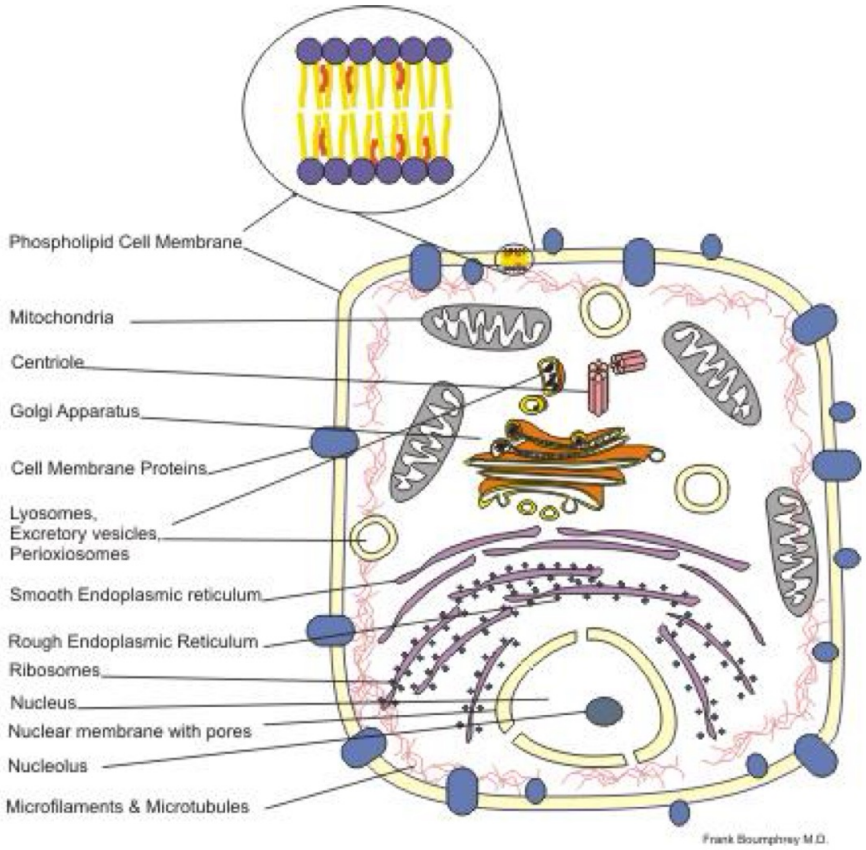


Sectional view

The Cell and Its Functions

بعد هذه الصفحه هي مراجعه لمادة البيو، حطيت اهم النقاط والباقي ان شاء الله نكون متذكرينه

Membrane



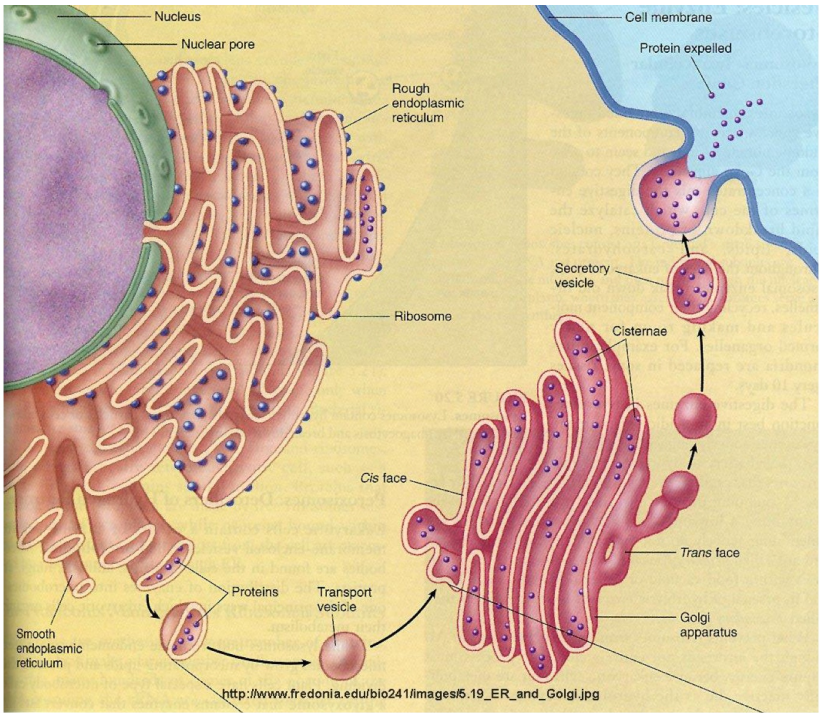
Most organelles of the cell are covered by membranes composed primarily of lipids and proteins. These membranes include the cell membrane, nuclear membrane, membrane of the endoplasmic reticulum, and membranes of the mitochondria, lysosomes, and Golgi apparatus.

Don't worry it's just a a review "biology "

The lipids in the membranes provide a barrier that impedes movement of water and water-soluble substances from one cell compartment to another because

water is not soluble in lipids. However, protein molecules in the membrane often penetrate all the way through the membrane, thus providing specialized pathways, often organized into actual pores, for passage of specific substances through the membrane. Also, many other membrane proteins are enzymes that catalyze a multitude of different chemical reactions, discussed here and in subsequent chapters.

ER and Golgi



The Golgi apparatus functions in association with the endoplasmic reticulum. small "transport vesicles" (also called endoplasmic reticulum vesicles, or ER vesicles) continually pinch off from the endoplasmic reticulum and shortly thereafter fuse with the Golgi apparatus. In this way, substances entrapped in the ER vesicles are transported from the endoplasmic reticulum to the Golgi apparatus. The transported substances are then processed in the Golgi apparatus to form lysosomes, secretory vesicles, and other cytoplasmic components that are discussed later in this chapter.

Endoplasmic reticulum network of tubular and flat vesicular structures in the cytoplasm, which is the endoplasmic reticulum. This organelle helps process molecules made by the cell and transports them to their specific, destinations inside or outside the cell. The tubules and vesicles interconnect. Also, their walls are constructed of lipid bilayer membranes that contain large amounts of proteins, similar to the cell membrane.

Substances formed in some parts of the cell enter the space of the endoplasmic reticulum and are then directed to other parts of the cell. Also, the vast surface area of this reticulum and the multiple enzyme systems attached to its membranes provide machinery for a major share of the metabolic functions of the cell.

Lysosomes and peroxisomes

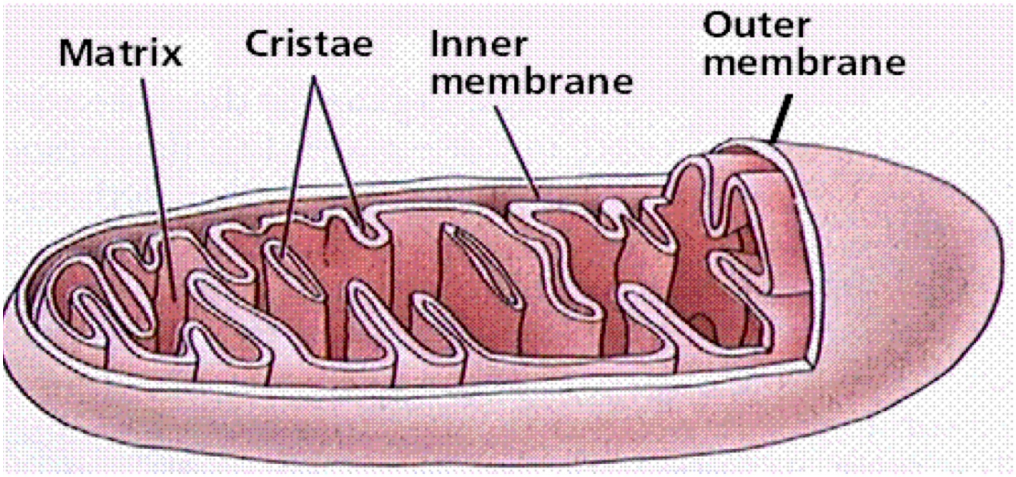
Lysosomes and peroxisomes

U.S. National Library of Medicine

The lysosomes provide an intracellular digestive system that allows the cell to digest (1) damaged cellular structures, (2) food particles that have been ingested by the cell, and (3) unwanted matter such as bacteria.

Peroxisomes are similar physically to lysosomes, but they are different in two important ways. First, they are believed to be formed by self-replication (or perhaps by budding off from the smooth endoplasmic reticulum) rather than from the Golgi apparatus. Second, they contain oxidases rather than hydrolases. Several of the oxidases are capable of combining oxygen with hydrogen ions derived from different intracellular chemicals to form hydrogen peroxide (H_2O_2).

Mitochondria



Mitochondria are present in all areas of each cell's cytoplasm, but the total number per cell varies from less than a hundred up to several thousand, depending on the amount of energy required by the cell.

The basic structure of the mitochondrion is composed mainly of two lipid bilayerprotein membranes: an outer membrane and an inner membrane.

CYTOSKELETON