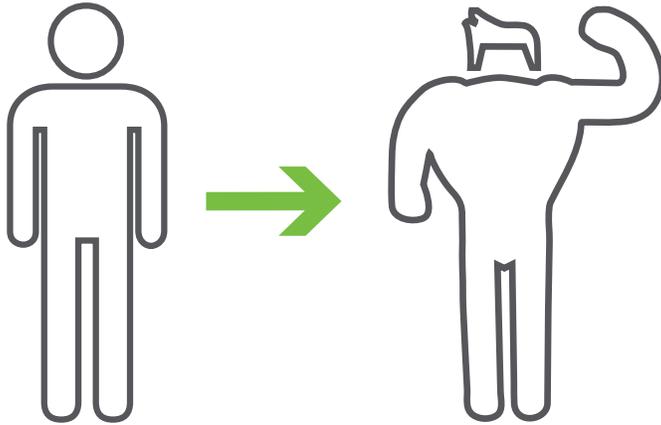


# TRAINER TIPS | HYPERTROPHY



## HYPERTROPHY

Increase in the size of a muscle, or its cross-sectional area attributed to an increase in the size and/or number of myofibrils (actin and myosin) within a given muscle fiber



INCREASED MUSCLE MASS

INCREASED STRENGTH POTENTIAL

INCREASED RESTING METABOLIC RATE  
*(Burn more fat at rest)*



### HOW IT'S DONE

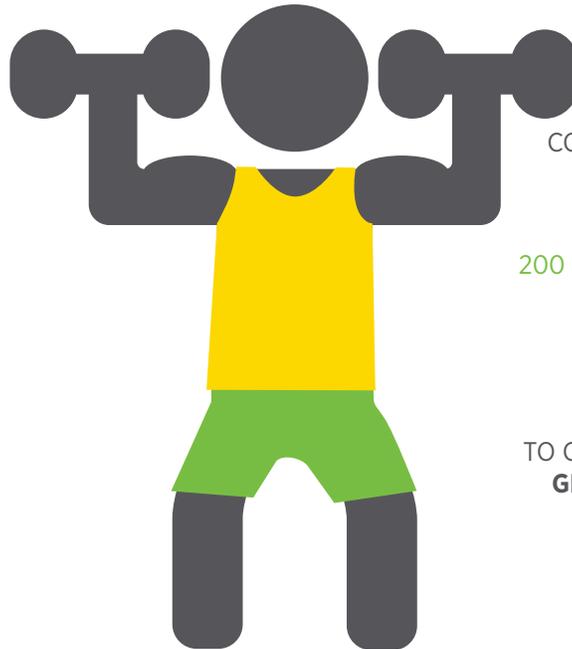


### WHAT ELSE CAN I DO

LIFTING WEIGHTS WITH MULTIPLE SETS OF 6-12 REPS AND 1 MIN. REST FOR THE SAME MUSCLE GROUPS CREATES MUSCLE DAMAGE



BODY REPAIRS DAMAGE BY INCREASING MUSCLE SIZE. SAME AMOUNT OF WORK WON'T CAUSE SAME DAMAGE IN THE FUTURE



CONSUME 1.2 - 2.0 GRAMS OF PROTEIN PER KILOGRAM BODYWEIGHT

1 lbs = 0.5 kilograms (kg)  
200 lb = 100 kg \* 1.2 - 2.0 grams of protein



A **200 LB PERSON** WOULD NEED TO CONSUME APPROXIMATELY **120 - 200 GRAMS OF PROTEIN** TO MAXIMIZE THE INCREASE IN HYPERTROPHY

### WHAT IS HYPERTROPHY?

Muscle hypertrophy (known simply as hypertrophy) is an increase in the size of a muscle, or its cross-sectional area attributed to an increase in the size and/or number of myofibrils (actin and myosin) within a given muscle fiber. Muscle hypertrophy occurs in both type I and type II muscle fibers but to a greater extent in type II muscle fibers (Weir & Brown, 2012).

### THE BENEFITS OF MUSCLE HYPERTROPHY

There is a strong correlation between muscle cross-sectional area and muscle strength (Schoenfeld B. J., 2010). This means that more muscle mass creates greater potential for developing maximal strength.

In addition to greater strength potential, resistance training and muscle hypertrophy have a positive effect on body composition, addressing two of the three factors that comprise energy expenditure; resting metabolic rate (RMR), physical activity, and the thermic effect of food. Resistance training causes an increased energy expenditure not only during exercise but in the 24-48 hours following activity. Additionally, fat-free mass accounts for approximately 65-70% of an individual's RMR; increasing an individual's muscle mass results in an increased RMR (Spano, 2012).

Body composition is measured as percentage of fat-free mass to fat mass. An individual's percent body fat can be decreased (improved) by inducing hypertrophy.

### INDUCING MUSCLE HYPERTROPHY

The three primary factors that induce a hypertrophic response in the body include mechanical tension, muscle damage, and metabolic stress. The degree of mechanical tension from a resistance training session is primarily determined by intensity (amount of weight lifted) and time under tension (duration of the applied load). Resistance training that creates an overload situation causes muscle damage and an inflammatory response, potentiating the release of various growth factors. Metabolic stress arises from training programs that rely heavily on the anaerobic system, decreasing the pH level and causing muscle fiber degradation (Schoenfeld B. , 2011).

While there are a number of ways to induce hypertrophy in the weight room, it seems that employing multiple sets with moderate loads (6-12 reps, 65-85% 1RM) and rest periods (60 seconds) creates the greatest elevation of testosterone and growth hormone (primary anabolic hormones); compared to heavy loads (1-5 reps, >85% 1RM) with long rest periods (2-5 minutes) and light loads (12+ reps, <65% 1RM) with short rest periods (30 seconds) (Schoenfeld B. J., 2010).

Muscular tension, damage, and metabolic stress cause an anabolic response, stimulating recovery to get the body back to homeostasis and ultimately supercompensation. Supercompensation refers to increasing the body's ability to manage the training stress. Simply stated, the body will repair itself above and beyond its previous ability so that the same workout will not cause the same amount of damage. In order to cause continual positive adaptations, a training program needs to systematically progress by modifying exercise variables (frequency, intensity, volume, rest periods, exercise selection). Regarding hypertrophy, overall training volume is the most commonly adjusted variable.

Sleep and nutrition each play a role in recovery and ultimately the body's ability to undergo supercompensation. The body uses sleep to repair damaged tissue and can play a vital role in hypertrophy. Research shows that 7-9 hours of sleep usually suffices for those participating in intense activity like resistance training (Kubitz, Landers, Petruzzello, & Han, 1996). Nutrition, specifically protein, provides the resources necessary to repair the damage done to muscles during resistance training. The general recommendation for recovery from intense activity is 1.2-2.0 grams per kilogram of bodyweight per day (Spano, 2012).

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