High Reps vs. Heavy Weights: Which Is Better For Muscle Growth?

“Everyone wants to be a bodybuilder, but no one wants to lift heavy-ass weights!”

Ronnie Coleman

Muscle growth is a complex process; professional bodybuilders are divided into two camps: the light weight, high-rep camp and the heavy weight. In order for a muscle to grow, muscle overload must occur with resistance exercise; no argument there, however several books have advocated high-rep exercises to stimulate muscle growth. The best example, the 50-rep squats to blast leg muscle, is a commonly used method. The most famous bodybuilder advocating high reps for muscle growth was Tom Platz; he was famous for sets with reps of 20 to 30 in the squat. A small reminder, ***Platz was known to squat 500 pounds for over 30 reps!!!*** Proponents of the high-rep training claim that high reps increase blood flow, which enhance

nutrient delivery, cause massive increases in nitric oxide and greater muscle pumps, which stimulate muscle growth.

Vascular Occlusion With Light Weight Produces Muscle Hypertrophy

It was previously thought that only performing resistance exercise at a load greater than 65 percent was enough to stimulate muscle growth. However, some recent studies have reported that muscle tension is not the only way to produce muscular hypertrophy. For instance, a low-intensity (~50 percent 1 RM) resistance training performed with leg extensions caused a marked increase in muscular size [~12 percent gain in muscle size and strength (~20 percent gain) when combined with moderate vascular occlusion.[8] The effects of these exercise training regimens with restricted muscular blood flow are likely mediated by the following processes: 1) stimulated secretion of growth hormone by intramuscular accumulation of metabolic byproducts, such as lactic acid [10]; 2) moderate production of free radicals and tissue damage promoting tissue growth [9]; and 3) additional recruitment of fast-twitch fibers in a hypoxic (low oxygen) condition. [11]

These studies suggest that the muscle mass-building effects of resistance exercise involves not only muscle tension (weight) but also metabolic, hormonal and neuronal factors.

Higher repetition exercises has been shown to increase testosterone, growth hormone (GH) and insulin-like growth factor 1 (IGF-1). [1,2,3,4]

You will definitely feel a greater muscle burn with a lighter weight and feel more pumped, but does a light weight, high-rep program such as the 50-rep squat routine lead to greater muscle growth?

Light Weight Exercise vs. Heavy Weights: Which Is Better?

Researchers tested a light-weight protocol and a heavy resistance exercise program to determine if light weight programs with lots of reps can stimulate muscle growth. Researchers took 12 healthy young men and made them perform 12 weeks of resistance exercise on a leg extension machine; they performed three workout sessions per week. A total of 10 sets was assigned to two groups:

A.) One leg with light weight; 36 repetitions per set (15 percent of 1 RM)

B.) The other leg with heavy weight; 8 repetitions per set (70 percent of 1 RM)

Here is what's really interesting; even though they performed different rep ranges, both groups ***performed the same workout volume***
. The good thing about this study is that the subjects served as their own controls, so they were not being compared to other people.

Heavy Resistance Exercise Beats Light Weight, High-Rep for Muscle Size

At the end of 12 weeks, the cross-sectional size or muscle growth of each leg demonstrated increases in muscle size, but ***the heavy resistance group demonstrated greater gains in muscle mass.*** [5] The heavy resistance exercise group demonstrated a 7.6 ± 1.4 percent gain in muscle mass while the light weight group gained 2.6 ± 0.8 percent. The heavy resistance training group also gained greater increases in muscle

strength as well. The study shows that light weight/high-rep routines do increase muscle mass, but just not to the same extent as heavy resistance exercise.

Despite getting a good muscle pump, you are not going to grow like loading up the bar with some iron! When I read this study, I remember an episode of ***NO BULL RADIO*** where Dave and John were discussing, “Who was the strongest bodybuilder ever?” Several names were mentioned: Johnnie Jackson, Dorian Yates and Greg Kovacs. Flex Wheeler set the record straight: “Ronnie Coleman was the strongest bodybuilder ever...period!” Is it any coincidence that as heavy as Ronnie trained, he also racked up eight Mr. Olympias? No high-rep training for Ronnie, only heavy weights!!

Muscle Hypertrophy Without Increases In Acute Anabolic Hormones

Another interesting finding was that ***increases in muscle hypertrophy occurred without increases in circulating anabolic hormones.*** This finding of increases in muscle growth without changes in circulating levels of anabolic makes one question: How important are the acute anabolic hormone responses to exercise? When I first started studying exercise endocrinology, I thought that the workouts that caused the greatest increase in anabolic hormones had to increase muscle mass. Current research shows that acute anabolic hormones responses are important, but are not the Holy Grail for increasing muscle size. Remember, endurance exercise can produce considerable increase in GH and testosterone in response to exercise, yet they don’t produce muscle hypertrophy. Powerlifters demonstrate significant muscle size yet the typical powerlifting workout produces low anabolic hormone responses. Previous studies have shown that ingestions of whey protein before exercise blunted testosterone and GH responses,
[6]

but many studies suggest that pre-exercise protein supplementation is essential for increasing muscle mass. I would not miss a pre-exercise whey protein shake in hopes of a better acute testosterone response.

Muscle Tension May Be More Important Than Acute Hormone Responses

This research also is in conjunction with researchers at the Exercise Metabolism Group at McMasters University who recently reported that muscle hypertrophy took place without acute increases in anabolic hormone concentrations.[7] Ten healthy young male subjects performed unilateral resistance training for eight weeks (three days/week). Unilateral resistance exercise is basically where you train one leg, while the other leg is used as a control or untrained muscle. Exercises performed in the study were knee extension and leg press performed at 80-90 percent of the subject's single-repetition maximum (1 RM). Blood samples were collected before, immediately after, 30, 60, 90, and 120 minutes post-exercise. The first training bout and following the last training bout were analyzed for total testosterone, free testosterone, GH and insulin-like growth factor-1, along with other hormones. Thigh muscle cross-sectional area of the (vastus lateralis) was measured pre- and post-training.

Acutely, no changes in GH, testosterone, or IGF-1 concentrations were observed in the 90 minutes following exercise and there was no influence of training on the anabolic hormones measured. GH did show a moderate increase 30 minutes post-exercise, but returned to baseline values by 90 minutes. Training-induced increases in muscle hypertrophy were observed in type IIb and IIa muscle fiber. No changes were observed in muscle size in the untrained leg. ***In conclusion, unilateral training induced local muscle hypertrophy only in the exercised limb, which occurred in the absence of testosterone, GH or IGF-1-circulating levels*** . The moral of the story, don't get so caught up in the acute anabolic hormone response that you limit your poundage.

A light weight, high-rep protocol does produce muscle hypertrophy, but light weight, however heavy resistance exercise produces greater muscle mass gains. Muscle "burn" does not stimulate growth; overload stimulates growth. "Muscle pumps" and "feeling the burn" are not really what building muscle is about, nor is it a good indicator of muscle growth, as the study demonstrates. You can get a good "burn" by doing 20-30 repetitions; however, training at that rep range does not efficiently overload the muscle. The bottom line of the study is that training loads less than 70 percent of a 1 RM are not going to induce significant gains in muscle mass or strength. High-rep training may be good for muscle pumps but not good for increasing muscle size or strength.

Key Points:

Ø Light weight, high-repetition workouts do not stimulate muscle growth effectively; heavy resistance exercise is a greater stimulator of muscle growth.

Ø Muscle hypertrophy occurred despite increases in anabolic hormones; muscle growth factors (IGF-1, MGF) may be more important than the acute hormone increases.

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Breaking Research Update: GH INCREASES SERUM IGF-1 BUT NOT MUSCLE IGF-1 LEVELS or MGF!

Proponents of high-rep training advocate that the larger increases in GH stimulate IGF-1, which makes it more important for muscle growth. Researchers from London reported disappointing results on the anabolic effects of GH for promoting muscle growth. The anabolic actions of GH has been previously been thought to be mediated by increases in IGF-1. The researchers took seven young, healthy men (average age of 24 years old) and gave them injections of GH (.075 IU kg per day) or a placebo for two weeks and performed a bout of resistance exercise. The subjects completed 10 sets of six lifts of a weight equivalent to 80 percent of their 1-RM. Two minutes rests were given between each bout of 10 repetitions. The main finding was that two weeks of ***GH administration resulted in a significant increase in circulating IGF-1, but did not affect the expression in skeletal muscle of muscle IGF-1 or MGF expression.***
In conclusion, the study shows that the regulation of IGF-1 by GH differs in muscle and liver. ***Although GH markedly increases IGF-1 circulating levels, two weeks of GH administration did not upregulate skeletal muscle IGF-1 mRNA in young males with***

normal GH endocrinology.
Perhaps a larger dose may have had a different effect. GH as a muscle builder has been disappointing; the fact that GH increased serum but not muscle IGF-1 or MGF may be the reason why.

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