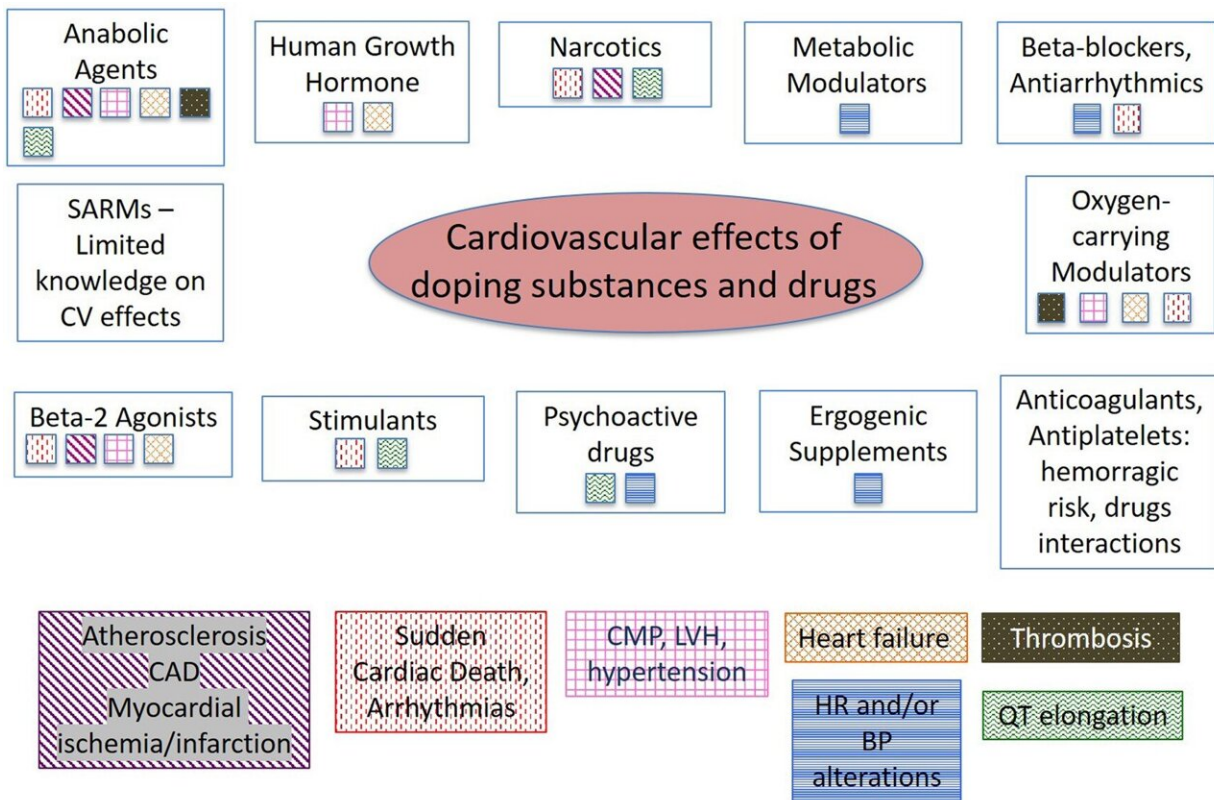


Athletes warned against potential dangers of natural supplements

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Cardiovascular effect of doping substances and drugs. The figure summarizes the main cardiovascular consequences of the different substance's categories. BP, blood pressure; CAD, coronary artery disease; CMP, cardiomyopathy; LVH, left ventricular hypertrophy; SARM, selective androgen receptor modulators. Credit: DOI: 10.1093/eurjpc/zwab198

Nutritional supplements taken to boost athletic performance can pose risks to the heart, according to a European Society of Cardiology (ESC) statement published today in the *European Journal of Preventive Cardiology*, a journal of the ESC.

"Nutritional supplements are commonly viewed as risk-free [substances](#) that may improve performance," states the paper. "Some [nutritional supplements](#), including various plant and 'natural' extracts, may pose a serious health risk and athletes may even risk contravening anti-doping rules."

"Athletes who use supplements often have no knowledge regarding their effects on [sports performance](#) and overall health," continues the document. "It is reported that most athletes get nutritional advice from coaches, fellow athletes, family members and friends, suggesting that more wide reaching educational interventions, at an early age, are necessary."

Key points for athletes using nutritional supplements:

- A natural [supplement](#) is not necessarily a safe supplement.
- Use products by established manufacturers with known good quality standards.
- Athletes are personally responsible for any substances they consume.
- Ignorance is not accepted as an excuse in relation to a positive doping test.

The position paper outlines the cardiovascular effects during sports of doping substances, prescribed and over-the-counter medicines, legal performance-enhancing supplements, and experimental drugs.

Doping refers to the use of a substance or method which is potentially

dangerous to athletes' health or capable of enhancing their performance. To take one example, death among athletes doping with anabolic androgenic steroids is estimated to be six to 20 times higher than in clean athletes, and around 30% of these deaths can be attributed to cardiovascular causes.

The World Anti-Doping Agency (WADA) maintains a list of prohibited drugs, but nutritional substances are not included since many are unregulated and unlicensed. The use of legal supplements by athletes varies between 40% and 100% depending on the sport and level of competition. Intended to enhance performance and give a competitive edge, legal supplements include caffeine, creatine, energy drinks/gels/bars, beetroot juice and proteins.

"Caffeine is a prime example of a natural substance that is considered safe," said first author Dr. Paolo Emilio Adami of World Athletics, the global governing body for track and field. "While caffeine improves performance, particularly aerobic capacity in endurance athletes, its abuse may lead to fast heart rate (tachycardia), heart rhythm disorders (arrhythmias), high blood pressure, and in some cases, sudden cardiac death."

"The 'more is better' philosophy, when applied to caffeine use in sports, may result in side effects that outweigh the performance benefits," states the paper.

Many elite athletes consume a combination of supplements daily and the document states, "Unfortunately, it is common practice for athletes to ignore dosing recommendations and use multiple drugs simultaneously." Sportspeople should be aware that supplement use exposes them to the risk of ingesting prohibited substances since they are regulated as food ingredients and not subject to the rigorous safety standards of pharmaceutical products.

The document warns that athletes' desire and consent to use experimental drugs that have not been proven safe in humans is potentially even riskier than using steroids or other prohibited drugs. The ongoing use of selective androgen receptor modulators or peptides "carry a substantial risk for long-term detrimental health consequences, which are usually understated by their promoters," states the paper. It also highlights that gene doping to improve strength, reduce pain and repair tissues is "expected to occur behind the scenes with limited protective actions and consequently increased health risks," and "constitutes a great threat of major concern about the future of human performance manipulation."

Dr. Adami said: "In many cases sportspeople use a mix or cocktail of substances to improve their performance and the interaction between them can also be extremely dangerous. All doping substances are risky and their use as medications should only be allowed when prescribed by a physician to treat a medical condition, when no therapeutic alternatives are available, and following the Therapeutic Use Exemption (TUE) requirements. Based on the dose, the duration of use, and the interaction with other substances, the health consequences can vary and in some cases be lethal. From a cardiovascular perspective they can cause sudden cardiac death and arrhythmias, atherosclerosis and heart attack, [high blood pressure](#), heart failure, and blood clots."

He continued: "Athletes should be aware that natural supplements and substances are not necessarily safe and should only be used if recommended by professional nutritionists. It is fundamental to use products from well-established manufacturers with known and internationally approved good quality standards. Athletes are always personally responsible for any substances they consume. Ignorance is not accepted as an excuse in relation to a positive doping test. In those with established cardiovascular disease, a sports physician or sports cardiologist should always be consulted prior to using any performance

aid or supplement."

More information: Adami PE, Koutlianos N, Baggish A, et al. Cardiovascular effects of doping substances, commonly prescribed medications and ergogenic aids in relation to sports: a position statement of the sport cardiology and exercise nucleus of the European Association of Preventive Cardiology, *European Journal of Preventive Cardiology* (2021). [DOI: 10.1093/eurjpc/zwab198](https://doi.org/10.1093/eurjpc/zwab198)

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