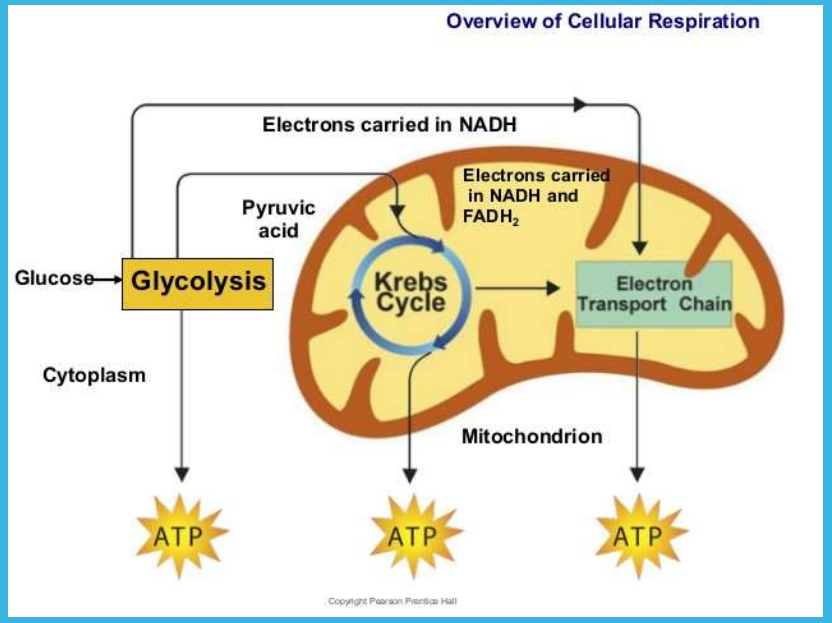
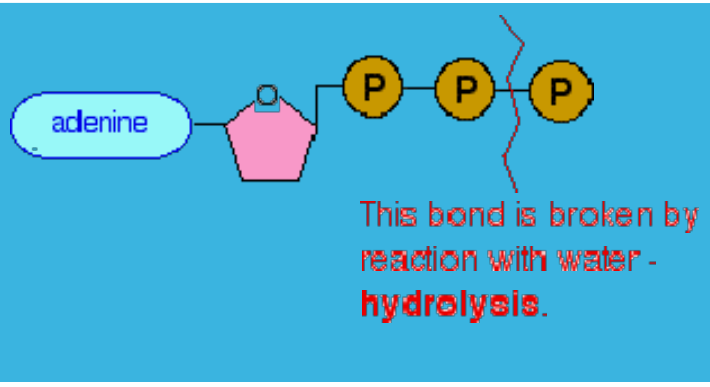
CHEMICAL ENERGY & ATP



WHY IS ATP USEFUL TO CELLS?

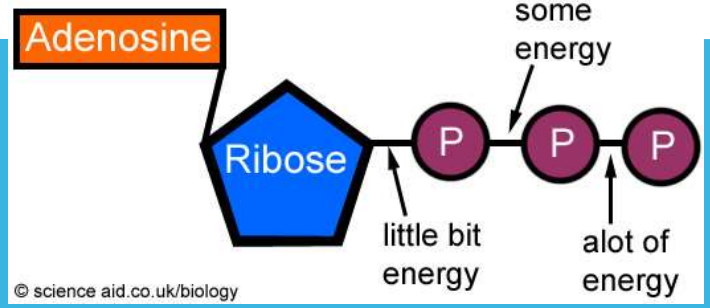
- Most activity depends on energy
- Cells use energy even while sleeping building new molecules, contracting muscles, and carrying out active transport
- The fuel source for cells is ATP (Adenosine Triphosphate)
  - Adenine,
  - 5 carbon sugar (ribose)
  - 3 phosphate groups
- The phosphate groups are the key to ATP's ability to store and release energy



STORING & RELEASING ENERGY

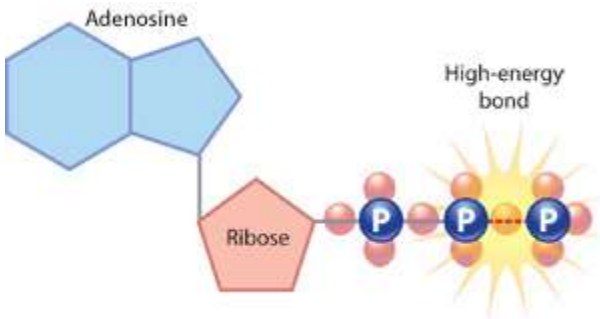
- ADP (Adenosine Diphosphate)
- When a cell has energy available it can store small amounts of it by adding phosphate groups to ADP to make ATP
- ATP can easily release and store energy by breaking and reforming bonds between phosphate groups
- ATP powers:
  - Movement of ions across cell membranes
  - Flagella and Cilia for cell movement
  - Synthesis of protein

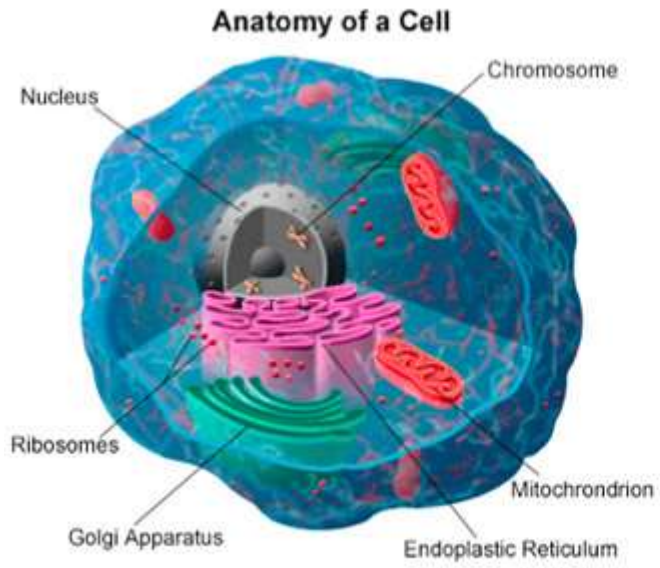
  Even creates light for firefly's!!

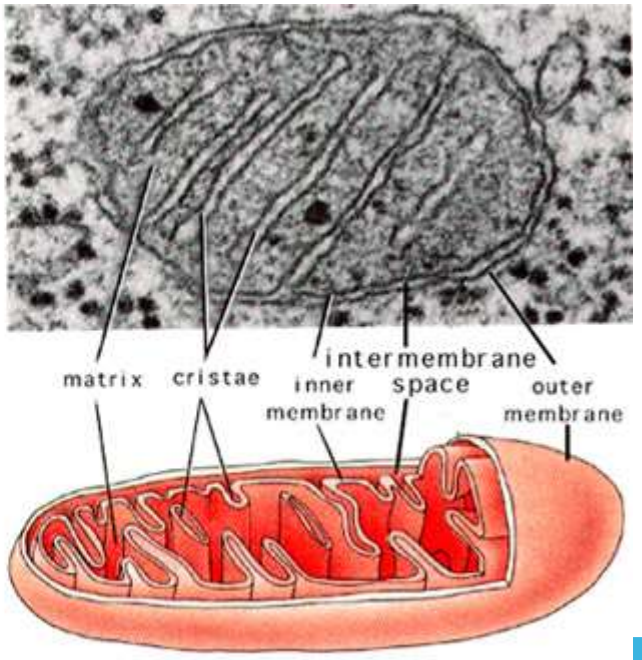


HETEROTROPHS AND AUTOTROPHS

- Organisms that gain energy by consuming other living things are heterotrophs
  - Some from plants directly (herbivore)
  - Some from eating animals that eat plants (carnivore)
- Organisms that make their own food are autotrophs
- Almost all life on earth depends on the ability of autotrophs to use the energy of sunlight to produce carbohydrates – sugar and starches (photosynthesis)
- In the process of photosynthesis plants convert the energy of sunlight into chemical energy stored in the bonds of carbohydrates


Adenosine
High-energy bond
Ribose
P
P
P


Anatomy of a Cell
Nucleus
Chromosome
Ribosomes
Golgi Apparatus
Endoplastic Reticulum
Mitochrondrion


matrix
cristae
inner membrane
intermembrane space
outer membrane