Energy Drinks Linked to Sudden Cardiac Arrest

HIGHLIGHTS...

- Consuming energy drinks may increase the risk of sudden cardiac arrest, particularly in people with certain genetic heart conditions
- Among 144 sudden cardiac arrest survivors with pre-existing genetic heart conditions, 5% consumed one or more energy drinks around the time the cardiac arrest occurred
- For people with genetic heart disease, researchers concluded, "an early warning should be made about the potential risks of these drinks"
- Other scientists described energy drink consumption as a "rising public health issue," noting that's it's linked to problems with the cardiovascular, gastrointestinal, renal, endocrine, psychiatric systems and neurological systems
- If your energy is lagging and you're struggling with brain fog, energy drinks are not the answer; optimizing your mitochondrial function is

Energy drinks are under scrutiny following research linking their consumption to sudden cardiac arrest.[1] The beverages have soared in popularity in recent years among those looking for a quick boost. Energy drinks are the No. 2 most consumed supplement after multivitamins among adolescents and young adults,[2] and their market size is expected to reach $90.49 billion in 2028.[3]

The cocktail of stimulating ingredients in energy drinks, however, could be putting heart health at risk, especially among people with certain genetic heart conditions. According

to researchers from the Mayo Clinic, energy drinks may be "arrhythmogenic foods" that increase the risk of sudden cardiac arrest.

Energy Drinks May Increase Risk of Sudden Cardiac Arrest

Cardiac arrest occurs suddenly due to a malfunction in the heart that causes it to stop beating. An electrical signal in the heart may lead to arrhythmia, or irregular heartbeat, including ventricular fibrillation, which is the No. 1 cause of cardiac arrest. It describes a heartbeat so rapid that the heart trembles instead of pumping blood.[4]

"Energy drinks can trigger life-threatening cardiac arrhythmias," researchers wrote in the journal Heart Rhythm. "It has been postulated that the highly stimulating and unregulated ingredients alter heart rate, blood pressure, cardiac contractility, and cardiac repolarization in a potentially proarrhythmic manner."[5]

The study involved electronic medical records of all sudden cardiac arrest (SCA) survivors with proven arrhythmias who came to the Mayo Clinic Windland Smith Rice Genetic Heart Rhythm Clinic in Rochester, Minnesota, for evaluation. Among 144 SCA survivors with pre-existing genetic heart conditions, seven of them — or 5% — consumed one or more energy drinks around the time the cardiac arrest occurred.

Lead study author Dr. Michael J. Ackerman, Ph.D., genetic cardiologist at Mayo Clinic, explained in a news release:[6]

> *"While there seemed to be a temporal relationship between energy drink consumption and the seven patients' sudden cardiac arrest event, a myriad of potential 'agitators' that could have also contributed to a genetic heart disease-associated arrhythmia occurred, like sleep deprivation, dehydration, dieting or extreme fasting, concomitant use of QT-prolonging drugs, or the postpartum period.*
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> *As such, unusual consumption of energy drinks most likely combined with other variables to create a 'perfect storm' of risk factors, leading to sudden cardiac arrest in these patients."*

That being said, previous studies have linked caffeine and sudden cardiac death. A 16-ounce energy drink may contain 80 milligrams (mg) to 300 mg of caffeine, along with other stimulant ingredients. Panera Bread recently removed caffeinated lemonade from its menu after lawsuits alleged they caused two deaths from cardiac arrest.[7]

"Although the relative risk is small and the absolute risk of sudden death after consuming an energy drink is even smaller, patients with a known sudden death predisposing genetic heart disease should weigh the risks and benefits of consuming such drinks in the balance," Ackerman said.[8] For people with genetic heart disease, the researchers concluded, "an early warning should be made about the potential risks of these drinks."[9]

Energy Drinks Are an Arrhythmogenic Food

In an accompanying editorial, Dr. Ehud Chorin, Ph.D. with Tel Aviv University described arrhythmogenic foods as an underestimated medical problem, stating that energy drinks fall into this classification.[10] Chorin says:[11]

> *"Establishing a probable cause of an arrhythmia includes inquiring about a potential exposure to toxins or medications. An increasing number of substances in the standard diet are found to have unwanted cardiac effects, prompting the consideration of a novel subcategory in a patient's clinical history intake: arrhythmogenic foods. Energy drinks fall in this category.*
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> *The findings reported in this study should be viewed in the context of the large body of evidence suggesting arrhythmogenic effects of certain foods, especially when consumed in large quantities or large concentrations by high-risk patients."*

In the featured study, for instance, two of those affected had long QT syndrome (LQTS) while two had catecholaminergic polymorphic ventricular tachycardia (CPVT). Both of these conditions are associated with cardiac arrest, but the energy drinks may have increased the risk further.

LQTS is a disorder of the heart's electrical activity that can cause dangerous arrhythmias, leading to fainting, seizures or sudden cardiac arrest. CPVT is a genetic condition that may trigger irregular, fast heartbeats, also leading to fainting, seizures or sudden cardiac arrest, particularly in young people and children. Chorin believes the energy drink connection to cardiac arrest is significant, stating:[12]

> *"Although the association could well be purely coincidental, the fact that this connection was observed in patients with long QT syndrome (LQTS) and catecholaminergic polymorphic ventricular tachycardia, but not in patients with Brugada syndrome (where the sympathetic stimulation of 'energy drinks' would not be expected to be proarrhythmic), provides some support to this observation."*

Energy Drinks a 'Rising Public Health Issue'

Energy drinks are often marketed in ways that suggest they're beneficial for boosting energy, enhancing physical and mental performance and improving concentration. These marketing strategies frequently highlight the inclusion of vitamins, amino acids and herbal extracts to create a perception of health benefits.

However, many health experts continue to caution that these beverages can pose significant health risks. "Large quantities of caffeine, taurine, sugars, and B-vitamins may be contributing to these outcomes by increasing the heart rate, blood pressure (BP), and contractility of the heart in addition to prolonging the QTc [corrected QT interval]," according to research published in Reviews in Cardiovascular Medicine.[13]

Scientists described energy drink consumption as a "rising public health issue," noting that's it's not only linked to problems with the cardiovascular system but also others, including the gastrointestinal, renal, endocrine, psychiatric systems and neurological systems.[14]

One-third of adolescents aged 12 to 17 consume energy drinks regularly, and these beverages are most common among men between the ages of 18 and 34. Often, energy

drinks are consumed along with alcohol or other substances,[15] which may increase the risk of adverse health outcomes.

One study looked into the cardio- and cerebrovascular effects of consuming Red Bull, one of the leading brands in the energy drink market. Among 30 young adult women, drinking Red Bull led to a "decrease in the velocities of the carotid arteries and the middle cerebral artery as well as a decrease in cardiac output accompanied by a decrease in heart rate and a slight, although not significant, increase in systolic and diastolic blood pressures."[16]

Caffeine and Other Stimulants in Energy Drinks Act Synergistically

The rising popularity of energy drinks led to a corresponding increase in caffeine consumption among children and adolescents. This rose 70% from 1977 to 2009.[17] In energy drinks, the caffeine typically occurs alongside other stimulants such as guarana, taurine and L-carnitine.

"The adverse effects of EDs on the cardiovascular system are due to its many different ingredients that have the ability to individually and collectively change the physiology of the cardiovascular system," researchers explained.[18] While often increasing alertness and attention, the drugs also increase heart rate and breathing, along with health problems that may be fatal:[19]

> *"Adolescents gravitate toward these beverages to swiftly boost energy levels, enhance alertness, and increase scholastic or athletic performance. Consequences of this consumption pattern have led to a rising incidence of young individuals seeking medical attention in emergency departments due to an array of adverse health outcomes, as documented in results section.*
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> *Reports underscore that energy drinks have deleterious effects on a broad spectrum of bodily organs, culminating in mild adversities such as anxiety, gastrointestinal disturbances, dehydration, nervousness, and tachycardia, along*

> *with more severe outcomes like rhabdomyolysis, acute kidney injury (AKI), ventricular fibrillation, seizures, acute mania, and stroke.*
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> *Furthermore, instances linking energy drink consumption to fatalities have been documented."*

Caffeine, for instance, blocks adenosine receptors, which usually help relax blood vessels. Blocking adenosine receptors also increases levels of adenosine in the blood, which raises sympathetic activity — the part of the nervous system that controls the fight-or-flight response — along with stress hormone levels.[20]

Guarana, a plant native to the Amazon basin, is another common energy drink ingredient. Its seeds are known to have a high concentration of caffeine, often more than coffee beans, adding to energy drinks' stimulatory effects.[21] Even B vitamins, which play a vital role in your body, could support stimulatory adverse effects when consumed in large quantities alongside caffeine:[22]

> *"Despite B-vitamins being regarded as generally beneficial to the human body, large quantities of B-vitamins may likely be included in Eds [energy drinks] due to their function as cofactors for energy utilization and metabolism, therefore possibly augmenting the stimulatory effects of the other ingredients present in these beverages."*

Is Taurine in Energy Drinks a Problem?

Taurine is a type of amino acid, which are the building blocks of proteins. Unlike many other amino acids, taurine is not used to build proteins but rather plays several other critical roles in the body, such as supporting nerve growth, producing bile salts and helping with digestion and maintaining proper hydration.[23]

Taurine is considered a "conditionally essential," or semi-essential, amino acid because, while your body can naturally produce it, supplementation might be necessary under certain conditions, such as in infants or in people with specific medical conditions.

Taurine is also commonly added to energy drinks, where it may contribute to caffeine-induced intracellular calcium release.[24] This, in turn, may disrupt the normal calcium balance within cells, particularly in the heart and muscles.

"Short term exposure to taurine increases intracellular levels of calcium in vascular smooth muscle cells and the heart, leading to a positive inotropic effect," according to the Reviews in Cardiovascular Medicine study.[25]

Positive inotropic agents, including caffeine, increase the amount of calcium available in heart cells. This enhanced calcium availability boosts your heart's ability to contract more forcefully. While this can be beneficial in certain medical situations, excessive stimulation can lead to potential risks. However, dietary taurine has many health benefits.

Taurine acts as an antioxidant and anti-inflammatory agent that may be useful in warding off sarcopenia, an age-related condition characterized by the loss of muscle mass and function.[26] Taurine is also the most abundant source of sulfur and is required for a wide range of physiological processes, including the healthy function of your immune system, nervous system,[27] metabolism and digestion — but that's not all.

According to research published in the June 2023 issue of the journal Science, taurine also appears to play an important role in longevity and healthy aging.[28] The key to remember is that it's best to get taurine and other nutrients from whole foods and, if necessary, via high-quality supplements — not synthetic energy drinks.

Taurine is found in animal foods such as seafood, red meat, poultry and dairy products. If you're a vegan, however, you may want to consider a high-quality taurine supplement, as you're not getting any from the foods you eat. While your body can synthesize some taurine, it's not going to be sufficient in the long run, especially as you get older and your body's ability to synthesize it diminishes. However, energy drinks are not a safe source of taurine or any other vitamin or herb.

How to Boost Your Energy Naturally

If your energy is lagging and you're struggling with brain fog, energy drinks are not the answer. Optimizing your mitochondrial function is, however. It's one of the most important strategies to increase your cellular energy, so it's at the core of improving your health.

Avoiding dietary pitfalls like excess **linoleic acid**, in the form of vegetable and seed oils, is instrumental in optimizing mitochondrial function. Factors like **estrogen** and endotoxins can also deplete your cellular energy. You can find more essential tips for mitochondrial health and energy production — that won't wreck your health like consuming energy drinks — in "**Mitochondrial Health Is a Key Countermeasure Against the Global Indoctrination Program**."

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