

PEAK ATP™

While the human body is a tremendous powerhouse of energy, it requires fuel for activity. When food is consumed, its energy is converted and stored within the phosphate bonds of ATP (adenosine 5'-triphosphate). This energy storage molecule exists both within and outside of every cell in the body; when its bonds are broken, the energy released powers biological processes. Without ATP, there is no cellular function, no life.

Within the cell, the process of breaking ATP's phosphate bonds is responsible for cellular energy production, function and survival. Extracellular ATP regulates many physiological responses, including vascular, cardiac and muscle function, by interacting with ATP receptors on cell surfaces. When ATP is depleted within cells, extracellular ATP can cross the cell membrane through its catabolic components, adenosine and inorganic phosphate.

Higher levels of ATP within the body's tissues increase energy production, while in the blood, ATP improves blood vessel tone and increases vasodilation, delivering more glucose, nutrients and oxygen throughout the body without affecting blood pressure or heart rate. Unfortunately, as with many other physiological processes, body levels of ATP decline with age; these declines in ATP stores are associated with impaired organ and muscle function. One study measuring ATP levels in red blood cells found people in their 70s had half the ATP of subjects in their 20s.¹

While other dietary ingredients claim to enhance physiological ATP synthesis, only the exogenous administration of ATP itself has been shown to effectively elevate ATP levels. Clinically tested ATP is now available as PEAK ATP™ from Technical Sourcing International (TSI). The company entered an exclusive license agreement with Eliezer Rapaport, Ph.D., one of the foremost world authorities on ATP, covering six issued patents and

four pending patent applications; TSI also has developed its own domestic and foreign patent pending ATP technology directed to exogenous administration of ATP for reducing muscle fatigue and enhancing performance.

Studies on ATP supplementation have shown substantial benefits to the body. Upon ingestion, ATP is broken down into free adenosine and free phosphate, which are absorbed in the gut and incorporated into the liver ATP pools, which in turn enhances red blood cell ATP pools. Initial studies on exogenously administered ATP were conducted with intravenous solutions, which were shown to be absorbed efficiently. Two studies in cancer patients involved administration of ATP to determine safety and pharmacokinetics. In the first, 14 men with advanced cancer received 96-hour infusions of ATP once monthly, which was found to significantly increase whole blood ATP levels for up to one week after treatment.² The second study also found administration of ATP for 30 hours in 28 patients significantly increased ATP concentration in erythrocytes with only minor side effects.³

Further studies have focused on oral administration of ATP. A study in rabbits found 3 mg/kg¹/d¹ or 20 mg/kg¹/d¹ for 14 days reduced peripheral vascular resistance, pulmonary resistance and respiratory frequency, with no effect on central blood pressure or heart rate.⁴ This is in contrast to earlier animal studies using intravenous ATP, in which animals had a rapid cardiac response. The researchers concluded, "chronic oral administration of ATP leads to pharmacological effects that are different from those achieved after intravenous administration." In a later study, the same researchers found repeated oral administration (30 days, 5 mg/kg/d ATP) in rats increased the ability of the gut to capture intraluminal purine nucleosides and to export ATP toward the bloodstream.⁵

By increasing cellular energy and blood flow, PEAK ATP benefits overall health as well as circulatory and mental health. In addition, the increases in blood flow can produce increases in skeletal muscle blood flow—delivering more nutrients and oxygen while removing catabolic waste products—of interest to athletes. A recent study conducted for TSI at the Cooper Institute Centers for Integrated Health Research, Dallas, investigated the impact of supplementation with PEAK ATP on 27 healthy male athletes.⁶ The double blind study used an oral dose of enterically coated ATP (as PEAK ATP) at 150 mg or 225 mg, or a matched placebo, with the effects checked at baseline, acute and chronic levels. Total blood and plasma ATP levels decreased with subject age, while supplementation had a significant age-dependent increase in blood plasma ATP. Individuals in the high-dose group also experienced an inverse age dependent increase in weight training performance. The researchers suggested the findings suggest younger individuals are more efficient in utilizing supplemental ATP and converting it into muscles, while older individuals see benefits in blood plasma, which may help treat other chronic health conditions.

PEAK ATP has also been shown safe and non-toxic. An LD 50 acute toxicity study, commissioned by TSI and performed at the Shanghai Institute of Materia Medica, found doses as high as 15 g/kg body weight in rats produced no toxicity, mortality or adverse reactions. PEAK ATP is not a stimulant, boosting energy without affecting heart rate or blood pressure, and does not appear on any prohibited substance list for athletes.

PEAK ATP is produced through a proprietary fermentation process in a GMP (good manufacturing practice) facility in China that conforms to ISO 9002 standards; manufacturing is conducted to TSI's specifications and subjected to extensive quality testing. Because ATP is subject to some degradation by stomach acids, TSI works closely to ensure proper technology is utilized to protect PEAK ATP in solid dose delivery forms.

References

1. Rabini RA et al. "Diabetes mellitus and subjects' aging: a study on the ATP content and ATP-related enzyme activities in human erythrocytes." *Eur J Clin Invest.* 27:327-32, 1997.
2. Haskell CM et al. "Phase I trial of extracellular adenosine 5'-triphosphate in patients with advanced cancer." *Med Pediatr Oncol.* 27:165-73, 1996.
3. Agteresch HJ et al. "Pharmacokinetics of intravenous ATP in cancer patients." *Eur J Clin Pharmacol.* 56:49-55, 2000.
4. Kichenin K et al. "Cardiovascular and pulmonary response to oral administration of ATP in rabbits." *J Appl Physiol.* 88:1962-8, 2000.
5. Kichenin K, Seman M. "Chronic oral administration of ATP modulates nucleoside transport and purine metabolism in rats." *J Pharmacol Exp Ther.* 294, 1:126-33, 2000.
6. Jordan AN et al. "Effects of oral ATP supplementation on anaerobic power and muscular strength." *Med Sci Sports Exerc.* 36, 6:983-90, 2004.