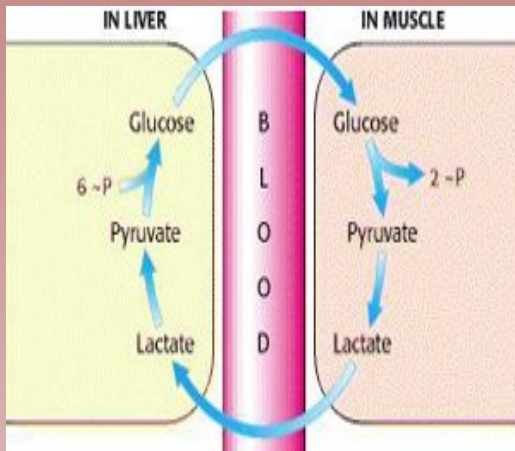
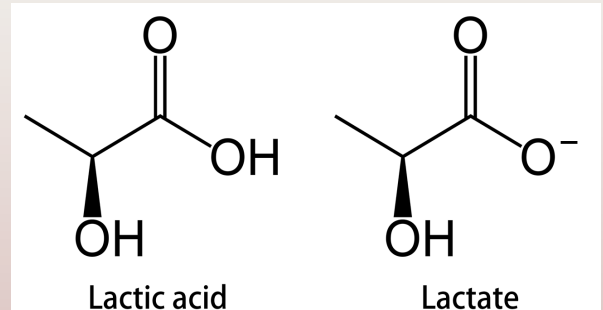


# THE WALL (LACTIC ACID MYTH)

The common belief is after an intense ride or run the reason you are sore and stiff is an accumulation of lactic acid within the muscles. This belief is FALSE. Causes of your post-exercise soreness vary from overuse to minor strains of your individual muscle fibers. During exercise you cause micro-trauma (small tears) to the muscle fibers. After about 24 hours the damaged muscle becomes swollen and sore. Chemical irritants are released from the damaged muscles and can irritate pain receptors. In addition to the injured fibers, there is increased blood flow from increased activity to the muscle, causing a swelling of the muscle tissues, which causes enough pressure to stimulate pain receptors. Instead of having free-moving muscle fibers the next morning, you have fibers that are fatigued, have microscopic tears and are swollen. This concept is called Delayed onset muscle soreness (DOMS). See info sheet brought to you by the ACSM on DOMS.



Our bodies store glycogen in both our muscles as well as liver. Within minutes of hopping on your bike your muscles will start to break down the glycogen into smaller energy units of glucose via glycolysis. Certain cells can break glucose down even further and convert it into two forms: pyruvate and lactate. If you're exercising at a moderate level (20 minutes or more) you're breathing in through the nose and out through the mouth and pyruvate will readily enter into mitochondria (powerhouse of the cell) and ATP (energy required for all cellular work) is formed. Your cells aren't just producing lactate or just producing pyruvate at a given time—the human body is constantly seeking balance, so there will always be some lactate produced. At the start of exercising, the ratio of pyruvate to lactate that's being formed is shifted more towards pyruvate. By in large, this ratio is really dependent on how many mitochondria in your muscles are available to take in the pyruvate, and how fast that first step of glucose break-down is occurring. You can imagine, that as your exercise intensity increases, your muscles are going to demand more energy, and in response, this first step will start to turn over faster. Ten minutes into your biking session and the energy compartments inside your muscle cells (mitochondria) are beginning to reach capacity of how much pyruvate they can take up and turn into ATP.

When the mitochondria can no longer take up pyruvate, they will start to produce more lactate to compensate (i.e. the ratio shifts in the other direction). This concept is what was once believed to be the culprit for (hitting the wall) or muscle fatigue. Lactate levels increase as performance coincidentally drops off. Lactate as mentioned is a source of energy the body uses. Lactate levels in the blood normalize about 60 minutes post



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