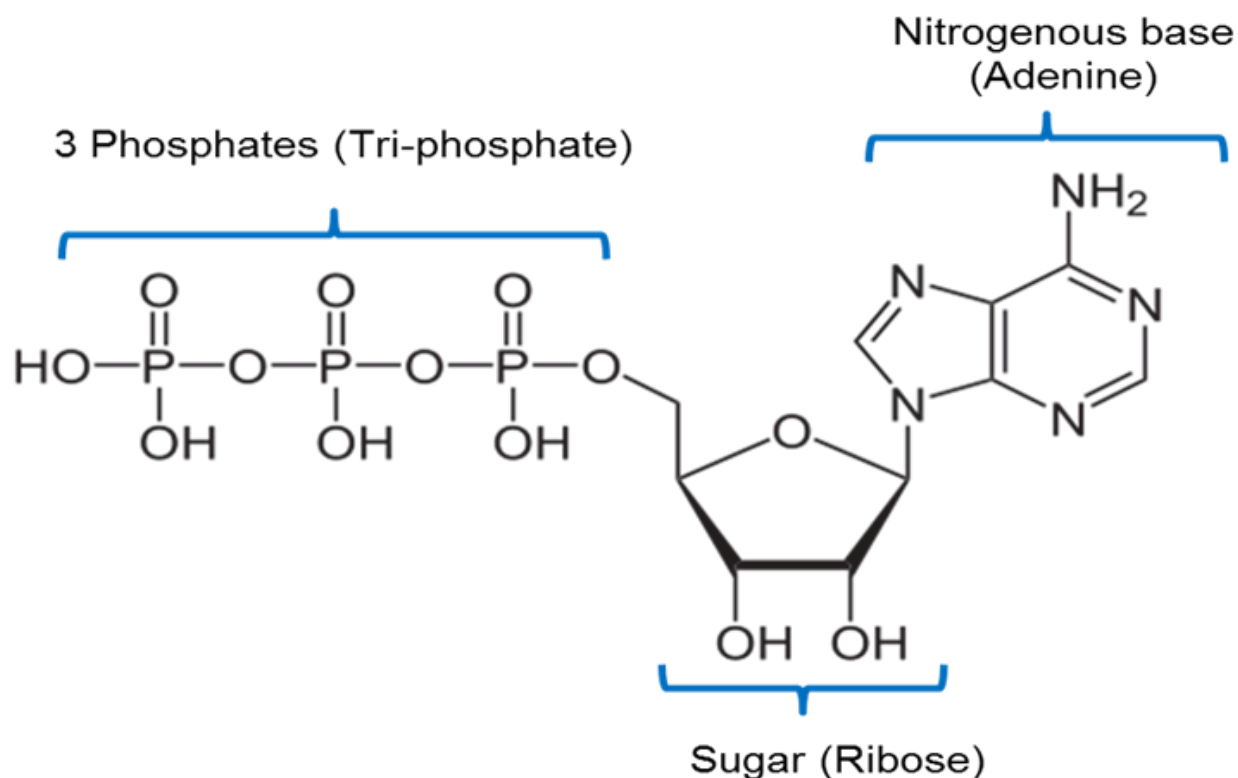


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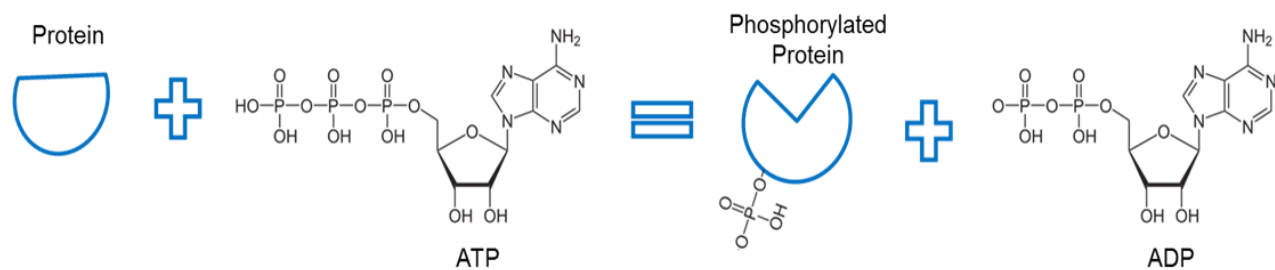
ATP

Cells use a molecule called **Adenosine Triphosphate** (or ATP) as an energy source. The phosphates in this molecule can supply energy to substrates in our cells. Enzymes exist in our cells that can remove a phosphate from ATP and attach it to a different molecule-usually a protein. When this happens, we say that the protein has been phosphorylated. Think of the third phosphate as being a little sack of energy. When it is transferred to a protein, this energy can be used to do something. For example, in the figure just below, the protein changes its shape when it becomes phosphorylated. When proteins change their shape, we often call this a conformational change to the protein structure. There are many proteins in the body that use a phosphate from ATP to induce a conformational change. This shifting of the protein shape ultimately allows for things like muscle contraction, cell mobility, membrane transport, and enzyme action. Cells and life exist only if a consistent and steady supply of ATP is available.



Chemical Structure of ATP. Image created by JS at BYU Idaho Fall 2013.

The image above is a representation of the chemical structure of ATP. ATP includes a nitrogenous base called adenine joined to a 5 carbon sugar called ribose and 3 phosphate groups.



Phosphorylation. Image created by JS at BYU-Idaho Fall 2013.

ATP is used to phosphorylate a protein. An enzyme, called a kinase (not shown) removes a phosphate from ATP and facilitates a bond between the phosphate and some other protein. The bonding of a phosphate to a protein in this manner is called phosphorylation. The phosphate bond with the protein has higher energy. Notice that phosphorylation uses this energy to cause a conformational change of the protein shape.



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