



ALIVE!

OVERLOADED

SKELETAL MUSCLE HAS THIS amazing ability to adapt to being overloaded. When weight bearing loads are repeatedly placed upon them, muscle responds by increasing in size and strength. Exercise is the most powerful stimuli for inducing reorganization of muscle cells. Genetics play a large role in muscle mass potential, as does diet and growth factors. These growth factors have become common terms in bodybuilding circles. They are advertised as having the ability to supersize muscles.

Growth factors are produced by the body and are very involved in muscle building. They work with each other to help bring about the desired goal: well-defined, larger muscles. One of these growth factors is a substance called insulin-like growth factor 1 (IGF-1). IGF-1 stimulates growth. It has been found to promote bone growth in osteoporotic individuals, enhance the growth of children, and has been linked with preventing muscle wasting in the elderly.

Several tissues produce IGF-1. Muscles themselves produce it in response to resistance exercise. IGF-1 circulating in the blood is typically produced by the liver in response to an abundance of ingested protein. Nutrition is a main regulator of circulating IGF-1 levels. As an example of how food intake can regulate blood levels of IGF-1, studies show that fasting results in a dramatic decline in the liver's

production of IGF-1. This would make sense as it's time to survive, not grow, when food is scarce. Sufficient calories and protein are needed to restore IGF-1 levels after fasting. Researchers found that even the lowest protein intake will increase IGF-1 as long as enough calories are consumed in this situation. Another factor that affects IGF-1 production by the liver is animal protein. Higher animal protein intake has been associated with higher IGF-1 levels. This includes meat, eggs, and dairy, although carnivores typically do have the highest levels. Meat-eaters are found to have 9% higher levels of IGF-1 than vegans. Those eating dairy products have 8% higher levels. A study with 2,109 women from eight European countries found that those who ate the most fruits and vegetables had lower IGF-1 levels in comparison to those who did not consume much plant food.

The questions that beg to be asked in this context are: Does the lower level of IGF-1 found in plant-based eaters hinder muscle growth? Is it true that one must eat animal protein to achieve gains?

In the midst of all the opinion and advice out there on the topic of muscle enlargement, I would like to interject some information that is worth looking at. Muscle gain is not as easy as simply increasing IGF-1 levels. Neither postmenopausal women, nor young men who were working out saw an increase in muscle mass by being injected with IGF-1 for one year.¹ In other words, simply having higher levels of IGF-1 in the blood did not translate into big muscles. In contrast, a study conducted with rats found that when

IGF-1 was infused directly into the muscle it resulted in significant increases in the totally protein and DNA content of the muscle.² Remember, muscle produces IGF-1 in response to being overloaded. Could the IGF-1 produced by the muscle itself be a more significant player in muscle growth than the IGF-1 in the blood, produced by the liver, in response to protein intake? I ask this question after reading statements such as these found in the medical literature. “Locally acting isoform of IGF-1 targeted to skeletal muscle enhances muscle growth and differentiation, prevents age-related muscle atrophy, and potentiates regeneration after injury.”³ “It is likely that the growth promoting actions of IGFs occur at or very near the site of their formation.”⁴

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While IGF-1 has a very important role, there's a time to grow, and there's a time to refrain from growing. The problem that has been found with IGF-1 is that it does more than grow muscle. It also been implicated in growing cancerous tumors. A review of the published literature on the topic of IGF-1 and cancer development was conducted. It confirmed that raised circulating IGF-1 is positively associated with prostate cancer risk.⁵ Circulating IGF-1 has also been associated with an increased risk of other common cancers including premenopausal breast cancer and colorectal cancer. Apparently the higher the IGF-1 level the higher the risk of cancer.

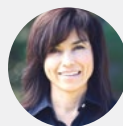
One has only to look at the bodies of professional vegan bodybuilders to know that muscle can be plant built. Their lifestyle and bodies prove that it is possible to develop the desired physique and performance without increasing the health risk associated with a meat-based diet. Torre Washington is a professional bodybuilder nicknamed “The Vegan Dread” for the way he eats and most likely his dreadlocks. Torre grew up a vegetarian and then in his own words, took his diet to the next level. He has been vegan for over 15 years. He has won numerous awards. Aussie bodybuilder Billy Simonds won the International Natural Bodybuilding Mr. Universe title in 2009 on a vegetarian diet. He turned vegan in 2010. Both men do not take steroids.

Interestingly, it has been found that though vegan men have lower IGF-1 levels, they have higher testosterone levels; more testosterone but less cancer.

Vegan and sedentary could be as deleterious a combination as carnivore and working out. While you don't want an excess of IGF-1, you don't want too little either. Lifting weights—gradually overloading muscles—will contribute to an optimal amount. Whether for strength, aesthetics, or performance, no matter how old, muscle building is achievable. Muscles that have been overloaded require sufficient protein to repair and grow. Shortly after working out, feed your body with good nutrition to ensure the building blocks and energy needed.

Adaptation to heavy and then heavier loads is a gift from God. No matter how weak you may feel in any given area of your life—whether it's the muscle of your legs or the strength of the will—know that you can become stronger. If gradually you are increasingly flexed, you will be built up. The process of struggling under being overloaded may not seem initially pleasant, but in the process we have the faithful One who has promised, “I will strengthen you; yes I will help you, I will uphold you” (Isaiah 41:10, NKJV). 🍀

1. A. Friedlander, G.E. Butterfield, et al., “One year of insulin-like growth factor 1 treatment does not affect bone density, body composition, or psychological measures in postmenopausal women,” <http://www.ncbi.nlm.nih.gov/pubmed/11297574>.
2. Bryan Hypertrophy, “IGF-1 and Skeletal Muscle Hypertrophy,” <https://thinksteroids.com/articles/igf-1-skeletal-muscle-hypertrophy/>.
3. P. Anversa, “Aging and Longevity,” *Circulation Research*, 2005;97:411-414, <http://circres.ahajournals.org/content/97/5/411.full>.
4. R. Utiger, “Insulin-like growth factor,” *Encyclopædia Britannica*, <http://www.britannica.com/science/insulin-like-growth-factor>.
5. M.A. Rowlands, et al., “Circulating insulin-like growth factor peptides and prostate cancer risk: a systematic review and meta-analysis,” *Int J Cancer*, 2009 May 15;124(10):2416-29.



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