

# The importance of atp and enzymes



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## The Importance of ATP and Enzymes

Our cells are perpetually using ATP (adenosine triphosphate). It is lucky for us that ATP is a renewable resource. With the inclusion of a phosphate group back to ADP, ATP can be replenished. In our reading of the textbook, it says , *“ This takes energy, that is like recompressing a spring, and wherever food enters the scene”* . The chemical energy that harvests cell respiration from sugars and other organic fuels is used to regenerate a cell’s supply of ATP. Cellular work employs ATP recycled when ADP and phosphate are combined with cellular respiratory energy. Thus, energy from processes that yield energy, like the disintegration of organic fuels, is transferred to the actions that consume energy, like the contraction of a muscle and alternative cellular work. The ATP cycle can operate at an amazing rate: in a working muscle cell, up to 10 million ATPs are absorbed and recycled every second(Simon, E. J., Dickey, J. L., Reece, J. B., Hogan, K. A., 2016).

For metabolism to occur in ATP chemical bonds within the chemical molecules should be broken. This method needs that the molecules absorb energy from their surroundings. So, in a chemical reaction to ATP, the cell has to allocate some energy in order to make more energy. In relating this to your own life: Cleaning up as you go along when cooking takes effort, but in the long haul, you will have less to do, or clean when you are finished cooking. The time spent, or invested at the beginning is the activation energy, it activates the stimulant (energy) and generates the chemical reaction. The importance of ATP being critical to the cellular chemical process is because energy-carrying molecules are found within the cells of all

living things. ATP captures energy obtained from the breakdown of food molecules and releases it to fuel, or different cellular structures.

Enzymes change metabolism to occur by reducing the quantity of energy of activation needed to interrupt the bonds of chemical molecules. If you believe of the activation energy as a barrier to a chemical reaction, lowering that barrier is the function of an enzyme. It does this by binding to and placing reactant molecules under physical or chemical stress, making it simpler to break their bonds and initiates a response. In the analogy that I gave of: Cleaning up as you go along when cooking takes effort, but in the long haul, you will have less to do, or clean when you are finished cooking. This would be the comparison of having help from someone, you would start and end at the same spot regardless if you had someone help or not, someone's help lowers your activation energy, meaning that it is more likely for you to complete the task.

An enzyme in the response to a catalyzes is very selective. This selectivity is based on the enzyme's ability to recognize a certain stimulant molecule, called the substrate of the enzyme. An enzyme area called the active site has a form and chemistry that suits the molecule of the substrate. For the most part, on the active site, there is a pocket or grove on the enzyme surface. When a substrate slides into the docking station, the active site shifts slightly to the substrate and catalyzes the response. This synergy is called induced fit because the onboarding of the substrate causes the enzyme to alter its shape slightly, making them fit between the substrate and is snugger on the active site. After releasing the products from the

active site, another substrate molecule can be accepted by the enzyme. The key feature of enzymes is the ability to function repeatedly.

In conclusion, if you took the enzyme “ lactose” and followed its breakdown we would understand why it is underproduced or defective in lactose-intolerant people. The structure change of this enzyme is why people cannot drink dairy products and which results in them taking lactose pills to build their immunity to milk products. By binding the enzyme “ lactose” to a molecule, it causes a metabolic reaction and disrupts the molecule’s function. Lactose is a substrate imposter that plugs up the active site in the molecule. The inhibitor disrupts the enzyme by changing its shape which makes the enzyme under-produced, or defective and without the function of a non-intrusive enzyme, you can’t drink dairy products without a reaction, for some people it causes diarrhea(Simon, E. J., Dickey, J. L., Reece, J. B., Hogan, K. A., 2016).

## References

- Simon, E. J., Dickey, J. L., Reece, J. B., Hogan, K. A. Campbell Essential Biology with Physiology. [South University]. Retrieved from <https://digitalbookshelf.southuniversity.edu/#/books/1323125574/>