



LACTIC ACID

The expression "lactic acid" is used most commonly by athletes to describe the intense pain felt during exhaustive exercise, especially in events like the 400 meters and 800 meters. When energy is required to perform exercise it is supplied from the breakdown of Adenosine Triphosphate (ATP). The body has a limited store of about 85 grams of ATP and would use it up very quickly if we did not have ways of resynthesising it. There are three systems that produce energy to resynthesise ATP: ATP-PC, lactic acid and aerobic.

Lactate Shuttle

The lactate shuttle involves the following series of events:

- As we exercise pyruvate is formed
- When insufficient oxygen is available to breakdown the pyruvate then lactate is produced
- Lactate enters the surrounding muscle cells, tissue and blood
- The muscle cells and tissues receiving the lactate either breakdown the lactate to fuel (ATP) for immediate use or use it in the creation of glycogen
- The glycogen then remains in the cells until energy is required

65% of lactic acid is converted to carbon dioxide and water, 20% into glycogen, 10% into protein and 5% into glucose

Aerobic Capacity

Given that high levels of lactate/hydrogen ions will be detrimental to performance, one of the key reasons for endurance training is to enable the body to perform at a greater pace with a minimal amount of lactate. This can be done by long steady runs, which will develop the aerobic capacity by means of capillarisation (formation of more small blood vessels, thus enhancing oxygen transport to the muscles) and by creating greater efficiency in the heart and lungs. If the aerobic capacity is greater, it means there will be more oxygen available to the working muscles and this should delay the onset of lactic acid at a given work intensity.

Anaerobic Threshold

Lactic acid starts to accumulate in the muscles once you start operating above your anaerobic threshold.. This is normally somewhere between 80% and 90% of your maximum heart rate (MHR) in trained athletes.

What a low Lactate Threshold means

If your lactate threshold (LT) is reached at low exercise intensity, it often means that the "oxidative energy systems" in your muscles are not working very well. If they were performing at a high level they would use oxygen to break lactate down to carbon dioxide and water, preventing lactate from pouring into the blood. If your LT is low it may mean that:

- you are not getting enough oxygen inside your muscle cells
- you do not have adequate concentrations of the enzymes necessary to oxidize pyruvate at high rates
- you do not have enough mitochondria in your muscle cells
- your muscles, heart, and other tissues are not very good at extracting lactate from the blood

Improving your Lactate Threshold

The aim is to saturate the muscles in lactic acid which will educate the body's buffering mechanism (alkaline) to deal with it more effectively. The accumulation of lactate in working skeletal muscles is associated with fatigue of this system after 50 to 60 seconds of maximal effort. Sessions should comprise of one to five reps (depends on the athlete's ability) with near to full recovery.

Training continuously at about 85 to 90% of your maximum heart rate for 20 to 25 minutes will improve your LT.

Lactate Tolerance Training Sessions

The following table identifies some possible training sessions that can be used to improve your lactate tolerance:

Distance	Pace	Recovery	Reps
150 metres	400 metres	90 seconds	3 x 3
300 metres	800 metres	2 minutes	6
150 metres	800 metres	45 seconds	12
150 metres	800 metres	20 seconds	2 x 4
300 metres	1000 metres	90 seconds	9

For more information –

Call +971 (0)4 452 2555

Email – info@ignite-wellness.com