

ERYTHROPOIETIN

What is erythropoietin (EPO)?

EPO is a naturally occurring hormone produced by cells in the kidneys that regulate the production of red blood cells in bone marrow. These kidney cells are sensitive to low blood oxygen content and will release EPO when oxygen is low. EPO stimulates the bone marrow to produce more red blood cells (to increase the oxygen carrying capacity of the blood).

Artificial EPO (r-HuEPO) was designed in 1989 to help people with kidney diseases that were chronically anaemic. r-HuEPO clearly enhanced aerobic capacity in these patients. Since then it has been used to help treat people with cancer and HIV patients who are undergoing debilitating AZT treatment.

Unlike other performance and image enhancing drugs (PIEDs), r-HuEPO is injected intravenously or subcutaneously.

It is illegal to use EPO without a prescription in all parts of Australia. Use of EPO for non-medical purposes is banned under the Olympic Movement's *World Anti-Doping Code Prohibited Classes of Substances and Prohibited Methods*.

Unlike other PIEDs, EPO has limited or no application to enhancing body image. People are using EPO illicitly to enhance performance in elite endurance sports.

What are the perceived benefits?

The use of EPO is believed to increase oxygen absorption, reduce fatigue and improve endurance by increasing the rate of red cell production. It is also believed that EPO increases the metabolism and the healing process of muscles because the extra red cells carry more oxygen and nutrients.

What are the side effects and potential harms?

It is now well recognised that the uncontrolled use of EPO can be dangerous. When a doctor is considering prescribing EPO for the treatment of severe anaemia, there is a specific evaluation of the benefits and dangers of this type of treatment.

In someone who already has normal levels of red blood cells, use of EPO can lead to increased thickening (or viscosity) of the blood.

- o Blood thickening from non-medical use of EPO may lead to clotting, thrombosis, heart attack and stroke.
- o Blood thickening from non-medical use of EPO may be further exaggerated by the dehydration that frequently occurs in training and endurance sports.

EPO has been implicated in the sudden deaths of several athletes.



Other possible problems experienced by users of EPO include:

- o **Rapid increases in blood pressure when the substance is introduced too quickly**
- o **Convulsions**
- o **Influenza-like symptoms, bone aches and shivering following injection**
- o **Skin reactions, allergy-like swelling at the site of injection**
- o **Liver or pancreatic damage**
- o **Increased risk of developing liver or lymphatic cancers**

Risks of counterfeit products

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

Injecting risks

Where needles, vials or other equipment are shared, there may be traces of blood, increasing the risk of transmission of blood-borne viruses (such as hepatitis or HIV).

Where the skin has not been properly cleaned, dirt or bacteria may inadvertently enter the bloodstream, carrying risk of infection, inflammation and damage to blood vessels. Injecting an unsterile substance also carries risks of infection or poisoning. In severe cases, infections from injecting can cause thrombosis, ulcers and gangrene.

Injecting into small muscle groups increases the risks of injecting into veins and nerves.

