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IS INFLAMMATION HOLDING YOU BACK? (Part 1 of 2)

The muscle soreness and joint pain you experience after workouts are more than just a nuisance. They're symptoms of post-workout tissue inflammation, which slows recovery, limits fitness gains and even causes overuse injuries. By better managing post-exercise inflammation, you can recover faster, enhance your training adaptations, perform better in workouts and competitions and possibly avoid injuries. In fact, the health of our major body systems – joint, cardiovascular, immune, blood sugar metabolism, cell health and even brain – is vitally connected to a healthy inflammation response.

What is inflammation?

Inflammation is an immune system response to tissue damage. Its purpose is to remove cellular debris from the site of damage and initiate repair. There are three phases of the inflammation response. First, blood accumulates at the site of damage, which causes the classic symptoms of swelling, heat and stiffness that are associated with inflammation. Next, specialized white blood cells called neutrophils migrate to the injured area and absorb the debris of damaged cells. Finally, other cells known as macrophages accumulate at the site of damage to complete the clean-up process and stimulate tissue regeneration.

The good

Inflammation is a double-edged sword. On the positive side, when a significant injury occurs, inflammation heals it and also produces symptoms of pain and stiffness that discourage activity during the healing process. A much milder inflammation response occurs after normal workouts in which we don't suffer any serious injuries. Every workout causes microscopic damage to muscle fibers; the inflammation process repairs this damage during the following recovery period, which begins about two hours after a workout and typically resolves after a minimum of 48 hours. In addition to repairing everyday muscle damage from exercise, inflammation promotes training adaptations such as satellite cell proliferation, an essential step in the development of bigger, stronger muscle fibers. Inflammation even makes you more resistant to muscle damage in the future (a phenomenon known as "the repeated bout effect"). Studies have shown that untrained individuals become more resistant to exercise-induced muscle damage after just a single workout. It appears that the inflammation response triggered by the first workout increases the activity of neutrophils in the next workout, protecting the muscle fibers from excessive damage.

The bad

There's a negative side to inflammation, however. Ironically, although inflammation repairs tissue damage caused during exercise, it also causes further damage, known as secondary muscle damage, between workouts. Secondary muscle damage is believed to be caused at least in part by the release of free radicals from active neutrophils. Secondary muscle damage is the main reason you feel sorer the morning after a particularly hard workout or race than you do right afterward, and why you sometimes feel sore two days after the workout or race. This phenomenon is aptly referred to as delayed-onset muscle soreness (DOMS). Delayed-onset muscle soreness (DOMS) is a symptom of muscle tissue damage that can seriously compromise the quality of your training while it persists. The loss of efficiency seen in athletes experiencing DOMS stems from changes in their normal movement patterns. These changes also place unaccustomed stress on the joints, increasing injury risk.

In athletes who train hard every day, inflammation may not be entirely resolved and muscle damage may not heal adequately between workouts. If you persist in training too hard and resting too little, you may enter a cycle of persistent tissue trauma and chronic inflammation. When inflammation is chronic, there is a general and persistent increase in oxidative stress. It follows that people with localized chronic inflammation are at greater risk of developing cancerous growths.

Joint tissues also suffer damage during exercise and undergo a subsequent inflammation response. When joint tissues fail to regenerate fully between workouts, they may become chronically inflamed and/or degenerate to the point of serious injury. Overuse injuries that are all too familiar, such as runner's knee and tendonitis, develop in this manner.

NEXT ISSUE: What can you do to limit post-workout inflammation and its negative effects?

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