

SECOND WIND

Second wind is a phenomenon in distance running, such as marathons or road running (as well as other sports), whereby an athlete who is out of breath and too tired to continue suddenly finds the strength to press on at top performance with less exertion. .

Heavy breathing during exercise is also to provide cooling for the body. After some time, the veins and capillaries dilate and cooling takes place more through the skin, so less heavy breathing is needed. The increase in the temperature of the skin can be felt at the same time as the "second wind" takes place.

A second wind phenomenon is also seen in some medical conditions, such as glycogen storage disease type V.

PROPOSED PHENOMENON

Lactic acid

Muscular exercise as well as other cellular functions requires oxygen to produce ATP and properly function. This normal function is called aerobic metabolism and does not produce lactic acid if enough oxygen is present. During heavy exercise such as long distance running or any demanding exercise, the body's need for oxygen to produce energy is higher than the oxygen supplied in the blood from respiration. Anaerobic metabolism to some degree then takes place in the muscle and this less ideal energy production produces lactic acid as a waste metabolite. If the oxygen supply is not soon restored, this may lead to accumulation of lactic acid.

This is the case even without exercise in people with respiratory disease, challenged circulation of blood to parts of the body or any other situation when oxygen cannot be supplied to the tissues involved.

Some people's bodies may take more time than others to be able to balance the amount of oxygen they need to counteract the lactic acid. This theory of the second wind posits that, by pushing past the point of pain and exhaustion, runners may give their systems enough time to warm up and begin to use the oxygen to its fullest potential. For this reason, well-conditioned Olympic-level runners do not generally experience a second wind (or they experience it much sooner) because their bodies are trained to perform properly from the start of the race.

The idea of "properly trained" athlete delves into the theory of how an amateur athlete can train his or her body to increase the aerobic capacity or aerobic metabolism.

Metabolic switching

When non-aerobic glycogen metabolism is insufficient to meet energy demands, physiologic mechanisms utilize alternative sources of energy such as fatty acids and proteins via aerobic respiration. Second-wind phenomena in metabolic disorders such as McArdle's disease are attributed to this metabolic switch and the same or a similar phenomenon may occur in healthy individuals

Endorphins

Endorphins are credited as the cause of the feeling of euphoria and wellbeing found in many forms of exercise, so proponents of this theory believe that the second wind is caused by their early release.