

# The Role Of Exercise In Health

*"The body responds to the stress of exercise in a rebound fashion resulting in bringing about a positive response, a process called hormesis."*

We know that if we embark on a regular exercise program we can increase the number of mitochondria in our muscle tissue. But did you know that if you engage in an exercise training program, your brain is increasing the number of mitochondria? It's called mitochondrial biogenesis.

Mitochondria are the cellular "power plants" because they generate most of the cell's supply of ATP. But in addition to supplying cellular energy, mitochondria are involved in other tasks such as cell signaling, cellular differentiation, cell death, as well as cell growth. New research connects mitochondrial health to anti-aging. It makes sense if you think about it because every muscle is tied to nerve fibers in the brain. So as you exercise your body, you are literally exercising your brain. Let's look at the process.

Exercise is a form of stress. The body responds to stress in a rebound fashion with the end result bringing a positive



response, a process called hormesis. Here's how the process works. Exercise causes oxidative stress due to increased intake of oxygen and tissue breakdown. Low levels of physical activity create high levels of oxidative stress. In other words the average person isn't creating enough physical stress in everyday life to cause the rebound.

People with moderately intensive regular exercise experience lower levels of oxidative stress due to the hormesis or rebounding effect. However, the body has a limit to recovery; and if exercise is pushed

beyond that level, individuals will experience the same high levels of oxidative stress that the low level people experience. The body can only recover so fast and then the damage overcomes the repair factor.

Here is another reason to exercise, myokines. Researchers have commented that adipose tissue is not static, that it secretes cytokines that turn on inflammation and contribute to metabolic syndrome, diabetes, heart disease, cancer, etc. Skeletal muscle is now looked at as the largest secretory organ. Chemical mes-

sengers called myokines are produced, expressed and released by muscle fibers and exert either autocrine, paracrine or endocrine effects.

Here's how Dr. Doug McGuff describes myokines in his book, *Body by Science*. "Myokines increase your insulin sensitivity. They increase your glucose utilization inside the muscle. They increase liberation of fat from adipose cells and the burning of the fat within the skeletal muscle. They also act as chemical messengers that inhibit the release and the effect of the inflammatory cytokines that are produced by body fat. Myokines also significantly, via inhibitory effect, reduce body fat irrespective of caloric intake. It actually has a fat reducing effect that exists outside of energy balance. They have very profound effects."

We've discussed HIIT, high intensity interval training, in the past and how short bursts of energy have a tremendous metabolic effect on tissue and hormones. For the last 40 years, Dr. McGuff has championed a slightly different form of high intensity training called high intensity strength training, HIST. Both HIIT and HIST have tremendous metabolic effects. But HIST has the added effect of synthesizing more muscle and therefore synthesizing more of the metabolic components that support it. He suggests a workout that pushes large muscles to exhaustion once a week. His experience and the data he presents in his book, show that "muscle recovery will be less than optimal if exercising to exhaustion occurs more than once a week".

In another controversial position, Dr. McGuff quotes 47 out of 49 studies that show performing multiple sets will not increase performance over one set. He said it this way, "according to the medical literature, the more

intensely the muscles are made to contract, the more damage or micro trauma takes place at a cellular level. Consequently, the greater the intensity of the workout, the more time must be allowed for the repair and growth of the tissue that was stimulated by the workout. It is this process of repair that makes the muscle fibers bigger and stronger."

He targets five major muscle groups. His workout is simple: One set to failure, per major muscle group, each set lasting approximately 45-90 seconds. Sets after appropriate warm ups should be as slow as possible without turning into a stuttering, stop-and-start scenario. The last repetition should be so difficult that the weight is unable to be moved, muscle failure is approaching. The muscle in this last phase is engaged for 10 seconds before unloading the muscle.

His work is extremely inspiring. You can go to his blog where he has a plethora of information including videos and articles.

As long as we are talking about enhanced performance, over the years, exercising physicians have put together nutritional protocols per sport to enhance athletic performance and reduce recovery time using Biotics Research products. You will be pleasantly surprised at how simple nutrients applied correctly can make such a big difference.

Understanding that regular exercise increases new mitochondria in your brain is a game changer for many people. And in light of the recent discovery that the body secretes anti-inflammatory and anticancer myokines as we exercise, the saying "Exercise covers a multitude of sins" has more truth than we know.

Thanks for reading this week's edition. I'll see you next Tuesday.