



## KetoActiv™ FAQs

### Is a ketone supplement an energy source?

B-hydroxybutyrate (BHB) is a ketone body that can be utilized as an ATP (cellular energy) substrate by our cells to generate ATP (energy). Research shows that the ketone can be used by our cells to generate as much as 38% more energy (ATP) per ketone carbon over glucose as an energy substrate. In addition, the cell requires lower oxygen demand than with glucose with the ketone as a substrate for ATP. The brain (neurons) in particular effectively utilizes BHB.

### How does the ketone work as fuel for the brain?

Neurons can use the ketone as an energy substrate very efficiently. In fact, dementias and other cognitive disorders are shown in research to be associated with impaired glucose metabolism, even being referred to as tissue-specific diabetic conditions. Since the ketone (ketone body) does not depend on insulin signaling for absorption into our cells, the ketone enters the cell to serve as an effective energy substrate, despite the status of insulin health.

### What is butyric acid / butyrate?

Butyrate or Butyric acid is a short chain fatty acid (not medium chain) found naturally in dairy fat. In fact, butter is one of the richest butyric acid food sources with a naturally inherent supply of 3-4% of its fat content as butyric acid. One tablespoon of butter typically delivers 14 grams of fat; of which 560 mg is butyric acid. It's easily possible for an individual to consume well in excess of 1000 mg of butyrate in a day from natural sources. However, to do so has an excessive exogenous fat, including an exogenous cholesterol consequence. Butyric Acid in this complex turns the typical Ketone body (BHB) into a potential weight loss strategy.

Dairy milk also contains a B-hydroxybutyrate (BHB) level ranging from 10-631 uM, making dairy products a natural source of B-hydroxybutyrate as well. The United States FDA classifies various forms of B-hydroxybutyrate as Generally Recognized As Safe (GRAS).

Adding short-chain fatty acids (SCFA) like butyrate/butyric acid (BA) with the ketone body, like B-hydroxybutyrate (BHB), synergizes the exogenous ketone. BA serves as a B-oxidation trigger. BA supports the effects of the exogenous ketone by contributing to serum levels from endogenous sources and does so without gastrointestinal (GI) distress.

### **Can KetoActiv™ cause gastrointestinal distress?**

Typically, BHB supplements are associated with gastrointestinal distress. This distress is common with high dose oral ketone and/or Medium Chain Triglyceride (MCT), and counters performance and immunity by disrupting probiotic stability and interfering with resorption of electrolytes and water. Dehydration and electrolyte depletion are an athlete's worst nightmare, compromising muscle mass strength and endurance. GI distress impairs exercise performance and doesn't support optimal health and immunity either.

On the contrary, BA is a short chain fatty acid (SCFA) that facilitates healthy gastrointestinal state; improves electrolyte and water reabsorption and helps balance probiotic culture in the colon. KetoActiv™, epithelial cells in the colon, use BA as an energy source and a down-regulator of inflammation. In addition, BA delivers a pharmacology that supports insulin efficiency and blood sugar management, allowing the ketone (BHB) an opportunity to surface in serum as a primary energy (ATP) substrate. BA also supports cognitive performance and cardiovascular health.

### **How much KetoActiv™ do I need to raise serum BHB levels?**

We show each regular serving of KetoActiv™ (such as Ketone Shift; 4.5-5 gram serving) can increase serum BHB to as high as 1.2 mM in some individuals; in others, the same dose increases serum BHB levels to 0.6 and 0.8. This variance is based on body weight, lean body mass proportion, metabolic activity, and dietary and lifestyle variations amongst us all. To compound this change in serum BHB, serum glucose is also shown to decrease (to 5.0 4.5 mM) with KetoActiv™ administration in most cases in a comparable inverse relationship to the incremental BHB pattern. Nevertheless, the interesting findings in our work related to Nrf2 enhancement demonstrate induction of the transcription factor to support internal (endogenous) antioxidant status of the cell occurs at 0.8 mM BHB. These represent mild incremental serum BHB levels. Yet Nrf2 activity in these same models increases again at 1.0 mM serum BHB; ultimately reaching peak activity for Nrf2 induction by 1.6 mM serum BHB. There is no incremental difference for Nrf2 activity at 2.4 mM serum BHB. Nrf2 is a transcription factor that promotes the production of protective antioxidants in our cells as a conditioning mechanism.

### How is KetoActiv™ different from a typical ketone supplement?

The typical exogenous ketone supplement is a BHB salt or ester supplying the BHB passively. KetoActiv™ is an activated ketone. KetoActiv™ couples the ketone (BHB) to a short-chain fatty acid B-oxidation activator, butyrate/butyric acid (BA) to facilitate fat burning for increased energy, stamina, mental clarity and anti-inflammatory benefits – BHB-BA. BA serves directly as an energy substrate for some cells just like BHB does, but more importantly provides an activation signal to the liver for ketogenesis – production of ketones from the breakdown of fatty acids. BHB on its own inhibits lipolysis preventing the body from utilizing its own fat stores to produce ketones. BA alternatively promotes insulin health and oxidation of fat to facilitate use of fat as an energy substrate.

### When should I take KetoActiv™?

There are many ways to use KetoActiv™ to support goal attainment. One of our recommendations is to take a KetoActiv™ serving as a pre-workout supplement to support a fasting workout. For example: Dissolve a full serving of KetoActiv™ into 500 mls of water; drink half immediately and sip on the rest throughout the workout. The carefully strategized BHB:BA ratio helps clear blood sugar while supporting an increase in serum ketone from two sources. This allows for maximum biological activity from the exogenous BHB supplied. This dose is high enough to support energy demands in the early stage of the workout but not excessive enough to limit generation of ketones from your own body fat as you progress through your fasted workout. The incremental contribution to serum ketones by a metabolism that has been corralled by BA toward the ketogenic goal supports energy demands after the accompanying BHB is 'burned'. This strategy helps spare dietary protein from gluconeogenesis, directing your selected protein source to support anabolism (building). This strategy is designed to get your body into fat 'burning' mode to use your stored fat as your primary fuel source for your workout. Mind and body energy are formidable.

### What dose of KetoActiv™ should I use?

The dose required depends on the goal and body weight of the user. We have well-conditioned and highly experienced professional athletes with body weights as high as 280 lbs. using 1.5 x dosing of the 4.5 to 5.0 g KetoActiv™ serving as a pre-workout/pregame application. Their feedback / claims are profound: "Never felt training intensity and stamina like that before". These are not controlled studies. However, we do have data for controlled serum kinetics as well. The average person weighing less than 200 lbs. will use the recommended dose of 4.5 to 5.0 g serving size.



## Is more KetoActiv™ better for my expected results? Can I lose weight using ketones or KetoActiv™?

Regular BHB (ketone) is very different from KetoActiv™. Typically it is said the more BHB consumed the better. This is certainly not the case. BHB represents a calorie source – 4.5-5.1 Kcal per gram. In order to begin burning your own fat calories after consuming a serving, one needs to burn through the consumed supplement calories. In addition to the calories, research irrefutably demonstrates that a rise in serum ketones can inhibit lipolysis NOT induce it so the blanket claims for fat loss by exogenous ketone supplementation are not appropriate. MORE IS NOT BETTER.

Nevertheless, research does support appetite control and beta-oxidation induction with butyric acid (BA) supplementation, a major constituent of the BHB-BA complex in KetoActiv™. This short chain fatty acid (not the medium chain triglyceride) is also shown to improve markers of cardiovascular and cognitive health [114]. Mice taking butyrate in the diet eat less food; stay spontaneously leaner; have more energy; and stay more active. This short chain fatty acid does not induce gastrointestinal distress like the MCT can. KetoActiv™ is designed to help the body 'burn' fat as a primary energy source.

## Is KetoActiv™ an antioxidant supplement?

Our research has shown the BHB-BA complex of KetoActiv™ stimulates the activity of transcription proteins (Nrf2) that improve the antioxidant status inside our cells. These proteins protect the mitochondria and DNA from oxidative stress and toxin-induced injury. This improved intracellular protein and antioxidant status is associated with improved resilience to workload and environmental toxins. KetoActiv™, itself, is not an antioxidant. Nevertheless, our research shows that it facilitates antioxidant status by getting your cells to manufacture more of its internal antioxidants which partake in the defense system of the body.

## How is KetoActiv™ used to support cognition?

Administration of KetoActiv™ produces an immediate increase in serum BHB that is measurable within 15 minutes. This coincides with a feeling of alertness and focus. Neurons can use ketones as energy substrates and it is said that the efficiency by which ATP can be generated using the ketone versus glucose may be in the order exceeding 38% more ATP per unit ketone carbon. The energy powerhouses (mitochondria) of this increase in numbers to accommodate the ketone.

The heightened mental state can survive for an hour to two hours post administration depending on various factors such as diet, body weight, rested state, exercise intensity, meal



size/load, metabolic features and more. Most people report a feeling of heightened awareness, focus and mental acuity upon administration. Research supports improvements in dementias, epilepsy and other cognitive disorders with ketone administration.

However, if long-term ketosis is intended, the ketogenic diet must form the foundation of the program and KetoActiv™ can serve as facilitation and buffering program to maintain a baseline serum BHB from the exogenous source once or twice daily. The BHB-BA complex of KetoActiv™ supplies BA to also support cognitive health from additional synergistic activity. Cognitive support in terms of therapeutic activity may require multiple daily doses.

### **Do ketone supplements help you burn fat?**

The short answer for the 'ketone' is 'NO'. Nevertheless, KetoActiv™ dosing involves the BHB-BA complex strategy. This strategy is such that we avoid producing a BHB serum spike that is prolonged since elevated serum BHB inhibits mobilization of fat during a fasting workout. It is well understood that elevated serum BHB inhibits lipolysis and will impeded fat utilization for B-oxidation by the liver. To raise and prolong ketosis from the exogenous ketone body is to simply prevent the body from oxidizing endogenous fat during that workout; and ketogenesis from ensuing during that fasted workout.

KetoActiv™ is designed to provide a bridging BHB energy substrate to start the workout at full force; but to push the body/metabolism to use its own fat stores from which the liver can generate ketones (Ketone Bodies) to fuel the balance of the workout.

### **Can all the tissues of the body use ketones to generate energy?**

Ketones (Ketone Bodies) are not used in the liver as energy substrates but can be used efficiently by the brain, heart and other tissues. Neurons can use ketones as energy substrates and it is said that the efficiency by which ATP can be generated using the ketone versus glucose may be in the order exceeding 38% more ATP per unit ketone carbon. Peripheral cells of the body including muscle can utilize the ketone to generate ATP as well, and their uptake by cells is independent of insulin. In addition, research shows that ketones (elevated serum ketone) provide the signal to spare lean muscle in the face of stress.

### **How much sodium does KetoActiv™ contain?**

Each dose supplies less than 75 mg sodium. KetoActiv™ is designed to offer an electrolyte balance: magnesium, calcium, sodium and potassium, which is supportive of health. Many ketone salts in the marketplace deliver a whopping 900 mg and even 1300 mg sodium load with them. This equates to an approximate heaping teaspoon of sodium chloride (table salt) in your



diet with each serving. This is not health-promoting. KetoActiv™ is designed to support optimal health: < 75 mg per serving.

### **Can KetoActiv™ replace the ketogenic diet?**

KetoActiv™ may help induce ketosis and support ketogenesis, but it cannot completely simulate the ketogenic diet and its known and unknown signaling and metabolic events. Upon consuming KetoActiv™ we can measure serum ketone (BHB) levels rise; we see incremental Nrf2 signaling despite serum glucose levels (and diet); and the irrefutable workload tolerance in a fasted state that is repeatedly reported in both uncontrolled and controlled experimentation.

Engagement of the ketogenic diet is advocated for therapy and for treatment of severe metabolic syndrome and cognitive deficits to generate higher serum ketone levels. In this case KetoActiv™ supplementation can play an instrumental role helping to maintain a buffer zone, so-to-speak, to make certain serum BHB levels stay consistently high and serum glucose is driven down.

### **How can KetoActiv™ be worked into a ketogenic diet?**

Taken once or twice daily, KetoActiv™ can help get one through the substrate transition phase without the carb-flu (while on the low to 'zero' carb diet); and facilitate hepatic B-oxidation via butyrate (BA) signaling to, again, support ketogenesis and ketosis. The results achieved and the reports announced by professional athletes in sport when KetoActiv™ is used as a pre-workout formula in the fasting workout are quite remarkable. BA is also shown to curb appetite and support better food portion control and this helps the user to stay in control of the ketogenic diet. KetoActiv™'s BHB-BA activated ketone strategy is more comprehensive than a basic passive ketone (BHB) supplement and void of gastrointestinal distress associated with the common BHB plus MCT strategy.

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