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# adenosine triphosphate

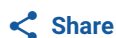
coenzyme



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**adenosine triphosphate (ATP)**, energy-carrying [molecule](#) found in the [cells](#) of all living things. ATP captures [chemical energy](#) obtained from the

breakdown of food [molecules](#) and releases it to fuel other cellular processes.

Cells require chemical energy for three general types of tasks: to drive metabolic reactions that would not occur automatically; to transport needed substances across membranes; and to do mechanical work, such as moving [muscles](#). ATP is not a storage molecule for chemical energy; that is the job of [carbohydrates](#), such as [glycogen](#), and [fats](#). When energy is needed by the [cell](#), it is [converted](#) from storage molecules into ATP. ATP then serves as a shuttle, delivering energy to places within the cell where energy-consuming activities are taking place.



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ATP is a nucleotide that consists of three main structures: the nitrogenous base, [adenine](#); the [sugar, ribose](#); and a chain of three [phosphate](#) groups

bound to ribose. The phosphate tail of ATP is the actual power source which the cell taps. Available energy is contained in the bonds between the phosphates and is released when they are broken, which occurs through the addition of a [water](#) molecule (a process called [hydrolysis](#)). Usually only the outer phosphate is removed from ATP to [yield](#) energy; when this occurs ATP is converted to adenosine diphosphate (ADP), the form of the [nucleotide](#) having only two phosphates.

ATP is able to power cellular processes by transferring a phosphate group to another molecule (a process called [phosphorylation](#)). This transfer is carried out by special enzymes that couple the release of energy from ATP to cellular activities that require energy.

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Although cells continuously break down ATP to obtain energy, ATP also is constantly being synthesized from ADP and phosphate through the processes of [cellular respiration](#). Most of the ATP in cells is produced by the [enzyme ATP synthase](#), which converts ADP and phosphate to ATP. ATP synthase is

# ubiquinone

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**ubiquinone**, also called **coenzyme Q** or **coenzyme Q10**, any of several members of a series of [organic compounds](#) belonging to a class called [quinones](#). Widely distributed in [plants](#), [animals](#), and many types of [bacteria](#), ubiquinones function in [conjunction](#) with [enzymes](#) in [cellular respiration](#) (i.e., oxidation-reduction processes). The naturally occurring ubiquinones differ from each other only slightly in chemical structure, depending on the source, the structures resembling those of the fat-soluble [vitamin K](#) and certain derivatives of [vitamin E](#).

*This article was most recently revised and updated by [Kara Rogers](#).*

[metabolism](#)

was

discovered

by

[Fritz](#)

[Albert](#)

[Lipmann](#)

and  
Herman  
Kalckar  
in  
1941.

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