

Performance and Image Enhancing Drugs

What is Clenbuterol?

Clenbuterol is classed as a 'beta-2 agonist' and its short-term effects are similar to stimulant drugs like amphetamine or ephedrine (i.e. increases heart rate, temperature, perspiration and blood pressure).

The main therapeutic use of clenbuterol is in the treatment of asthma to relax the smooth muscle in the airways. Clenbuterol is also used as a bronchodilator in veterinary medicine.

Clenbuterol produced for human consumption is generally in tablet form. The most common veterinarian preparation is a syrup.

Clenbuterol is not approved for human use in Australia and is also banned under the Olympic Movement's *World Anti-Doping Code Prohibited Classes of Substances and Prohibited Methods*.

What are the perceived benefits?

Clenbuterol is being used alone and in conjunction with other substances to promote the growth of skeletal muscle ('anabolic effects') and to reduce body fat ('catabolic effects').

Some athletes and body builders are using clenbuterol without proof of its effectiveness or safety. Some animal studies have shown that using a stimulant like clenbuterol has the 'anabolic effect' of increasing muscle mass and body weight by enhancing muscle protein synthesis in rodents. However, no human studies are available on whether clenbuterol can increase strength or power.

Body builders and athletes most often utilise clenbuterol as a 'fat burner' to 'define' muscles (i.e. for its 'catabolic effect'). Clenbuterol has the ability to slightly increase the body's core temperature and metabolism, which users believe assists in the burning of calories. The body will fight this effect however, so clenbuterol may only have an effect over a limited time period.

What are the side effects and potential harms?

Clenbuterol is a potentially dangerous drug.

The most common problems experienced by clenbuterol users include:

- o Headaches
- o Tremors (especially hand shakes)
- o Cramps
- o Restlessness/ nervousness
- o Anxiety
- o Insomnia
- o Sweating
- o Increased appetite
- o Nausea
- o Palpitations
- o Hypertension (high blood pressure)

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For some users the troubling tachycardia (heart palpitations) and tremors have been enough to stop them using clenbuterol.

Most of the above side effects will reduce when clenbuterol is cleared from the body. However, the long-term effects of use on humans are not yet understood.

Animal studies have shown that, although clenbuterol has an 'anabolic effect' in rats, there are also some very negative effects on their hearts when used long term. The hearts of rats on clenbuterol increased in size due to the infiltration of collagen fibres into the heart wall (not an increase in heart muscle cells). Collagen is a tough connective tissue that can stiffen the heart muscle, actually reducing cardiac output and possibly producing cardiac arrhythmias. Also, clenbuterol rats suffered from noticeable cardiac-cell degeneration.

Unsupervised use of clenbuterol could exacerbate pre-existing heart conditions or hypertension. There is a risk of overdose and stroke when used at high doses.

There have been reports of sudden deaths among bodybuilders on clenbuterol, although it is unclear whether this was the result of clenbuterol or other drug combinations.

Risks of counterfeit products

There is an active blackmarket in clenbuterol and in addition to the legitimate clenbuterol preparations for medical use, there are counterfeits which may have few, if any, active ingredients and carry the risk of contamination.

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