

Reversing Aging Changes with Exercise

Midlife Matters by Dr. Vicki Holmes, April 18, 2018

We all know that exercise is important for cancer prevention, heart, and lung and bone protection and also for emotional stability. It is somewhat confusing which type of exercise to choose.

Several years ago many articles appeared in the literature about High Intensity Interval Training (HIIT). HIIT involves short bursts of maximal effort followed by rest, resulting in 10-15 minutes of vigorous exercise after 20-30 minutes. It is interesting that the rest part is just as important and the exercise part. The beauty of this is that it doesn't matter what your fitness level, you can benefit from this. Maximal effort will vary with your state of fitness. If you have a heart condition you need to be assessed to see if you can exert yourself and your exercise initially would need to be supervised.

In case you think that you would not be a candidate for this type of exercise, you should know that this has been studied in high risk groups; people with coronary artery disease, congestive heart failure, and Multiple Sclerosis, obesity and heart transplants. There were more cardiac deaths in the control group than those who did this vigorous exercise!

For diabetic and obese patients it is particularly exciting because of the effect on muscle. These people have insulin resistance. Insulin is produced in the pancreas and is responsible for carrying the sugar into cells to be used for energy and it stores excess glucose in the liver and muscles as glycogen.

In pro-inflammatory states, metabolic syndrome and diabetes, these organs become resistant and require higher levels of insulin to take glucose into the cells, straining the pancreas to keep up.

Exercise reduces insulin resistance and lowers blood sugar. It also helps build up muscles and makes them metabolically active, improves the blood supply, increases exercise tolerance and time to exhaustion.

A recent study done by Dr S. Nair, an endocrinologist from the Mayo Clinic, was extremely interesting. He studied 72 sedentary men and women for 12 weeks; half were 18-30 and the other half over 65-80. There were three groups- HIIT, resistance training, and combined training. The High Intensity Interval Training did brief interval training riding a stationary bike vigorously for 4 minutes followed by three minutes of rest (pedaling with no load) repeated x3, three times/week and 2 days of 45 min treadmill walking at 70% of vo2 peak. Resistance training group did upper and lower body exercises 4 sets of 8-12 repetitions, two days/week. The third group road a stationary bike at a moderate pace for 30 min 5 times/week and lifted weights four days/week with fewer repetitions than RT

All of the activity groups had enhanced insulin sensitivity and lean mass. HIIT and combined training had more improved aerobic capacity; HIIT had a better effect on endurance and muscle mass.

This is where it gets interesting. The mitochondria are the engine of the cells. As we age, the mitochondria do not function as well and reduce in number. We lose muscle mass. They used muscle biopsies to examine changes in muscle tissue, muscle protein and influence on mRNA (messenger RNA

molecules) or an important messenger in genetic function. In the HIIT, there were 400 genes that worked differently; only 33 in weight training and 19 for moderate exercisers. This showed that HIIT induced the largest gene expression change.

What does this mean? HIIT had a positive influence on the muscle protein and mitochondrial function, *reversing some of the age related changes within the cell*. The muscles functioned better and increased in size.

It is amazing how complex our bodily functions are -- so complex that we are just beginning to identify cellular physiology. What is clear is that what we do can influence our long term health in many ways. Perhaps this reprogramming of our DNA function is how we can influence the development of cancer - this is a leap of faith on my part but it makes sense.

I challenge you to examine your exercise choices and start adding short bouts of challenging intervals to improve your strength, endurance, and insulin resistance. You CAN take charge of the only thing you have control over - your actions!