TRUTH AND LIES ABOUT BUILDING MUSCLE: 10 MUSCLE MYTHS DEBUNKED BY SCIENCE

To help you separate fact from fiction, I've taken a closer look at ten muscle myths that are still widely believed, even though there's overwhelming evidence to the contrary.

MYTH 1: MUSCLE SORENESS MEANS MUSCLE GROWTH

Most people think that sore muscles after a workout are a sign that you've stimulated muscle growth, and that more soreness equals faster muscle growth.

But while sore muscles might make you feel good, it doesn't necessarily mean that your workout has been effective at stimulating muscle growth.

What causes sore muscles after a workout? Well, it has nothing to do with lactic acid or lactate. In fact, most of the lactate is gone from your muscles soon after exercise.

A tough workout, or even just a single exercise that you haven't done before, leads to a bout of inflammation — the same defense mechanism that causes swelling and pain if you cut your finger.

Inflammation is the way that your body handles an injury. And as part of the repair and recovery process, your body ramps up the production of immune cells.

These cells then produce substances that make certain nerve endings in your body more sensitive [1]. When you move, these nerves send signals to the brain, which then creates the perception of soreness.

In fact, pain appears to be an output constructed *by the brain* as opposed to an input *to the brain* as was once believed.

The nerve fibers that transmit pain are located mainly in the connective tissue found between muscle fibers, as well as the junction between the muscle and tendon.

In other words, the source of the pain appears to be the connective tissue that helps to bind muscle fibers together, rather than the actual muscle fibers themselves.

A lot of people like to use muscle soreness as a marker of recovery, and assume that when the soreness goes away, the damage has been repaired and the muscle has recovered.

However, muscle soreness is not generally a good indicator of exercise-induced damage [3].

An increase in muscle soreness doesn't necessarily reflect an increase in muscle damage. Conversely, a decrease in muscle soreness is not always indicative of less muscle damage.

In one study, a post-exercise bout of foam rolling led to a decrease in muscle soreness [28]. But contrary to what you might expect, this reduction in muscle soreness was accompanied by an *increase* in markers of muscle damage.

There is also a large degree of variability in the individual damage response to exercise.

In fact, there seems to be a population of "high responders" to eccentric exercise [29]. These people lose more strength after a workout, take longer to recover as well as experiencing a greater degree of muscle soreness.

Muscle soreness is nothing more than a sign that you did something your body wasn't used to, or performed an exercise that just so happens to trigger more soreness than others.

The fact that you're not sore doesn't mean your muscles aren't growing. Likewise, sore muscles don't necessarily translate into faster growth.

MYTH 2: LIFTING HEAVY IS THE ONLY WAY TO BUILD MUSCLE

Contrary to a lot of the training advice out there, you can and will gain muscle using higher reps.

A good example comes from research comparing the effect of high and low reps on muscle growth [5].

Subjects in the study trained their legs three times a week for 10 weeks, using one of three different set and rep configurations:

- 1 set of 10-12 reps performed to voluntary failure
- 3 sets of 10-12 reps performed to the point of fatigue
- 3 sets of 30-40 reps performed to the point of fatigue

After 10 weeks, the high reps and light weights (3 sets of 30-40 reps) stimulated just as much muscle growth as heavy weights and low reps (3 sets of 10-12 reps).

The average size of both type I and II muscle fibers increased equally with heavy and light loads, meaning that both fiber types were recruited during training.

Of course, these are the results from just one study. As I've explained in The Sherlock Holmes Guide to Separating Fitness Fact from Fiction, drawing conclusions about anything from the findings of one study is never a good idea.

However, it's not a single, lone piece of information that contradicts a large amount of existing research on the subject, and there are plenty of other studies out there showing multiple benefits of high rep training.

Slow-speed training (6 seconds per rep) with a light weight increases both muscle size and strength to a similar degree as normal-speed training (2 seconds per rep) with a heavy weight [6].

Light training (not done to failure) also stimulates protein synthesis in connective tissue just as well as heavy training, giving it a role during injury rehabilitation to improve regeneration of connective tissue [7].

If you want to add muscle mass as fast as your genetics will allow, lifting heavy weights should still be the main focus of your training.

But the addition of some high rep work to a program that already includes heavier training is a great way to get bigger and stronger.

MYTH 3: CREATINE CAUSES HAIR LOSS

Rather than calling this a myth, it's more of a highly speculative theory that hasn't been adequately tested.

Much of the concern about creatine and hair loss comes from a 2009 study showing that creatine raises levels of a hormone called DHT in a group of college-aged rugby players [9].

DHT levels rose by over 50% after a week of creatine loading (25 grams of creatine per day). They remained 40% above baseline after two weeks on a lower maintenance dose (5 grams of creatine per day).

High levels of DHT seem to play a part in male-pattern baldness, and have been linked with a higher rate of hair loss in those who are sensitive to its effects [10].

Based on these findings, Examine.com, one of the most popular sources of evidence-based information on supplements, reports that creatine "may increase the rate of balding in men with male-pattern baldness."

However, saying that there "may" be a link between creatine and male-pattern baldness is just another way of acknowledging that the possibility exists, but you don't really know for sure one way or the other.

It's an interesting study. But it does leave us with more questions than answers.

First off, have the findings been replicated? In other words, have other researchers repeated the study and got the same set of results?

One study by itself is not really news. It's only when you get several studies showing the same thing, ideally from different scientists acting independently of each other, that it's worth sitting up and paying attention.

Unfortunately, I could find no follow-up studies to look at the link between creatine and DHT. That doesn't mean they haven't been done, only that they haven't been published.

Second, the normal range for DHT in adult men ranges from 0.8 to 3.4 nmol per liter. In the rugby players, it ranged between 1 and 1.5 nmol per liter. So even though DHT levels rose by over 50%, they were still well within the normal range.

In other words, it's possible that the rise in DHT actually had nothing to do with creatine at all, and was part of the natural fluctuation in DHT levels that would have happened anyway.

Third, the rugby players used creatine for just three weeks. Where would DHT levels sit after three months? Or three years?

But that's not all.

Was the increase in DHT levels large enough to have an impact on hair loss? What was happening to DHT levels in the scalp, as it was only measured in the blood? The subjects taking part in the study were 18-19 years old – would we see the same results in older men?

The case for creatine increasing hair loss is not a strong one. You'd need to measure hair loss directly in a very large group of subjects taking creatine for a much longer period of time to get a better idea about what's really going on.

Myth 4: Your Workout Shouldn't Last More Than 45 Minutes

"Don't lift weights for more than 45 minutes," warn the exercise police.

"If you do, testosterone levels will plummet, cortisol levels will rise and you'll be sucked into a catabolic black hole from which you'll never escape."

The idea that you should stop training after 45 minutes because you reach some kind of hormonal "tipping point" is one of the most ridiculous things I've ever heard.

It's a claim that fails on a couple of levels, most notably the fact that it's not true. In fact, some workouts lasting more than 90 minutes have been shown to raise testosterone above resting levels for at least two hours *after* the workout has finished [13].

And even if it was true, the idea that the short-term hormonal response to training has a big impact on muscle growth is something that's been called into question in recent years.

In one study on the subject, researchers analyzed data collected from 56 healthy (but untrained) young men who took part in a 12-week resistance training program [14].

If the post-exercise change in testosterone levels was important as far as building muscle is concerned, guys with the largest testosterone response after training would build the most muscle. And those with the smallest response would build the least muscle.

But when they looked at the data, the researchers could find no significant link between the exercise-induced rise in testosterone levels and gains in muscular size or strength.

What about cortisol?

Cortisol is generally considered a "catabolic" hormone that you should take all possible steps to avoid. If the post-exercise rise in cortisol was putting the brakes on muscle growth, you'd expect to see men with the largest rise in post-exercise cortisol gaining the least amount of muscle.

Instead, the opposite was true. There was a weak but significant link between the rise in cortisol and gains in lean body mass, as well as the growth of the type II muscle fibers.

In other words, subjects with the biggest rise in cortisol levels were also the ones who gained the most muscle.

Drilling further down into the results, subjects in the study were also divided into responders (men who built the most muscle) and non-responders (those who built the least muscle).

And the hormonal responses of those who made the fastest gains in size and strength were not significantly different to those who made the slowest gains.

Or to put it another way, the hormonal response of subjects in the top 16% in terms of muscular gains were no different from those in the bottom 16%.

So why are people saying that 45-60 minutes is as long as your workout should last?

The idea seems to have originated with Bulgarian Olympic lifting coach Ivan Abadjiev. Over a 20-year period, Abadjiev turned a weightlifting team that struggled to win anything into one that won numerous European, World and Olympic titles.

Rather than train once a day for several hours at a time, the Bulgarians would train numerous times both in the morning and in the afternoon, with each training session lasting from 30 to 45 minutes.

The protocol was based on Abadjiev's claim that elevated blood testosterone levels could only be maintained for between 30 and 60 minutes, with the average being 45 minutes.

Whether or not he actually believed this himself is hard to say. Nicknamed "the Butcher" for the extreme level of dedication and commitment he demanded from his athletes, Abadjiev's need for control was so vast that he once had a rebellious pupil sent to the military to work from dawn to dusk in a stone quarry.

Keeping them in the gym all day may have had a lot less to do with testosterone than it did with imposing discipline and control on his athletes.

Many of the principles employed by the Bulgarians were popularized in a book published in the early 1990's called *The Bulgarian Power Burst System*. Later editions had different titles, such as *Big Beyond Belief*.

The book sold thousands of copies via its famous "I've got to get this off my chest before I explode" advertisement, and became one of the most successful self-published bodybuilding guides of all time.

It went on to influence a number of writers, many of whom simply regurgitated the fictitious "testosterone levels drop after 45 minutes of lifting weights" advice before checking whether or not it was actually true.

That's not to say you can or should be training for hours on end. Plenty of people are wasting much of their remaining time on this planet doing endless sets of pointless exercises.

But cutting your workout short simply because you've been in the gym for 45 minutes makes absolutely no sense at all.

MYTH 5: EVERY EXERCISE SHOULD BE TAKEN THROUGH A FULL ROM

You've probably been told that if you want your muscles to grow, all the exercises you do should be taken through a full range of motion (ROM).

Going from "full stretch" to "peak contraction" is necessary to stimulate the maximum amount of growth in the shortest possible time. Anything less is cheating, and you might as well just not bother.

Do you need to use a full ROM on every exercise?

That depends a lot on you and how you're built. Not everyone is put together in a way that allows them to perform a full ROM without some kind of compromise to their form that exposes them to an increased risk of injury. In fact, you may very well be better off using a shorter ROM on certain exercises.

Let me explain why.

Consider the example of two different lifters – Mr Long Arms and Mr Short Arms – performing the bench press. Both lifters start with their arms straight. They lower the barbell so that it touches their chest before returning it to the start position.

Mr Long Arms and Mr Short Arms have both performed the bench press through what most people would consider a full ROM. But there are some important differences.

Firstly, Mr Short Arms has done less work than his long-armed counterpart.

The amount of work performed during a given exercise is normally calculated by multiplying the amount of weight on the bar by the number of sets by the number reps (weight x sets x reps).

So if you were to bench press 200 pounds for 2 sets of 10 repetitions, the total amount of work done is 4000 pounds (200 x 2 x 10 = 4000).

But measuring work in this way doesn't tell the whole story. Why not? Because it doesn't include the distance traveled by the bar.

"Consider two individuals who are tasked with lifting 200 pounds in the bench press," explains Matt Brzycki. "Because of lever lengths and body proportions, suppose that Lifter A has to move the weight a distance of 20 inches and Lifter B has to move the weight 22 inches.

"Since work is defined as force (or weight) times distance, Lifter A must do 4,000 inch-pounds of work [20 inches x 200 pounds] and Lifter B must do 4,400 inch-pounds of work [22 inches x 200 pounds] to lift the weight. In other words, Lifter A doesn't need to make anywhere near as much effort as Lifter B to lift the same weight."

Next, think about what's happening to your shoulders.

If you have long arms and a small rib cage, bringing the bar all the way down to your chest means that your shoulders have to go a lot deeper into extension than someone with short arms and a large rib cage.

This can be very hard on your shoulders. Done often enough with a heavy weight, it could lead to a rotator cuff injury that keeps you out of the gym for some time. At the very least, you might find it impossible to perform the bench press without pain in your shoulders.

Mr Long Arms may be better served by wrapping a barbell pad around the bar. This is a bit of foam padding that's normally used to prevent neck pain during the squat. It will shave off an inch or so from the bottom of the movement, preventing his shoulders from going too far into extension.

He could also try the decline bench press or even the floor press, both of which involve a much shorter ROM than the flat bench press.

There have been a number of studies over the years to compare partial with full ROM training. With few exceptions, most studies show that full ROM delivers superior gains in both size and strength [11, 12].

However, these studies have used a partial ROM that is only 25-50% of a full ROM. They don't compare a full ROM with an "almost full" ROM.

It's far better to modify an exercise so that you stop an inch or two short of a full ROM than to use 100% ROM all of the time and end up injured because of it.

This doesn't mean that you're cheating. You're just making intelligent training decisions designed to keep your joints strong and healthy.

MYTH 6: YOUR MUSCLES NEED TO BE CONFUSED TO GROW

The concept of "muscle confusion" is based on the idea that you "keep your muscles guessing" by constantly introducing new exercises and routines.

By continually mixing things up, your body is forced to respond. The plateaus you get with regular training programs are avoided entirely, putting you on the path to rapid muscle growth.

Or so the theory goes anyway.

The two main factors that stimulate muscular growth are progressive tension overload and, to a lesser degree, metabolic fatigue. While doing a different exercise might leave you feeling sore the next day, it won't automatically "shock" a muscle into growth.

Despite the popularity of this idea, the simple fact that your muscles are sore a day or so after a workout doesn't mean that they're going to grow any faster, and there is no proven link between muscle soreness and long-term muscle growth [15].

In fact, beginners can make great progress simply by sticking with the same program for long periods of time and simply adding weight to the basic exercises each workout.

Beginners can train each muscle group more frequently than someone with a few years of training under their belt. That's because they can't recruit as many muscle fibers in each workout, don't create as much muscle damage, and so can recover more quickly.

When you try a new exercise, you'll tend to get stronger relatively quickly. But this isn't because you've suddenly gained a lot of new muscle.

Instead, the reason people make rapid improvements in strength with a new exercise is that their nervous system gets better at recruiting muscle fibers.

In other words, when you change exercises, any increase in strength has more to do with the fact that your body is using more of the available fibers in a muscle. It's not because the fibers themselves have got any bigger.

The more advanced you get, the more variety you'll need in terms of sets, reps and load in order to keep on gaining strength and adding muscle.

However, this has nothing to do with “confusing” your muscles. Rather, it has everything to do with getting the balance right between work and recovery so that you can continue to get stronger.

As an example, on Monday you might do 5 sets of 5 repetitions with a heavy weight, a few lighter sets of 15 on the Wednesday and moderately heavy sets of 10 reps on the Friday.

You can even take things a step further and use different exercises on different days.

Using the chest as an example, you could do the flat bench press on Monday (heavy day), incline presses on Wednesday (light day) and dumbbell presses on Friday (medium day).

This variation in sets, reps and exercise selection is not there to “confuse” your muscles. It’s designed to vary the stress imposed on your body to allow for recovery while still providing a sufficient stimulus for growth.

Muscle confusion might sound like a great idea in theory, but don’t let it distract you from what really matters. You don’t need to change your workout every week to confuse your muscles into getting bigger.

If there is a “secret” to building muscle, it’s simply to keep on getting stronger in the 5 to 15 repetition range on a few basic exercises for each major body part.

MYTH 7: YOU CAN GAIN 30 POUNDS OF MUSCLE IN 4 WEEKS OR LESS

Everywhere you turn, it seems that people are making outrageous claims about how fast you can build muscle.

You see a book that promises gains of 18 pounds in just two weeks. Then you hear about a strength coach who claims that he put on 14 pounds of muscle in 5 days. One famous author went as far as claiming that he gained 34 pounds of muscle in 28 days with just two 30-minute workouts per week.

Pick up any of the popular fitness magazines and you'd be forgiven for thinking that building muscle is the easiest thing in the world.

There's conflicting advice coming at you from here, there and everywhere, and you can't figure out who, or what, to believe.

So how fast is it possible to build muscle?

The honest answer is I have no idea. And neither does anyone else. Muscle growth varies so much from person to person that it's almost impossible to predict in advance how much muscle you'll gain over a given period of time.

The variable that has the biggest impact on your rate of muscle growth is the one that you can't do a damn thing about — your genetics.

Like it or not, some people build muscle very quickly, and will see impressive results after only a few months. Others, however, seem to make little or no progress at all.

In one study, a group of identical guys (diet, training age, compliance, age, muscle mass) lifted weights for 12 weeks [22].

When the researchers looked at the results of the men who built the most muscle (high responders) and those who built the least muscle (low responders), they found roughly four times greater gains in muscle in the high versus the low responders.

Or to put it another way, you and a friend of a similar build could follow exactly the same training program and diet for the next three months.

But individual variations in the rate of muscular growth mean that he might gain 10 pounds of muscle. You, on the other hand, might gain just half that amount.

Research also shows a wide range of strength gains even in people following the exact same training program [23].

Subjects were grouped into high responders (those who made greater than 20% strength gains), medium responders (10-19% gains) and low responders (less than 10% gains).

There was an average increase in strength of 29% for high responders, 14% for medium responders and 3% for the low responders.

In other words, some people respond extremely well to strength training. Some will get "good but not great" results. Others will see almost no results at all.

Yes, I know it sounds like a bit of a cop out to point the finger at "bad genetics" when it comes to explaining away your slow rate of progress.

In many cases, a poor training program and diet are equally to blame for the fact that you've gained no new muscle since the Bush administration.

But like it or not, the fact remains that there are genetic factors outside your control that affect how fast you can build muscle, as well as the maximum amount of muscle you can expect to gain naturally.

And unless you're willing to have your genes tampered with by a renegade scientist, there's not a single thing you, me or anyone else can do about it.

MYTH 8: YOU SHOULD ALWAYS SQUAT ASS-TO-ANKLES

Few subjects divide opinion more than how deep you should go when you squat.

On the one hand, you have people saying that you should go to parallel or slightly below. What this means is that when seen from the side, the crease of your hip should be slightly below the level of your knee.

Others will tell you to squat ass-to-ankles, which basically means as low as you can get.

If you can't get that low then there is some kind of "dysfunction" that needs addressing. Most people had this range of motion as a child, they point out, and it's possible to recover this with practice.

Both are wrong.

Squat depth is important, but so is good form. With very few exceptions, you should squat no lower than the point where you lose the arch in your lower back.

If your spine repeatedly flattens out and loses its natural curvature with a heavy barbell across your shoulders, you're doing more than just inviting trouble. You're rolling out the red carpet and asking him to move in.

Your ability to maintain a neutral spine during the squat depends on a number of factors, including the strength of the muscles around the hip, the flexibility of the hip and knee joint, as well as the relative lengths of your torso and thighs.

If you have relatively long thighs, for example, you'll have to shift your weight back by leaning forward as you squat. Combine this with a lack of flexibility in the hip area, and you'll find it very difficult to hit parallel without losing the arch in your lower back.

Some people will tell you that if it's not ass-to-ankles, or even to parallel, the squat won't make much of a contribution to gains in size and strength because it wasn't done through a full range of motion.

Many of these same people will then go on to recommend the deadlift as one of the best overall mass building exercises for the entire body. That's despite the fact there is not one muscle group that is taken through a full range of motion during the deadlift.

Unless you're training for a powerlifting contest, or to improve your performance in a sport where you need to be strong in a deep squat position, don't worry if you can't get to parallel or below.

Squatting slightly above parallel is still enough to make your legs bigger and stronger. In fact, studies show that bending the knees to 80-90 degrees is sufficient to achieve very high levels of muscular activity in the quadriceps [24].

However, it is important to have some kind of consistent point of reference that you can use to measure your progress. Don't delude yourself into thinking that you're increasing your strength when all you're really doing is decreasing your depth. Have a firm standard for what constitutes a squat, and stick to it.

MYTH 9: PROTEIN IS BAD FOR YOUR KIDNEYS

The idea that a high-protein diet puts "stress" on the kidneys they're unable to handle is something that people have been arguing about for years.

It dates back to the early 1980′s when Dr. Barry Brenner proposed a link between high protein diets and the progression of kidney disease.

It's true that a low-protein diet helps to prevent the deterioration in kidney function in patients with kidney failure [26]. That's because one of the main jobs of the kidneys is to remove the end products of protein metabolism from your body. They act a bit like a sieve, filtering out any unwanted substances in the blood and sending them to the bladder where they can be removed in the urine.

But the majority of scientific evidence cited by Brenner and his colleagues was generated from animal models and patients with existing renal disease. While protein restriction may be suitable for treating someone with existing kidney disease, there is no evidence to show that high protein intakes can lead to kidney damage in healthy individuals.

A study by Belgian researchers Jacques Poortmans and Oliver Dellalieux examined the diets of young male athletes to see if their high level of protein intake had any negative impact on kidney function [27]. One group consisted solely of bodybuilders, while subjects in group two took part in a variety of sports, such as cycling, judo, and rowing.

On average, the bodybuilders consumed about 3,900 calories and 169 grams of protein per day (0.9 grams per pound of body weight). Group two consumed around 2,600 calories and 99 grams of protein daily (0.6 grams per pound of body weight). Some of the bodybuilders consumed up to 1.3 grams of protein per pound of body weight.

Despite the high levels of dietary protein, blood and urine samples showed that all markers of kidney function were well within the normal range.

In a 12-month study of 68 overweight men and women, a low-carbohydrate diet providing around 130 grams of protein per day had no adverse effects on renal function compared to a high-carbohydrate diet providing roughly 85 grams of protein per day [20].

There were no significant changes in creatinine levels in the blood or estimated glomerular filtration rate, both of which are used to check how well the kidneys are working.

University of Connecticut researchers reached a similar conclusion when they reviewed years of research on the subject [19]. After trawling through dozens of studies on dietary protein and renal function, they found no research carried out on healthy individuals to demonstrate a clear link between increased dietary protein intake and a detrimental "strain" on the kidneys.

What's more, there are estimates that some of your Paleolithic ancestors consumed upwards of 230 grams of protein per day [18]. For someone weighing around 176 pounds, that works out at 1.3 grams per pound of bodyweight.

That's actually 30% higher than the typical "one gram of protein per pound of bodyweight per day for building muscle" figure that's been doing the rounds as long as I can remember.

Protein has formed a safe part of the human diet for many years, and there's no good reason to believe that this level of intake is unhealthy or unsafe.

MYTH 10: THERE IS A BEST TIME OF DAY TO EXERCISE

Everyone has their own theories and preferences about the "best" time of the day to exercise. Some people, such as 5-time Mr. Universe Bill Pearl, like to get up early and finish their workouts before dawn. Others prefer to exercise in the late afternoon or evening.

Measures of muscular performance, as well as hormones (like testosterone, cortisol and growth hormone) have their own unique rhythm or timing pattern, where there are low points and high points over the course of a day.

As a rule-of-thumb, most people feel strongest in the afternoon or evening. That's pretty much what most studies have found; muscle strength is at a low point in the morning and gradually improves until it peaks in the early evening.

When researchers looked at the effect of time of day on muscular performance, they found that subjects performed better in the evening, but only during the exercises that involved faster movements [17].

Why was performance greater during the faster, rather than the slower movements?

The activation of fast twitch muscle fibers — which are called into action when force requirements are high — is preferentially enhanced at a higher body temperature, which tends to peak in the early evening.

If your workouts involve a lot of strength- or power-based movements, chances are you'll perform a little better in the evening than you will in the morning.

But this doesn't apply to all forms of exercise. Performance during low-intensity steady-state (LISS) exercise (such as walking or cycling) isn't affected by the time of day [8].

It's also worth pointing out that there is a phenomenon known as temporal specificity, which means that muscular strength will adapt and be highest when tested at the time of day when training occurred [16]. Or to put it another way, consistently training in the morning will improve your performance in the morning.

If you want to get in shape and stay that way, exercise will need to be something you do most days of the week for the rest of your life. And there'll be times when you won't be able to match your circadian rhythms to your workout schedule, or set records every time you train.

Ultimately, the best time of day to exercise is the time of day that works for you. If you consistently exercise at a particular time of day, your body will adapt and that will eventually become the "best" time of day for you to exercise even if it wasn't at first [25].

It's a lot more important to work hard and be consistent than to waste time and energy second-guessing whether you're training at the "right" or "wrong" time of day.

SHAMELESS PLUG

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