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CREATINE

Bio-Synergys comprehensive guide to creatine. In this short guide we explain what creatine is and how to use it to your advantage to take your training to the next level.

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CREATINE

There's a lot of myths and misconceptions surrounding creatine. Some sources question its safety, suggesting that creatine may cause liver damage and dehydration. Bio-Synergy believes (and University research has shown) that creatine is not only safe; it is the 'one that works'. In other words, creatine definitely has attributes that support cell volumisation, recovery, strength and burst energy. We typically stay in creatine balance.

Creatine is probably the most widely used nutritional supplement and seems to have universal success in promoting gains in size and strength and Bio-Synergy was the first company back in 1997 to pioneer the two phase pack and capsule formulation. Creatine is naturally formed in the liver through a

chemical process that combines several amino acids together. On average our bodies produce and use approximately two grams of creatine each day and under normal conditions, creatine is also found naturally occurring in animal proteins such as chicken, beef and fish. For example a pound of raw beef contains around 1.8g – 2.2g of creatine.





BUT HOW DOES IT WORK?

Creatine is naturally produced in the body from amino acids methionine, arginine and glycine and is available through the diet from foods like fish and beef. However, the capsules or powdered form is not only more convenient, it's also much more practical. For instance, you would have to ingest roughly 2.5 pounds of raw meat to equal one 5-gram serving of supplemental creatine.

Your body utilises a few different methods of producing energy, but the ultimate source of that energy is always a chemical known as adenosine triphosphate, or ATP. For you to run, walk, lift weights and even breathe your body must either derive energy from its immediate ATP stores or it must create it using stored glucose or fats.

The problem is, your body only has enough immediate ATP to last for about three to five seconds of intense activity, which is typical of a weight-training set or an allout sprint. This is one of the reasons why you can only sprint at full speed for a short time or why you fatigue quickly during your 5-rep max on the bench press—your ATP is depleted rapidly, and it takes a few minutes to regenerate. That leaves us with glucose and fats. Either one can be used to create ATP, but it takes time. You can't go all-out on a lift or a sprint and expect a meaningful contribution

Approximately 95%
of all the creatine
stored in the human
body is found in
skeletal muscle

from carbs or fats—they simply can't produce ATP quickly enough.

These systems are very valuable, however, for providing sustained energy during longer term exercise bouts. These just aren't the kind of activities that are going to pack on mass. No one got big running marathons. The key, is to enhance shortterm exercise performance by increasing your immediate ATP stores. Knowing this, researchers, for years, focused on how to do just that, but it was futile since you couldn't really increase ATP beyond existing levels. In fact, taking ATP itself made no difference.

Why? Simple. The limiting factor in this case was not ATP, but rather a chemical known as phosphocreatine (PCr). Chemically speaking, once you utilise an ATP molecule for energy, it's reduced to ADP, or adenosine diphosphate.

ADP, lacking one phosphate, is basically useless unless a companion chemical can donate the additional phosphate, allowing ADP to once again become an energy providing ATP molecule. That companion chemical is, of course, phosphocreatine. Therefore, by increasing the levels of PCr within muscle, you could regenerate ATP like never before. You would be stronger. You would perform; say 8 reps with a weight that was previously a 5-rep max. Your 3-rep max would be your 6-rep max. You could work out with greater weights for longer periods of time. Run faster, jump higher, recover quicker, and grow bigger.

This is exactly what the ingestion of a creatine supplement allows. With the absorption of creatine into muscle, you've provided a greater pool of phosphocreatine, allowing faster and more prolific regeneration of ATP, the ultimate source of energy. This is why creatine has attracted the attention of the weight-training community, the athletic community, the scientific community and even the medical community.



- The research emphatically supports its use, and its mechanisms for enhancing strength and lean body mass are practical and purposeful, as outlined by the following:
- Increased ability to train at higher intensities and workloads, thus providing greater stimulus for training adaptations.
- Increased protein synthesis secondary to increased muscle cell hydrations.
- An increase in myosin heavy-chain RNA and protein expression, which basically stimulates the building of new muscle.
- Increase in satellite cell activity. Satellite cells are cells that are attached to the muscle cell membrane. When activated, they are involved in repairing damaged muscle and aid in increasing muscle size and/ or increasing muscle fibre number

CREATINE + CARBOHYDRATES

When it comes to nutrients that enhance the effect of creatine, some of the most solid research has been performed using the powerful combination of carbohydrates plus creatine.

The main benefit of adding carbohydrates to your creatine is that it increases creatine uptake within the body. Creatine Boost launched in 1999 not includes creatine monohydrate but also l-glutamine and carbohydrates.

Obviously, the more creatine you can absorb, the greater the corresponding effect. Carbohydrates, especially if they're the 'fast-acting' kind - such as glucose - can indirectly aid creatine absorption by stimulating the release of insulin from the pancreas. Insulin is a powerful hormone that effectively 'shuttles' protein, carbohydrates and in this case, creatine, into muscle cells.

Therefore, if you can enhance the release of insulin when taking creatine, you can send more of it to muscle cells, which may augment its already positive effects. Again, it's the presence of carbohydrates in the blood stream that allow this to happen.

In order for your body to recreate ATP, it must have an abundance of phosphates readily available to reattach to the adenosine molecule.

Phosphocreatine provides the required phosphates needed to rebuild ATP from ADP (or even AMP). This may allow this energy process to repeat itself more rapidly. For simplification, maybe consider creatine as supplying the fuel that powers the energy machine in the muscle.

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WHY CREATINE WORKS

Creatine is used for producing muscular energy. As creatine molecules are shuttled into the muscle cells, they may bind to water molecules, which may result in cell volumisation. This is one of the positive effects of creatine that contributes towards gains in lean body mass. Once inside the muscle

cell, creatine binds to a mineral called a phosphate and is then permanently stored as phosphocreatine until needed. Phosphocreatine is stored in the muscle cells until it is needed to help create a special molecule called ATP. ATP is what actually provides the muscular energy.

Creatine molecules are shuttled into the muscle cells, they may bind to water molecules, which may result in cell volumisation

ATP stands for Adenosine Tri-Phosphate because it is comprised of an adenosine molecule with three phosphates attached. A phosphate is a mineral which is commonly found in many foods and multi-vitamin products. When one of these phosphates breaks loose, energy is released and the ATP molecule now becomes an ADP (adenosine di-phosphate) molecule. When this process occurs again, we now have AMP (although the prime source of energy is from ATP to ADP). In order for your body to recreate ATP, it must have an abundance of phosphates readily available to reattach to the adenosine molecule. Phosphocreatine provides the required phosphates needed to rebuild ATP from ADP (or even AMP). This may allow this energy process to repeat itself more rapidly. For simplification, maybe consider creatine as supplying the fuel that powers the energy machine in the muscle.



CREATINE + CARBOHYDRATES

It may take up to 30 days to fully saturate the muscle cells with supplemental creatine. To speed the process of saturating muscle cells creatine loading is a popular practice with weight trainers. Creatine loading is simply the practice of taking multiple doses of creatine each day for a period

of several days. After the loading phase, it is normal to continue with a daily maintenance dose of creatine. Creatine loading is not essential; however it does help to flood the muscle cells with phosphocreatine storage in a short space of time. Using this method, muscle cells could be fully saturated

with creatine in as few as five days! Water consumption is critical, so drink plenty when using creatine. Athletes who engage in intense, regular exercise should consume at least 3 litres of water per day. Drink an additional 500ml of water for every pound lost during exercise.

CREATINE MONOHYDRATE

Our bodies naturally make the compound which is used to supply energy to our muscles - creatine. It is produced in the liver, pancreas and kidneys and it transported to the muscles through the bloodstream.

Once it reaches the muscles, it is converted into phosphocreatine (creatine phosphate). This highpowered metabolite is used to regenerate the muscles' ultimate energy source, ATP (adenosine triphosphate).

Creatine is 100% natural and occurs naturally in many foods especially herring, salmon, tuna and beef. However, the very best source of creatine by far is creatine monohydrate because it contains more creatine per weight of material than any other source.

Around 50% to 85% of ingested L-glutamine is 'robbed' by the gut and never makes it to muscle tissues to aid repair and recovery. This makes

supplementing with extra glutamine a necessity for those trying to gain lean body mass and maximise recovery.

Therefore it is a conditionally essential amino acid. Bio-Synergy L-glutamine is incorporated in to Essential Sports Fuel and Creatine Boost and can also be found in Whey Better.

L-glutamine is ideal for anybody looking to maximise muscle recovery, immune function and muscle growth.

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