

# PRODUCT INFORMATION

## ALCA FUEL

### 100% ACETYL L-CARNITINE POWDER

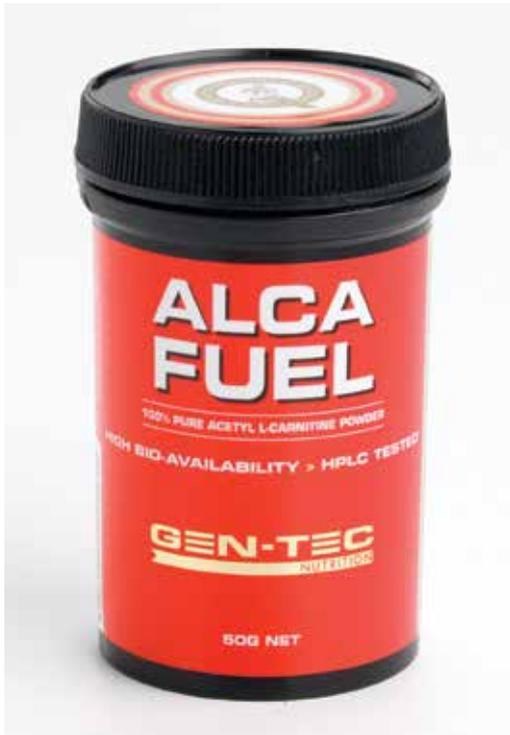
#### BASIC FUNCTIONS

Fat metabolism, cognitive functions (ie reflex's and co-ordination), vigilance, fatloss, mind/muscle connection.

Acetyl L-Carnitine (ALC) plays a critical role in not only lipid and energy metabolism but also within nerve cells of the central nervous system (CNS) (Rebouche, 2012). Research shows that in the periphery skeletal muscle sites, ALC is a co-factor for beta-oxidation (metabolism of fatty acids) whereby it mops up available fats to be sent to the muscle cells for metabolism (Stephens et al., 2007, Kido et al., 2001). More specifically it translocates long chain fatty acids (LCFA) to the mitochondrial matrix where it can undergo beta -oxidation and enter the Kreb cycle for fat derived ATP re-synthesis (Stephens et al., 2007). This involvement in fat metabolism is also one way by which ALC assists with energy levels during exercise.

It is important to understand that the mitochondria is an organelle within a cell that functions to produce energy by ATP synthesis from primarily fats and carbohydrates (Stephens et al., 2007). If the mitochondria is a factory to burn fuel then ALC is the employee who transports that fuel into the factory to be burned. If there is insufficient ALC (employees) then naturally there is a reduced mitochondrial (factory) use of fats (fuel). In addition, ALC can reduce the amount of muscle damage experienced by intense exercise by acting as "mitochondrial antioxidant", which if revisiting the previous factory analogy, within every factory there must be some level of maintenance to ensure the longevity and proper functioning of machinery, so ALC is like that 'oil' or 'maintenance check' to ensure a healthy and functioning environment for fats (fuel) to be burned (Stephens et al., 2007).

Moreover, ALC crosses the blood brain barrier which means it exhibits activity in not only the muscle cells for energy but also in the brain and nerve cells (Kido et al., 2001). Over recent years research has revealed that ALC acts as a neuro-protective agent against alcohol related nerve cell damage and glucose transportation to the brain (Abdul Muneer et al., 2011). Furthermore, evidence has indicated possible clinical benefit for ALC use in neurodegenerative conditions such as Alzheimer's disease, diabetic neuropathy and other conditions resulting in nerve damage (Malaguarnera, 2012, Ruggenenti et al., 2009). It appears that ALC assists with the activity of cholinergic neurons, membrane stabilization and mitochondrial function (Palacios et al., 2011). To further understand how, we must understand that the brain and nerve cells also require adequate energy supply, so they too poses mitochondria within the nerve cells (Palacios et al., 2011).



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The difference between muscle cell mitochondria mentioned above and neuronal cell mitochondria is that neuronal mitochondria are more vulnerable to oxidative stress (wear and tear by producing energy), therefore a strong mitochondrial antioxidant like ALC can provide ongoing maintenance checks to all nerve cells (Palacios et al., 2011, Rebouche, 2012).

In addition to ALC's use for increased metabolism of fats in the mitochondria and its neuro-protective properties in a range of clinical settings, it is also shown to assist with reproductive function and glucose tolerance (Showell et al., 1996). Studies which have explored ALC's use in patients with low sperm count concluded that although ALC does not conclusively increase the quantity of sperm, it does improve sperm motility and quality (Busetto et al., 2012). In women who suffer from a neuroendocrine impairment, which adversely affects their reproductive axis, ALC is reported to significantly improve Luteinizing hormone (LH) profiles and stress induced abnormalities caused by the condition resulting in improved well-being and energy levels (Genazzani et al., 2011). Lastly in patients with abnormal glucose tolerance, ALC significantly improved insulin sensitivity and glucose functioning with the cessation of ALC resulting in immediate reversal of acquired benefits from ALC (Ruggenenti et al., 2010, Ruggenenti et al., 2009). Once patients went back on ALC their glucose tolerance improved again, thus demonstrating a multi-factorial benefit from ALC in the body.

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## PERSONAL NOTE

Combined with John O'Neil's ADVANCE Co-Enzyme Q10. Acetyl L-Carnitine helps relieve my fatigue in Chronic Fatigue Syndrome .... Nick Jones.

## SUGGESTED USED

For Fat Loss Use 1 level teaspoon (2 grams) 10-20 mins before cardio upon rising (use with 10ml Ultimate Thermo Fuel).

For Athletic Performance ie weight lifters, boxers, bodybuilders etc) Use 1 level teaspoon (2 grams) 20 mins before training or event.

## TIPS

For endurance athletes and to help reduce fatigue  
Use with 200mg "Advance Nutrition Co-Enzyme Q10.  
For Fat Loss use with 10ml Ultimate Thermo Fuel.

## SIZES

Available in 50g, 150g

## FLAVOURS

Orange, Lemon, Natural