L-TAURINE

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Taurine is an amino sulfonic acid which is essentially classified as ‘related amino acid’ as it’s not an essential or nonessential amino acid, rather it acts more like a conditionally essential amino acid for humans. Furthermore, Taurine is synthesised in the body by methionine and cysteine in the presence of vitamin B6 and zinc, however the individual variation to which Taurine can be synthesised to maintain Taurine pools can vary considerably between organs and individuals. This is mostly due to the different activity in the intestinal brush boarder (intestinal wall mucosa) transport systems and the presence of Taurine’s enzyme, cysteine sulfonic acid decarboxylase enables the biosynthesis to take place. Other factors which affect Taurine availability appears to be chronic stress which became evident in those patients with heart conditions and neurological disorder whereby Taurine levels are significantly reduced in these conditions.

In addition, as Taurine is currently quite a mysterious amino acid in that the exact mechanisms behind Taurine’s biochemical actions are not yet understood and thus its role in health, the brain and skeletal muscles hasn’t been clearly established to date. Therefore, insufficiencies may be possible in heightened states of Taurine uptake and use by those tissues which heavily rely on Taurine such as neurons in the central nervous system (brain) and skeletal muscles which store the majority of Taurine and use Taurine to maintain cellular integrity, manage calcium movements inside and outside the cell as well as mitochondrial function to name a few.

Taurine appears to play a role in; function (1-11)
> Eye health: Taurine is found in high concentrations to provide retinal support
> Gall bladder support: Bile salt conjugation (production) to help with fat digestion
> Cell development: Taurine is 4-5 times higher in developing brains than adult brains
> Neuroprotection and regulation: Taurine is proposed to act similar to a neurotransmitter and exert similar activity and metabolism to Gamma-aminobutyric acid, or GABA which acts to control over excitation of neurons and anxiety. however, to date research is still catching up with the full effects that Taurine has on the brain and its use for mental vigilance, therefore it is a promising area of research.
> Mitochondrial support: oxidative function allowing efficient ATP production in neuronal cells and anti-oxidation
> Cell protection: Taurine displays various cytoprotective (cell protecting) attributes through cell calcium homeostasis, membrane stabilisation, osmoregulation and mitochondrial function.
> Improve lipid metabolism: Taurine appears to increase fatty acid utilisation during exercise and at rest

Furthermore, the combination of caffeine and Taurine together for enhanced performance and mental vigilance has been explored in performance based studies finding increases in anaerobic performance and mitigated the chronotropic effects (increases in heart rate and over stimulation) of caffeine (12, 13). However, while not all studies have found a positive effect with Taurine and caffeine co-ingestion, it is thought there may be a dose dependent effect of Taurine and may be more beneficial in some modes of exercise activities than others, i.e. anaerobic (glycolytic) vs aerobic (oxidative) activity. Taurine’s performance enhancing effects have also been illustrated in several small randomised trials finding decreased muscles damage and delayed onset muscle soreness followed eccentric based exercise and middle distance running performance (14-17).
Taurine is certainly a mysterious and unique amino acid that appears to have great potential for enhanced performance, mental vigilance and health benefits. While the exact mechanisms behind Taurine actions haven’t been established, the available data on human and animal model trials shows promise for an effective ergogenic related amino acid to support skeletal muscle function and mitigate central nervous system oxidative stress.