

CAN KETONES HELP MITIGATE CONCUSSIONS?



BE GREAT.

ABOUT THE AUTHOR



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Anytime a person suffers from a traumatic brain injury (TBI), such as a concussion, it's a cause for concern. The National Institute of Child Health and Human Development notes that just one TBI can lead to long-term effects.

These include difficulty learning, tinnitus (ringing in the ears), trouble communicating, behavioral

issues, and emotional challenges, including mood swings, depression and anxiety.

There are currently no FDA-approved medications to prevent these and other neurological issues that can result from TBI. However, there is growing evidence that a natural alternative approach could help TBI sufferers as they heal – ketones.



ARE KETONES NEUROPROTECTIVE

Ketones are naturally occurring energy sources. The liver produces ketones when there is a relative lack of carbohydrates (glucose, i.e., sugar), creating them from fatty acids. The liver turns fat into ketones, which enter the bloodstream and circulate around your body, including your brain.

(Note: ketones can cross the blood-brain barrier)

More research is needed on the neuroprotective nature of ketones. However, preliminary studies on animals show that ketones could help fight energy deficits in the brain after a TBI. They can lower neurodegeneration and oxidative stress resulting from an excess production of free radicals.

THE ROLE OF KETONES IN POST-CONCUSSION THERAPY

Understanding how ketones can benefit the brain after a concussion is critical, especially during the early stages of a concussion or other TBI.

WHY THE BRAIN NEEDS ENERGY POST-CONCUSSION

Scientists know that brain glucose levels rise early in a TBI before dropping to below-normal levels. Therefore, providing additional glucose to help in concussion recovery can be detrimental. Too much glucose may create more lactic acid in the brain, which limits the brain's ability to use energy from non-glucose sources.

Glucose levels rise early in a concussion because the brain is starving for fuel. The brain needs the energy from glucose to heal from the injury it has suffered, whether mild or severe.

However, the rise in glucose levels after a TBI is temporary. Scientists call this a “metabolic cascade,” which refers to a series of metabolic events that occur throughout the body. These events significantly alter the body's metabolism following a concussion. As part of that cascade, glucose uptake significantly diminishes, and the brain's ability to use glucose is impaired. This leaves the brain in a state of lowered metabolism, known as hypometabolism.

Just as the brain is needing a greater energy supply to help it heal from a TBI, its ability to produce and utilize energy is impaired by that same injury. This situation



has been termed an “energy crisis.” This state can last for weeks or even months. It can result in post-concussion symptoms such as headaches, mood changes, irritability, and cognition challenges.

Researchers have found a correlation between hypometabolism and mood disorders. They conclude that those with a lower metabolism in their frontal lobe after a concussion are more likely to experience anxiety and depression than those with a higher metabolism.

KETONES AS AN ALTERNATIVE FUEL SOURCE

So, how can concussion sufferers get the energy their brain needs without glucose?

Ketones may be the answer.

Ketones are an alternative energy source that can reduce the brain's reliance on glucose metabolism. Instead, the brain can metabolize ketones as an energy source.

Studies have shown that a ketogenic diet is safe for post-TBI treatment in both animals and humans. There have also been several studies exploring the effects of ketones on animals with a TBI, finding that ketones are both safe and effective in helping individuals with a TBI.

One way to achieve the benefit of ketones is through fasting. For example, scientists have found that the number of ketone bodies produced and used by the brain increased in infant and adult rats when they were starved. This suggests that the body will turn to an alternative energy source when faced with starvation.

The effects of starvation can be replicated through intentional fasting. Another study conducted on rats found that fasting for 24 hours following a TBI reduced the biomarkers of calcium loading and oxidative stress in mitochondria that were isolated from the injury site.

Note: "oxidative stress" is a condition where the production of free radicals overwhelms the body's ability to render these radicals inactive—and is associated with multiple known human disease states. The researchers concluded that a 24-hour fast offered neuroprotection and improved mitochondrial function.

Of course, the goal is not to starve individuals with a concussion. Instead, why not supply them with an energy source that could potentially help the brain heal and provide some of the benefits seen in the fasting

animal studies?

Scientists theorize that finding a way to fill the energy deficit during a concussion could reduce the likelihood and severity of post-concussion symptoms. So, it is possible that increasing ketone levels in the brain can help mitigate the damage of a concussion and potentially improve the healing process.



HOW TO INCREASE KETONES IN YOUR BRAIN



Many people turn to a ketogenic diet to raise ketone levels in their brains. However, the carb-restricting ketogenic diet may not be feasible or healthy for all, particularly adolescents and teenagers who require energy from carbohydrates to help them grow and develop. Moreover, many individuals may have difficulty adhering to such a diet plan.

It typically takes about two days (48 hours) for an individual to get into a state of ketosis after

beginning a strictly keto diet. Therefore, starting a keto diet after suffering a concussion could delay getting precious ketone energy to the brain. Even a slight miscalculation of carb intake could prevent or delay ketosis from occurring.

There are other ways to elevate ketone levels in the brain without adopting a keto diet. And, of course, you can always supplement a more modified keto diet (i.e., one that is not so restrictive) to insure against accidental carb miscalculation.

USING **EXOGENEOUS KETONES** IN POST-CONCUSSION RECOVERY

The simplest way to get more ketones into the brain is through exogenous ketones. These are available in a few forms, including ketone salts and ketone esters.

Ketone esters contain more Beta-Hydroxybutyrate (BHB) than ketone salts. BHB is a vital ketone that acts as an energy source when glucose levels are low. It's one of three natural ketones the body produces and presents in larger quantities than the others. Therefore, ketone esters can increase ketone levels faster than ketone salts.

This efficiency makes ketone esters a preferable source of ketones during post-TBI treatment and healing. During a time when the brain needs quick recovery, being able to get the energy to it as quickly as possible is essential.

Researchers have found exogenous ketones to be safe and effective in helping people get into a state of ketosis without resorting to a strict keto diet. Thus, they may be beneficial for people who have suffered a concussion or other brain injury and need an alternative source of energy to help their brains heal.





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